

1926 Subpart L

Scaffolds

History

- Subpart L originally issued in December 1971
- Amendments during the first two years:
 - Planking grade
 - Overhead protection
 - Plank spans
 - Guardrails
- Complete review of Subpart L initiated in 1977

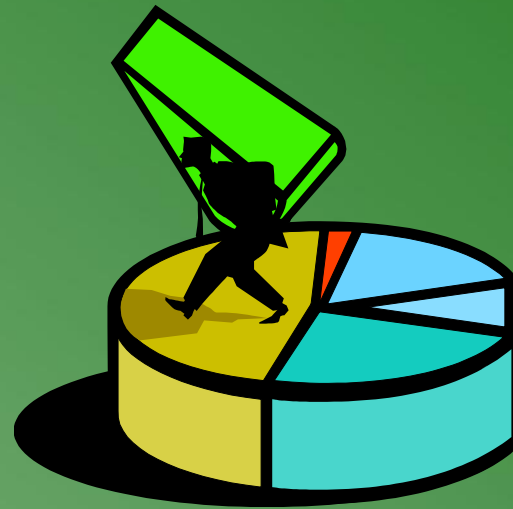
History

- Scaffold injuries and fatalities continue despite Subpart L provisions
- Almost 10,000 scaffold related injuries annually.
- Over 75 scaffold-related fatalities annually
- Advisory Committee on Construction Safety and Health (ACCSH) consulted on draft revisions



Need for Additional Regulation

- BLS statistics:
 - 72% of workers injured on scaffolds attributed accident to planking giving way, slips, or falling objects
 - 70% of workers learn safety requirements on-the-job
 - 25% received no training
 - Only 1/3 of scaffolds equipped with guardrails



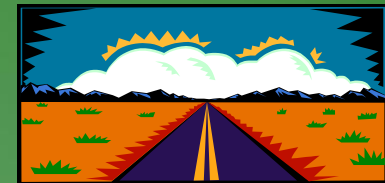
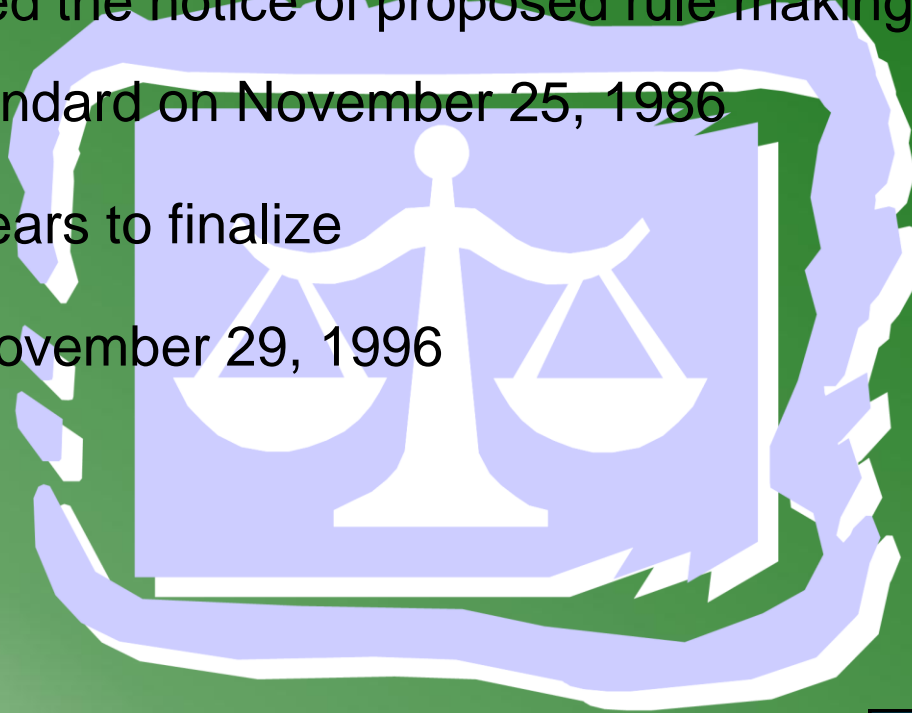
Need for Additional Regulation

- Scaffold related fatalities accounted for approximately 10% of construction fatalities
- OSHA determines revision of scaffold standard is necessary
- Estimates changes can save 50 lives and prevent 4500 injuries annually



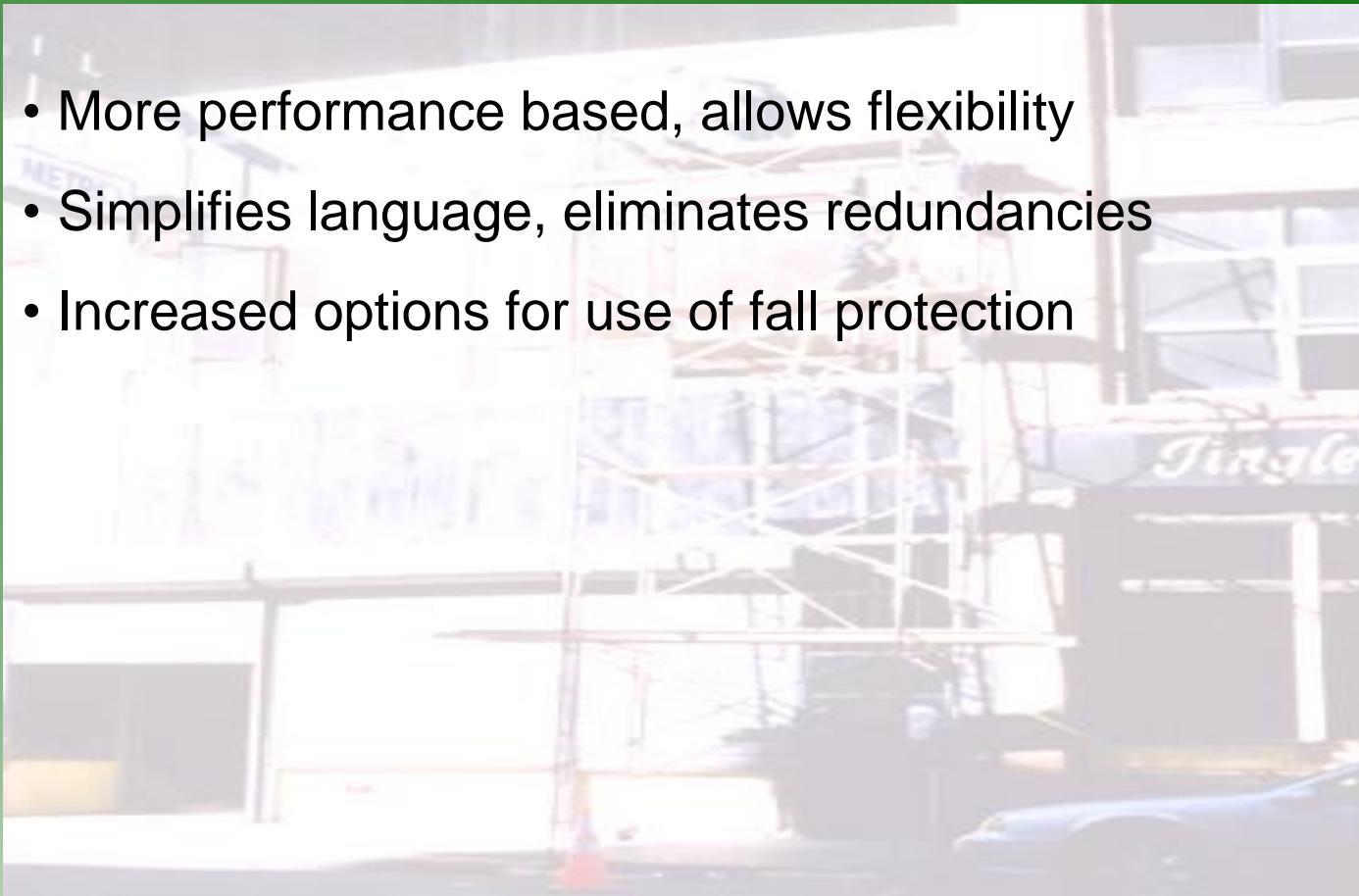
A long process

- OSHA issued the notice of proposed rule making for the updated standard on November 25, 1986
- It took 10 years to finalize
- Effective: November 29, 1996



