

SECTION 22 WORK PLATFORMS AND SCAFFOLDING

22.A GENERAL

22.A.01 Manufactured work platforms shall be erected, used, inspected, tested, maintained, and repaired in accordance with ANSI A10.8 and the manufacturer's recommendations as outlined in the operating manual or in accordance with guidance from the Scaffolding, Shoring, and Forming Institute or the Scaffold and Access Industry Association. A copy of the manufacturer's recommendations (operating manual) or guidance from the Scaffolding, Shoring, and Forming Institute shall be available at the work site.

Comment [teg1]: Added reference to SAIA; their name changed in 2011

22.A.02 Work platforms and scaffolding shall comply with fall protection and appropriate access requirements of Sections 21 and 24.

a. All requirements of this section shall be applied to work platforms and means of access.

b. Standard railing and handrails for stairs shall be in compliance with the requirements of Section 24.C and E; Standard guardrails shall be in compliance with Section 21.E.01; personal fall protection devices shall be in compliance with Section 21.H; and safety (fall protection) nets shall be in compliance with the requirements of 21.G. [Cross-bracing shall not be used as any part of a fall protection system.](#)

c. Ladders used as work platforms shall be in compliance with the requirements of Section 24 [and as specified in this section.](#)

Comment [teg2]: Self explanatory

22.A.03 Prior to commencing any activity that requires work in elevated areas, all provisions for access and fall protection shall be delineated in the Site-Specific Fall Protection and Prevention Plan and AHA, per 21.C and accepted by the GDA for the activity. For specific guidance related to erecting and disassembling scaffolds, see paragraph 21.J.02.

22.A.04 The following hierarchy and prohibitions shall be followed in selecting appropriate work platforms.

a. Scaffolds, platforms, or temporary floors shall be provided for all work except that can be performed safely from the ground or similar footing.

b. Ladders may be used as work platforms only when use of small hand tools or handling of light material is involved.

c. Ladder jacks, lean-to, and prop-scaffolds are prohibited.

EM 385-1-1
XX Jun 13

d. Emergency descent devices shall not be used as working platforms.

22.A.05 Erection, moving