Purpose of new standard

- More performance based, allows flexibility
- Simplifies language, eliminates redundancies
- Increased options for use of fall protection



Major issues resolved

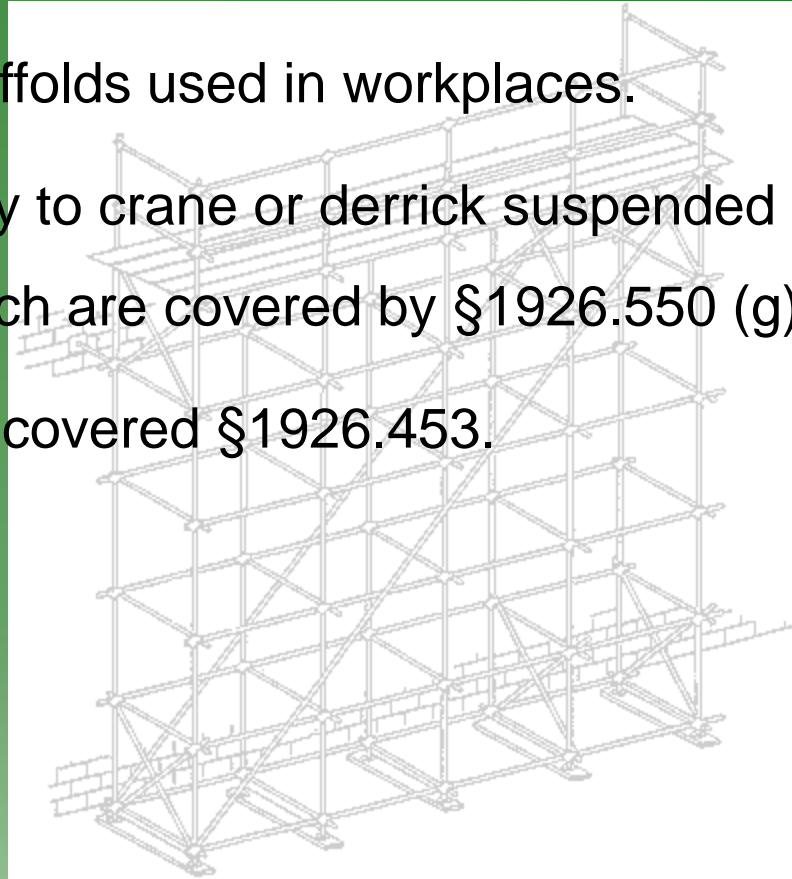
- Trigger height for fall protection 10 feet
- 38 inch guardrail height when primary FP
- 36 inch when guardrails required and fall arrest used (e.g.: suspended scaffolds)
- CP determines FP feasibility for erectors and dismantlers
- Crossbracing for guardrail per .451 (g)(4)(xv)

Organization of Standard

- 1926.450 Scope, application and definitions applicable to this subpart
- 1926.451 General requirements
- 1926.452 Additional requirements applicable to specific types of scaffolds
- 1926.453 Aerial lifts
- 1926.454 Training
- Appendix A - Scaffold Specifications
- Appendix B - (Reserved) Criteria for Determining the Feasibility of Providing Safety Access and Fall Protection for Scaffold Erectors and Dismantles
- Appendix C - List of National Consensus Standards
- Appendix D - List of Training Topics for Scaffold Erectors and Dismantlers
- Appendix E - Drawings and Illustrations

§1926.450 Scope, Application & Definitions

- Covers all scaffolds used in workplaces.
- Does not apply to crane or derrick suspended personnel platforms, which are covered by §1926.550 (g).
- Aerial lifts are covered §1926.453.



Scaffold Competent Person

- Preamble - page 46059
 - Knowledge of structural integrity
 - Maintenance of scaffolds
 - Effects of potential hazards
 - Knowledge of standard



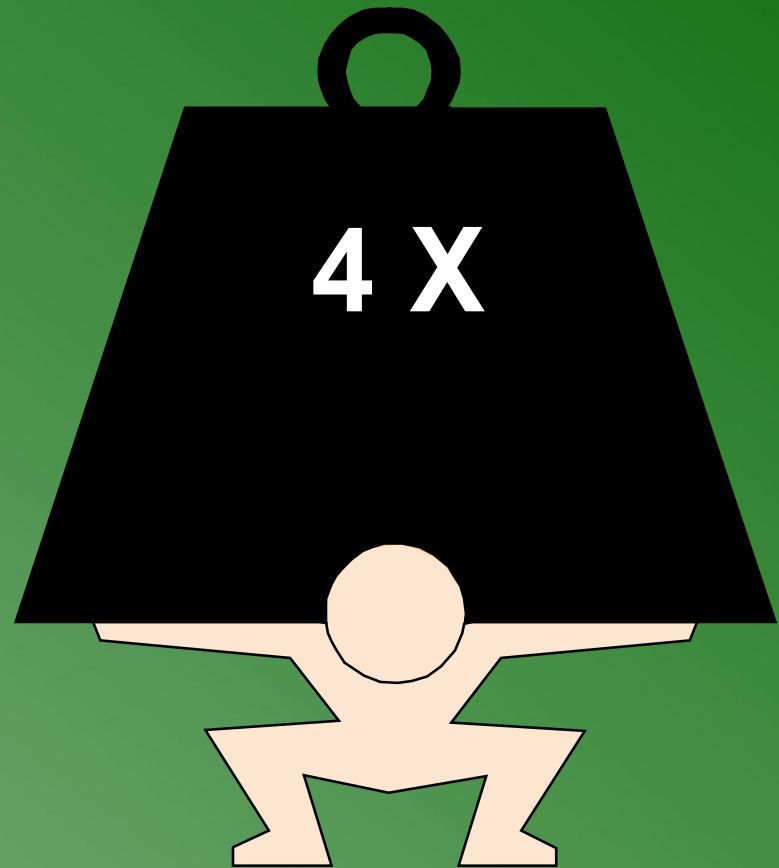
§1926.451 General Requirements

- (a) Capacity
- (b) Scaffold Platform Construction
- (c) Criteria for Supported Scaffolds
- (d) Criteria for Suspension Scaffolds
- (e) Access
- (f) Use
- (g) Fall Protection
- (h) Falling Object Protection



1926.451 (a) Capacity

- Support without failure four times intended load (personnel, equipment and supplies)



1926.451 (a) Capacity

- Connections to roof and floors four times the tipping moment
- Suspension ropes & hardware 6 times intended load

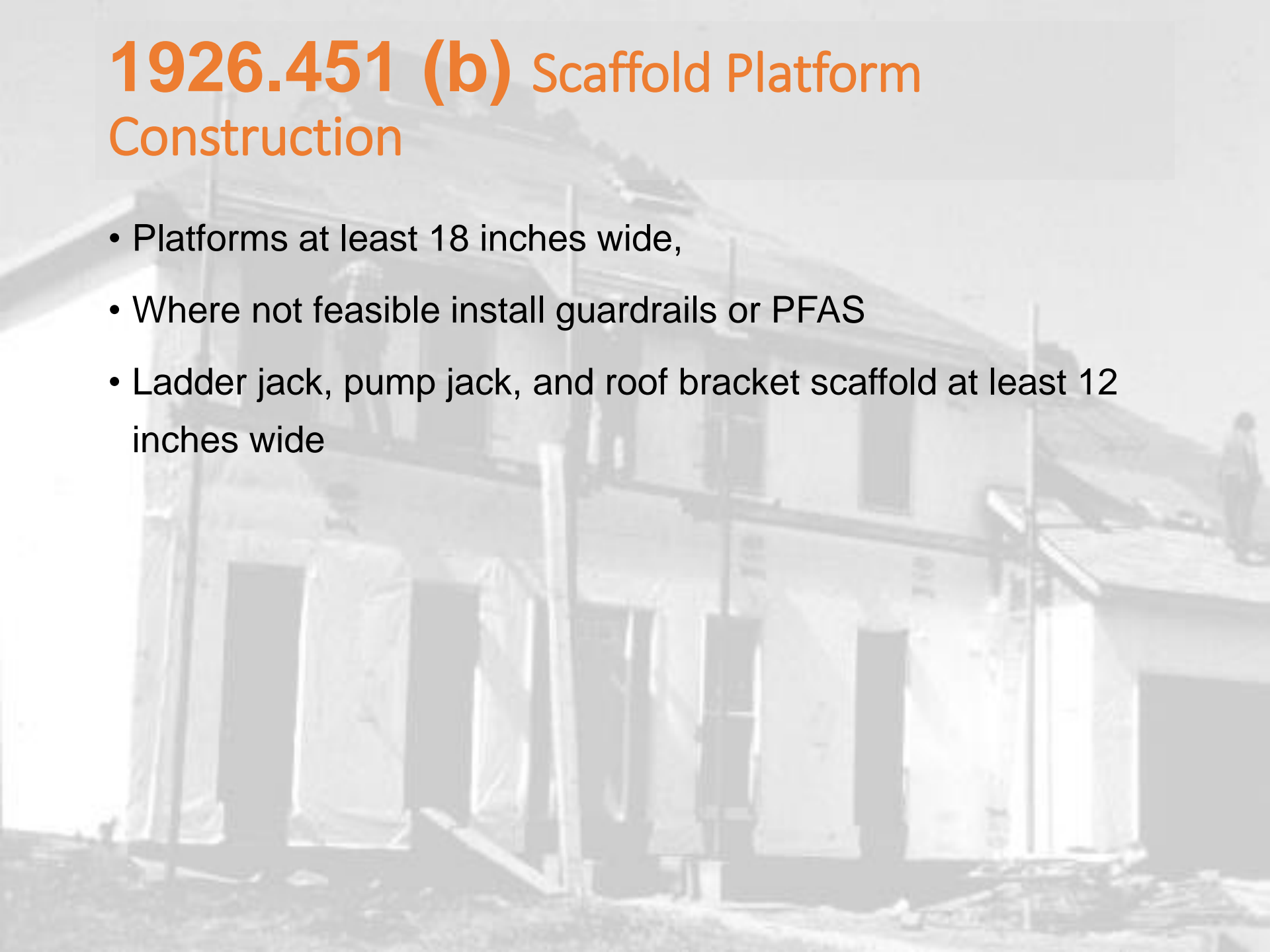


1926.451 (b) Scaffold Platform Construction

- Planked as fully as possible
- Gaps to 1 inch or less
- Max 9 1/2 inches around uprights when extending platform width with side brackets
- Does not apply to walkways, erection and dismantling

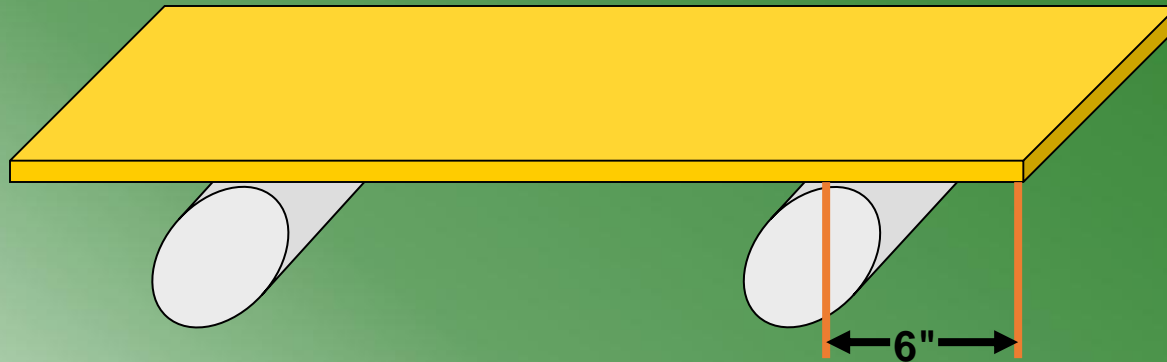
1926.451 (b) Scaffold Platform Construction

- Platforms at least 18 inches wide,
- Where not feasible install guardrails or PFAS
- Ladder jack, pump jack, and roof bracket scaffold at least 12 inches wide



1926.451 (b) Scaffold Platform Construction

- Front of scaffold no more than 14 inches from face of work
- For outrigger scaffolds 3 inches
- For plastering 18 inches
- Unless secured platforms extend minimum of six inches over support



1926.451 (b) Scaffold Platform Construction

- Platforms less than 10 feet, Max. extension over support 12 inches
- Platforms over 10 feet, Max. extension over support 18 inches
- Overlap platforms only over support, minimum overlap 12 inches unless nailed
- Planks laid at angles other than 90° laid first under planks laid over supports at 90 °

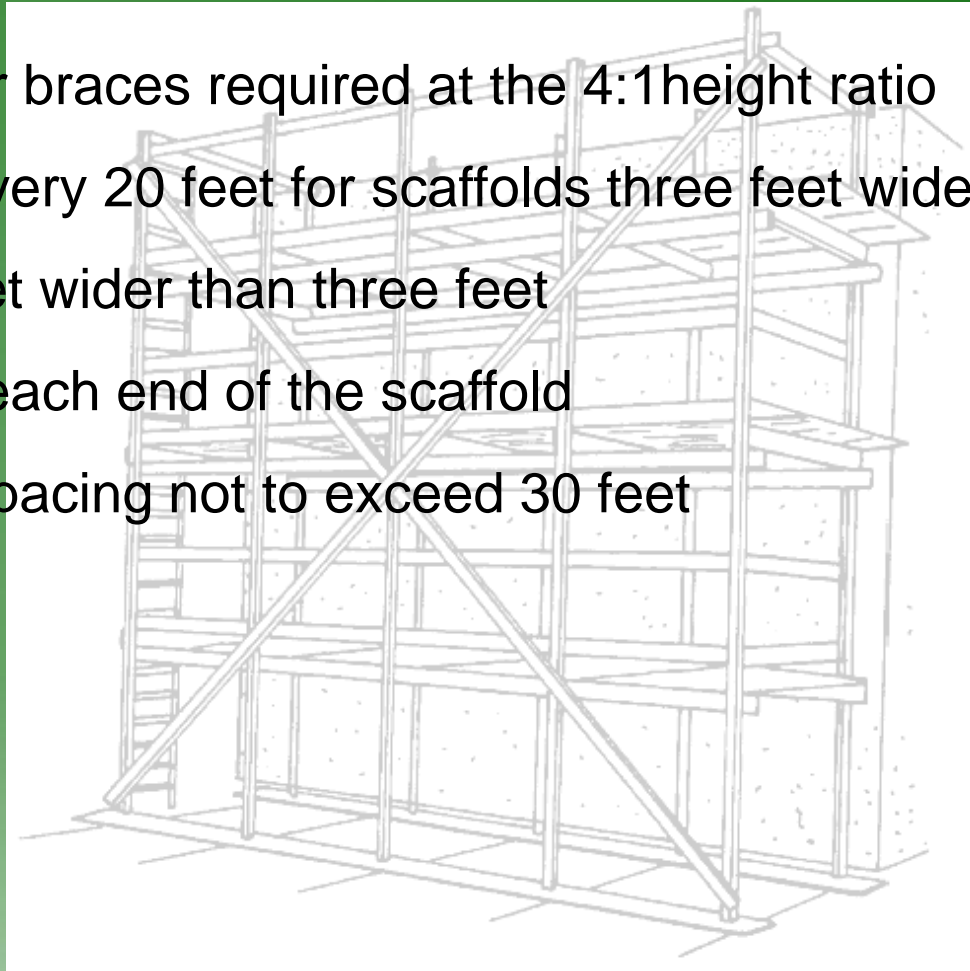
1926.451 (b) Scaffold Platform Construction

- No painting of scaffold planks or mud sills
- No mixing components from different scaffolds unless they match

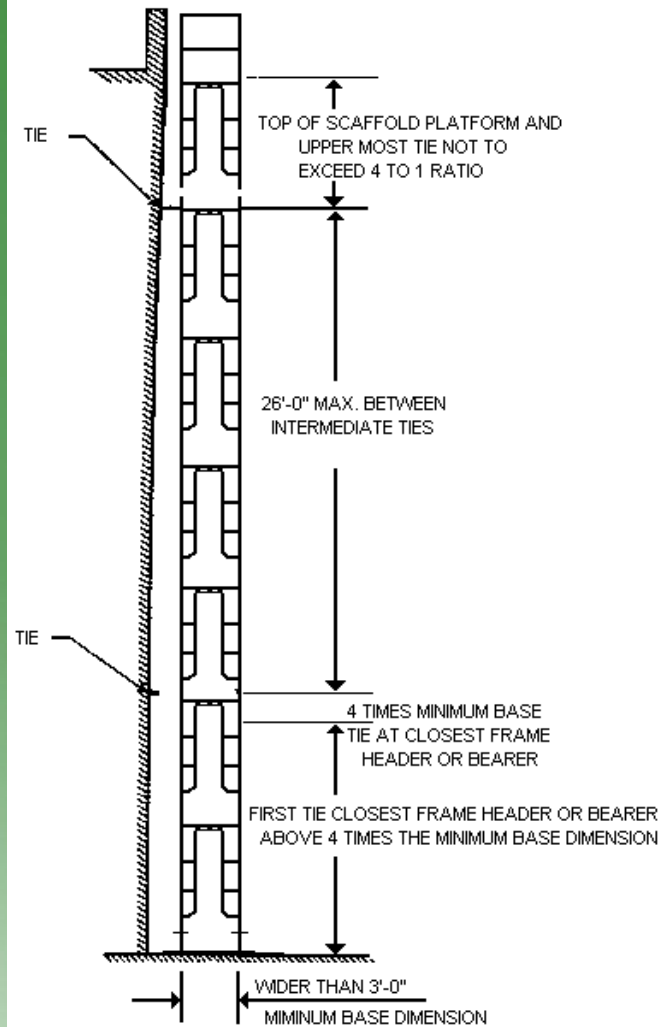


1926.451 (c) Supported Scaffolds

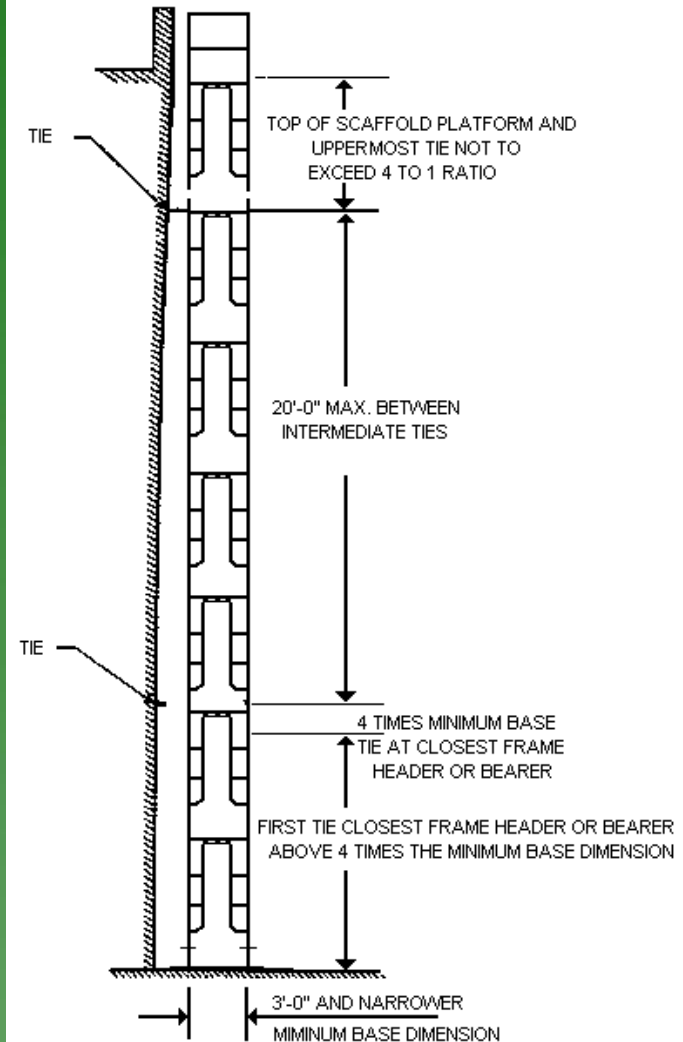
- Guys, ties or braces required at the 4:1 height ratio
- Repeated every 20 feet for scaffolds three feet wide or less
- Every 26 feet wider than three feet
- Installed at each end of the scaffold
- Horizontal spacing not to exceed 30 feet



MAXIMUM VERTICAL TIE SPACING WIDER THAN 3'-0" BASES

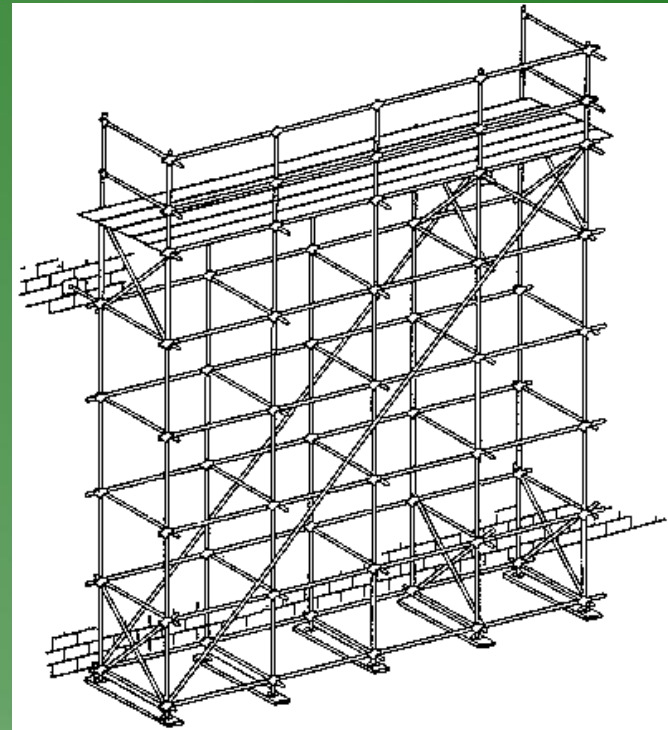


MAXIMUM VERTICAL TIE SPACING 3'-0" AND NARROWER BASES



1926.451 (c) Supported Scaffolds

- Bracing required to prevent tipping for all eccentric applied loads
- Scaffolds must bear on base plates and mud sills or other firm foundation
- Footings rigid with no settling or displacement



1926.451 (c) Supported Scaffolds

- Unstable objects shall not be used to support scaffolds or platform units.
- Unstable objects shall not be used as working platforms.



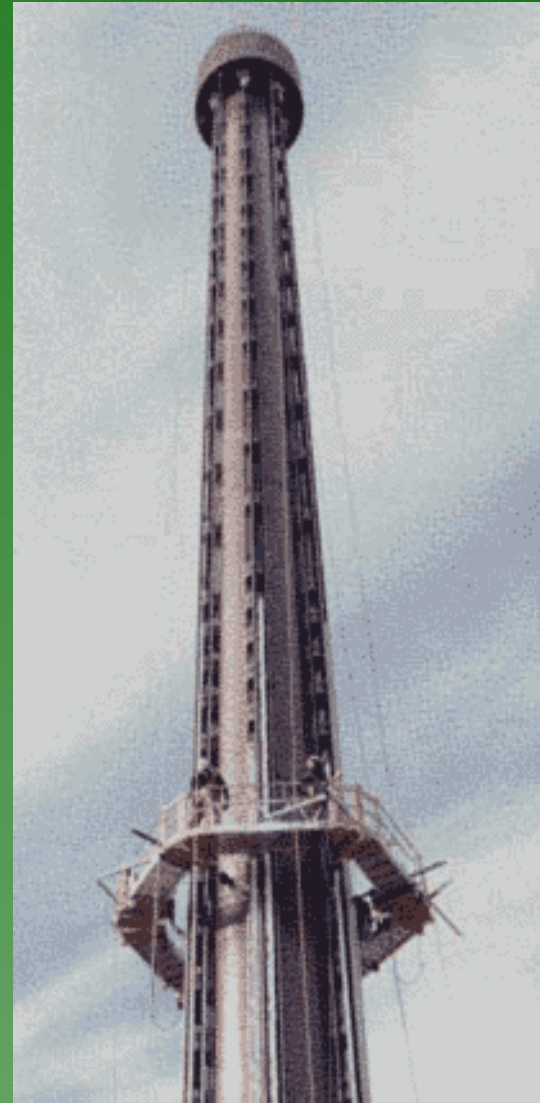
1926.451 (c) Supported Scaffolds

- Poles, legs, posts, frames, and uprights plumb and braced



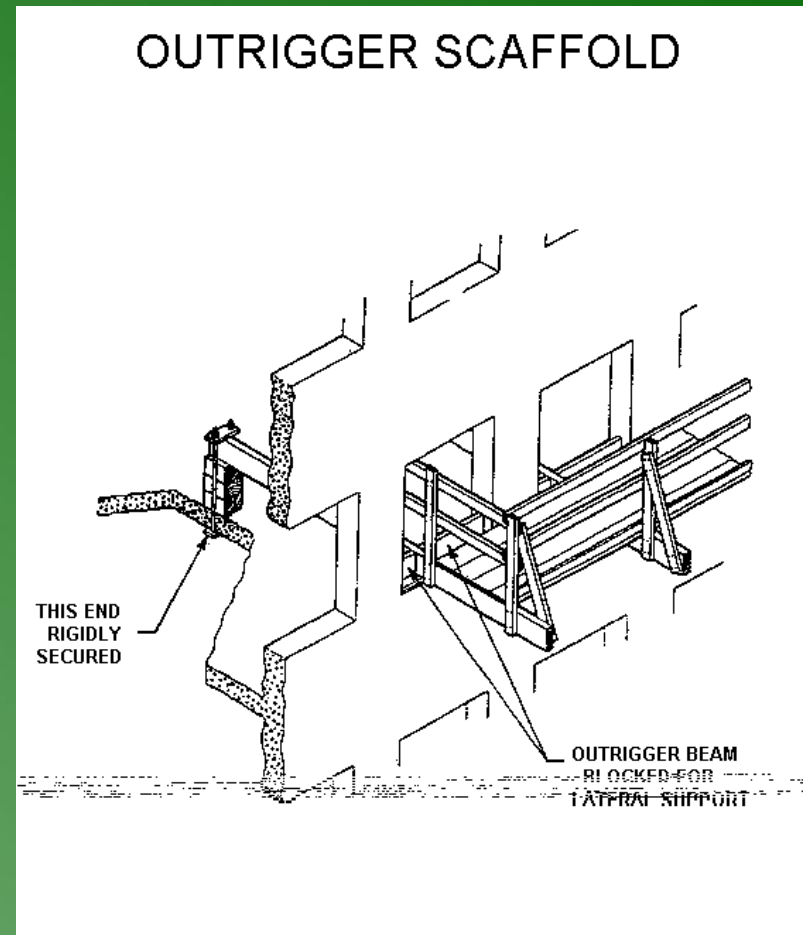
1926.451 (d) Suspended Scaffolds

- All suspended scaffold devices must rest on surfaces capable of supporting four times the the rated load of the hoist



1926.451 (d) Suspended Scaffolds

- Outrigger beams made of structural metal or equivalent and restrained to prevent movement.



1926.451 (d) Suspended Scaffolds

- Inboard ends of outrigger beams bolted to floor or roof or counterweights, or tiebacks used
- Tiebacks equivalent in strength to suspension ropes
- All direct connections evaluated by competent person



1926.451 (d) Suspended Scaffolds

- Counterweights non-flowable material
- Only specifically designed counterweights allowed
- Counterweights secured to outrigger beams by mechanical means
- Counterweights not removed until scaffold is disassembled



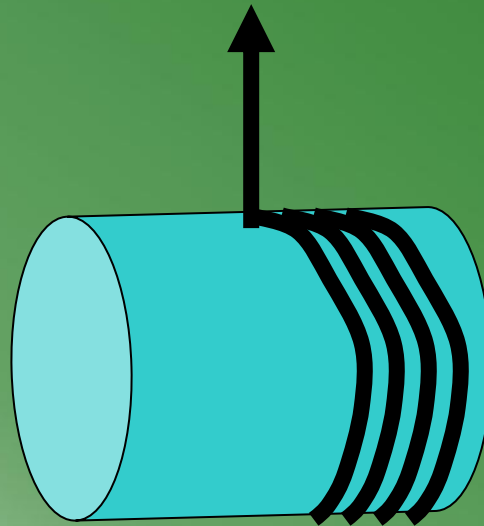
1926.451 (d) Suspended Scaffolds

- Tiebacks secured to structural anchorage
- Not standpipes, vents, or conduit
- Support devices (cornice hooks, parapet clamps) made of steel or equivalent and supported by bearing blocks
- Tiebacks set perpendicular to building face



1926.451 (d) Suspended Scaffolds

- Four wraps minimum on winding drum hoists
- Use of repaired wire rope prohibited
- Wire rope inspected by CP prior to each shift
- Damaged rope must be replaced



4 wraps at lowest
point of hoist travel

1926.451 (d) Suspended Scaffolds

- Gas powered equipment not allowed
- Power gears and brakes enclosed
- Manual hoists require positive crank to descend
- Secondary breaking device required or overspeed descent



1926.451 (e) Access

- Scaffold more than two feet above or below a point of access ladders, stairs, ramps or other similar access provided
- **No cross braces for access!**
- Hook on ladders positioned so as not to tip the scaffold
- Bottom rung within 24 inches of supporting level
- Over 35 feet, rest levels every 35 feet

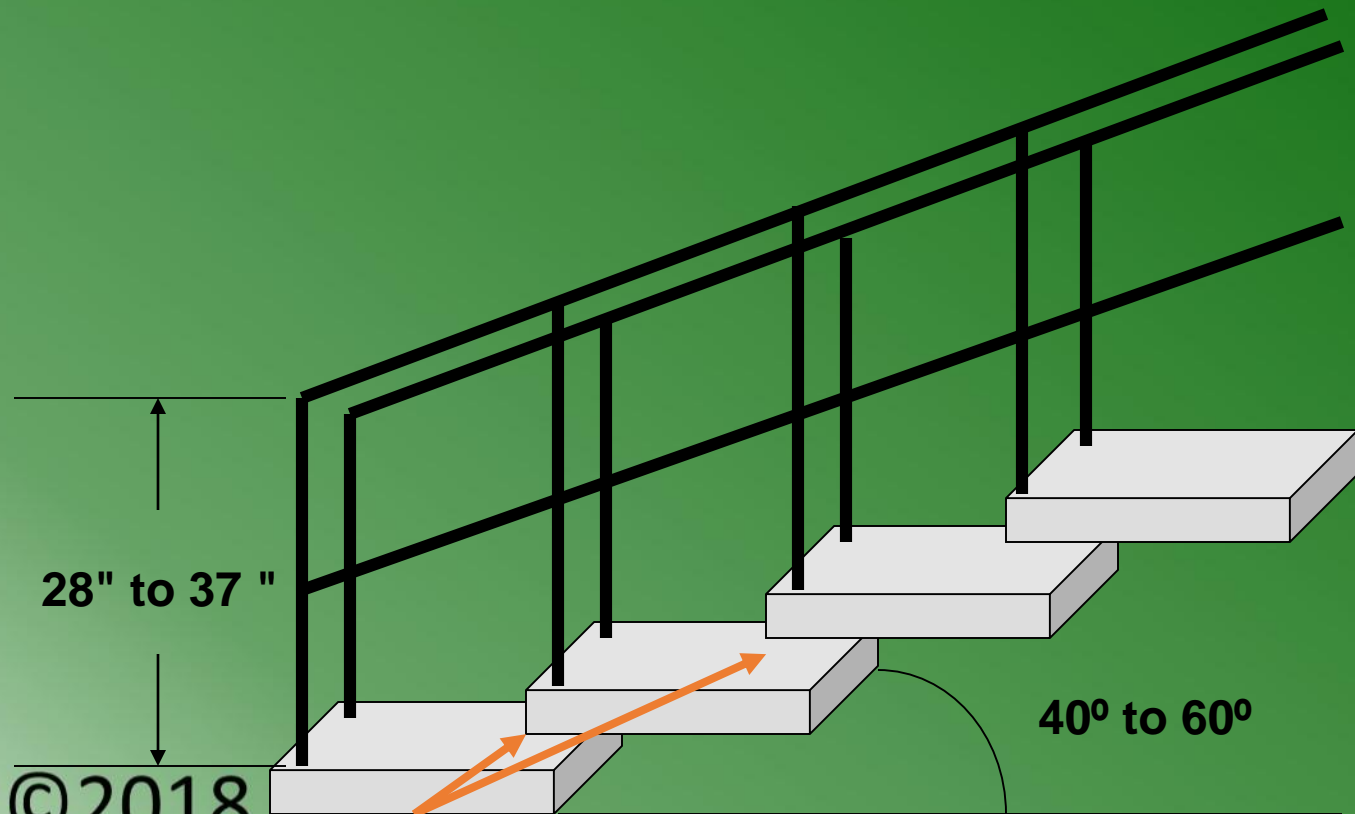
1926.451 (e) Access

- Hook-on ladders compatible with scaffold used
- Minimum rung width of 11 1/2 inches
- Rungs uniformly spaced
- 16 3/4 inches maximum rung spacing
- Slip resistant treads on stairs and landings



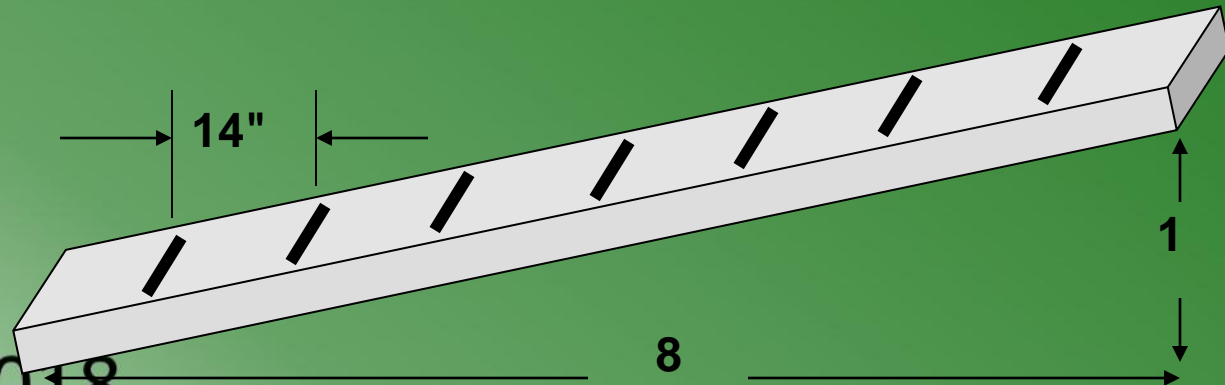
1926.451 (e) Access

- Stairrails provided on scaffold stair towers
- Handrails smooth with no hazardous projections
- 28 to 37 inches high
- 18 inches wide



1926.451 (e) Access

- Ramps and walkways above 6 feet require guardrails
- Maximum pitch: rise of one for run of three (20°)
- Rise higher than one in eight require cleats



1926.451 (e) Access

- Prefabricated scaffold access:
 - specifically designed and constructed for use as ladder rungs;
 - Have a rung length of at least 8 inches
 - Uniformly spaced
 - Max. spacing 16 3/4 inches



1926.451 (e) Access

- Erectors and dismantlers provided with:
 - Safe means of access; CP determines if feasible
 - Based on conditions and scaffold type
 - Attachable ladders installed ASAP
 - Horizontal members used for access not more than 22 inches apart
 - No cross braces for access



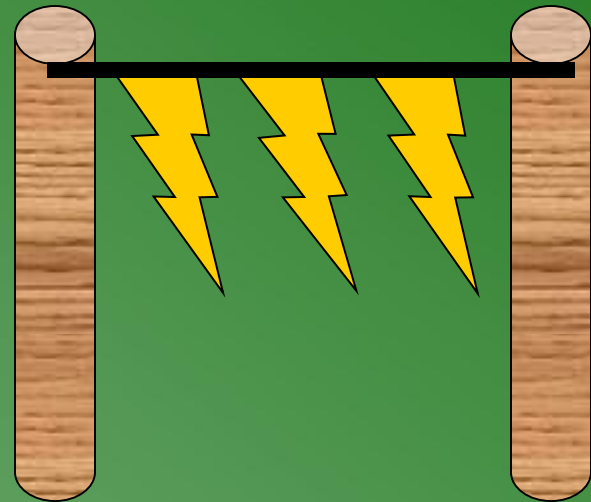
1926.451 (f) Use

- No loading in excess of intended or rated load
- Lean-to scaffolds prohibited
- CP to inspect for defects each shift
- Damaged scaffold repaired, replaced or braced



1926.451 (f) Use

- No moving of scaffolds with employees on them unless designed by PE for such
- For movement of mobile scaffolds see .452 (w)
- Safe distance from electric lines:
 - Insulated lines:
 - Less than 300 volts = 3 feet
 - 300 volts to 50 kilovolts = 10 feet
 - Over 50 kilovolts = 10 feet plus .4 inches for each additional kV; or twice the length of the line insulator but never less than 10 feet



1926.451 (f) Use

- Scaffolds erected, moved, dismantled, or altered only under the supervision and direction of a competent person qualified in scaffolds
- Access scaffolds with snow/ice only to remove
- Swinging loads near scaffolds must use tag lines



1926.451 (f) Use

- Suspension scaffolds:
 - Ropes large enough for safe functioning of brake and hoist mechanism(s)
 - Suspension ropes shielded from heat sources
 - No damage from chemicals allowed
 - No working on scaffolds during storms or high winds unless CP determines safe & protection with PFAS or wind screens



Debris shall not be allowed to accumulate on platforms.

OSHA PROPOSES FATALITY FINES

THE U.S. OCCUPATIONAL SAFETY AND Health Administration is proposing \$313,700 in fines for three Massachusetts firms involved in a fatal scaffolding collapse last August in Quincy. "Our investigation concluded that the primary cause of the collapse was the overloading of the scaffold with brick, debris, and excess scaffold planking," says Brenda Gordon, OSHA area director.

1926.451 (f) Use

- No increasing working height with makeshift devices
- Ladders only used on scaffolds if:
 - Platform units secured
 - Ladder placed against other surfaces, scaffold secured
 - Legs on same platform or stabilized
 - Ladder legs secured



1926.451 (f) Use

- Platforms shall not deflect more than 1/60 of the span when loaded.



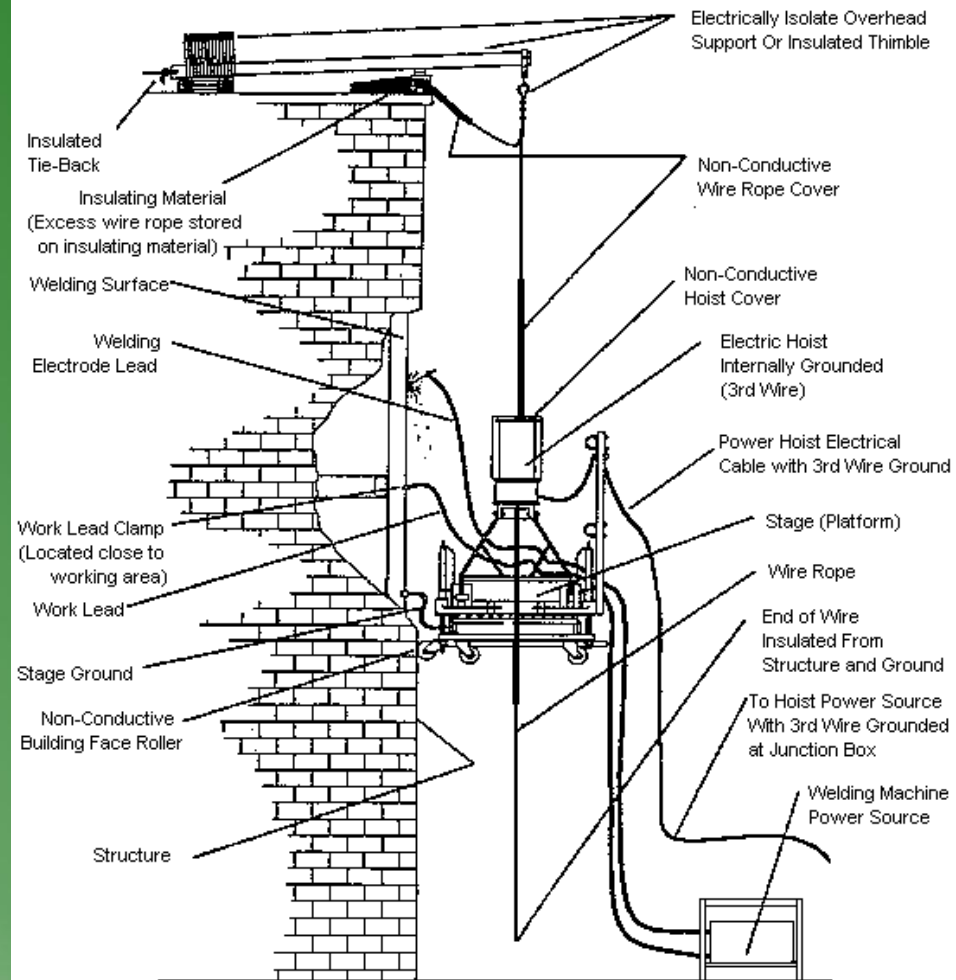
1926.451 (f) Use

- When welding from suspended scaffolds:
 - Isolate overhead support or insulated thimble used to attach suspension wire rope to its hanging support
 - Suspension wire rope covered with insulating material extending at least 4 feet above the hoist
 - Each hoist shall be covered with insulated protective covers;
 - Grounding conductor shall be connected from the scaffold to the structure
 - If scaffold grounding lead becomes disconnected, shut of welder until reconnected



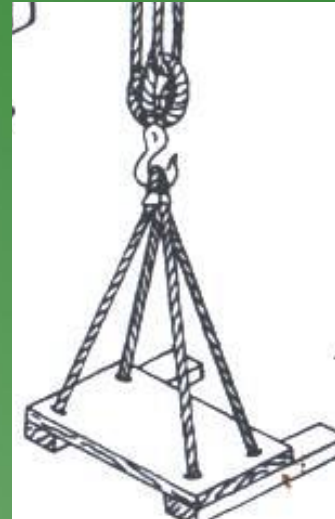
An active welding rod or uninsulated welding lead shall not be allowed to contact the scaffold or its suspension system.

SUSPENDED SCAFFOLD PLATFORM WELDING PRECAUTIONS



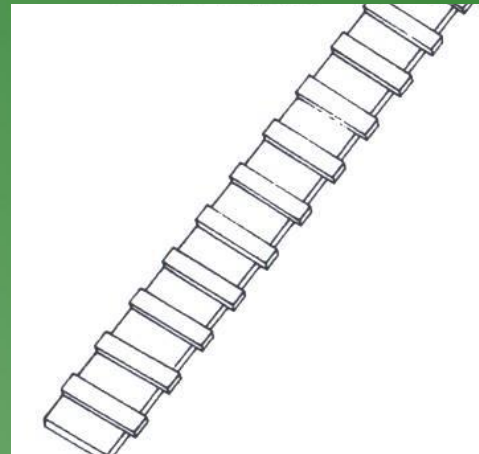
1926.451 (g) Fall Protection

- Fall protection required above 10 feet
- Boatswains' chair, catenary scaffold, float scaffold, needle beam scaffold, or ladder jack scaffold shall be protected by a personal fall arrest system;
- Single-point or two-point adjustable suspension scaffold shall be protected by both a personal fall arrest system and guardrail system;



1926.451 (g) Fall Protection

- Crawling board (chicken ladder) protected by a personal fall arrest system, a guardrail system or by a three-fourth inch (1.9 cm) diameter grabline or equivalent handhold securely fastened beside each crawling board;
- Self-contained adjustable scaffold protected by a guardrail system when platform is supported by the frame structure, by both a personal fall arrest system and a guardrail system when platform is supported by ropes;



1926.451 (g) Fall Protection

- Each employee on a walkway *located within a scaffold* shall be protected by a guardrail system installed within 9 1/2 inches of and along at least one side of the walkway.



1926.451 (g) Fall Protection

- Overhand bricklaying operations from a supported scaffold protected from falling from all open sides and ends of the scaffold (except at the side next to the wall being laid) a personal fall arrest system or guardrail system
- For all scaffolds not otherwise specified, each employee protected by personal fall arrest systems or guardrail systems

Effective September 2, 1997, the employer shall have a competent person determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds. Employers are 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.

1926.451 (g) Fall Protection

- In addition to meeting the requirements of 1926.502(d), personal fall arrest systems used on scaffolds shall be attached by lanyard to a vertical lifeline, horizontal lifeline, or scaffold structural member.

1926.451 (g) Fall Protection

- Vertical lifelines shall:
 - Not be used when overhead components are present on single or two-point adjustable scaffolds
 - Fastened to a fixed safe point of anchorage
 - Independent of the scaffold
 - Protected from damage and sharp edges
- Safe points of anchorage include structural members of buildings, but do not include standpipes, vents, other piping systems, electrical conduit, outrigger beams, or counterweights.

1926.451 (g) Fall Protection

- Horizontal lifelines shall:
 - Be secured to two or more structural members of the scaffold
 - Horizontal lifelines shall not be attached only to the suspension ropes.
 - Lanyards on horizontal lifelines on suspended scaffolds: scaffold must have independent support line(s) with automatic locking devices, and in number and strength equal to suspension ropes

1926.451 (g) Fall Protection

- Vertical lifelines, independent support lines, and suspension ropes shall not be attached to each other, nor shall they be attached to or use the same point of anchorage, nor shall they be attached to the same point on the scaffold or personal fall arrest system.

1926.451 (g) Fall Protection

- Guardrail systems shall be installed along all open sides and ends of platforms.
- Guardrail systems installed before scaffold is released for use by employees other than erection/dismantling crews.



1926.451 (g) Fall Protection

- Guardrails 38 to 45 inches high, or higher if conditions warrant
- Suspended scaffolds where PFAS is required, 36 to 45 inches
- Suspension scaffold hoists may be used as endrails if they prevent worker passage
- Toprail strength on suspended scaffolds withstand 100 pounds
- Other types 200 pounds

1926.451 (g) Fall Protection

- Crossbracing is acceptable in place of a midrail when the crossing point of two braces is between 20 inches and 30 inches above the work platform or.
- As a toprail when the crossing point of two braces is between 38 inches and 48 inches above the work platform.
- The end points at each upright shall be no more than 48 inches (1.3 m) apart.



1926.451 (h) Falling Object Protection

- Requires hardhats
- In addition to (as necessary):
 - Toeboards
 - Screens
 - Debris nets
 - Canopies
- When objects are too large, or heavy to be contained by the above-listed measures, place potential falling objects away from the edge from which they could fall and secure



1926.451 (h) Falling Object Protection

- When employees below could be struck by falling objects the following is required:
 - Barricade area and no access, or;
 - Toeboard installed of sufficient length
- Material piled higher than toeboard must be screened, from platform to top of guardrail

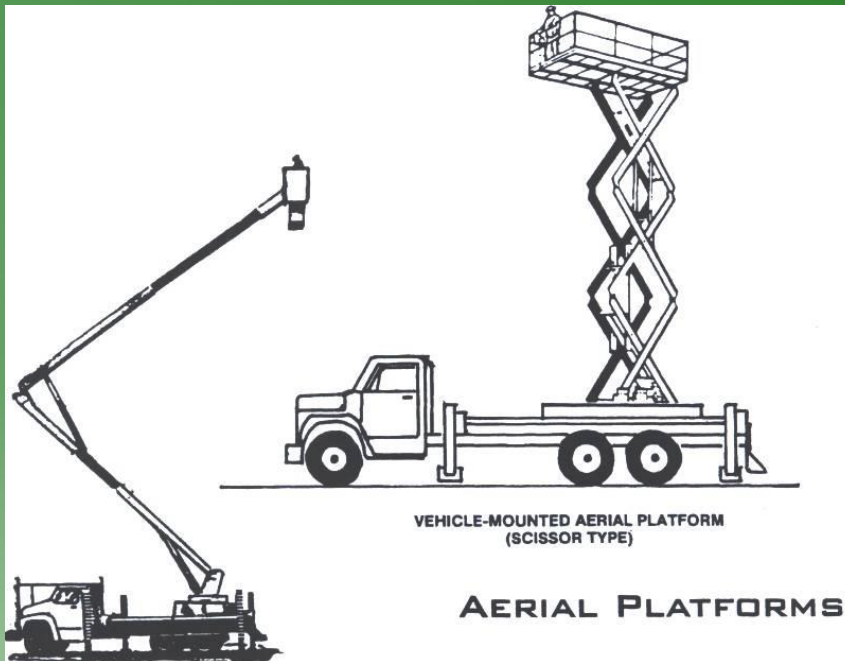


Aerial Lifts

- Comply with ANSI A 92.2 - 1969
- Lift controls tested each day prior to use
- Operated only by authorized persons
- Belting off to adjacent pole or structure while in lift is prohibited
- Must always stand firmly on floor of basket
- Harness & lanyard worn and attached to boom or basket



Aerial Lifts



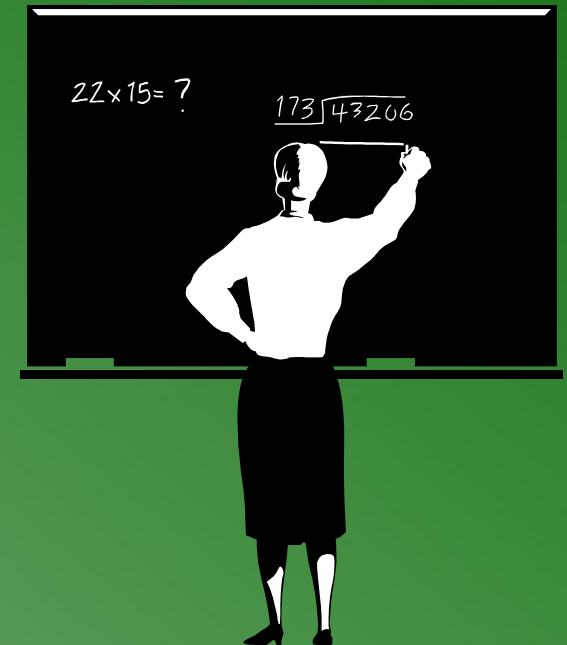
- Boom load limits not exceeded
- Brakes set when in use
- When outriggers used, positioned on pads or solid surface
- Not moved when boom is elevated with men working in basket

Scaffold

Training

1926.454 Training

- Each employee who works on scaffold trained to recognize and avoid hazards including (as applicable):
- Electrical hazards,
- Fall hazards, and;
- Falling object hazards in the work area;



1926.454 Training

- Proper use of the scaffold
- Proper procedures for fall protection, and falling object protection systems
- Maximum intended load
- Any applicable regulations

1926.454 Training

- Each employee who is involved in erecting, disassembling, moving, operating, repairing, maintaining, or inspecting a scaffold trained by a competent person to recognize any hazards associated with the work.

1926.454 Training

- When the employer has reason to believe that an employee lacks the skill or understanding needed for safe work involving the erection, use or dismantling of scaffolds, the employer shall retrain each such employee so that the requisite proficiency is regained. Includes:
 - New hazards
 - New equipment
 - Lack of retention or proficiency

A photograph of a construction site under a clear blue sky. A tall crane is visible on the left, with a worker in a yellow safety vest on its arm. In the foreground, there is a large structure of scaffolding and formwork, likely for a building's exterior. The overall scene is bright and clear.

The

End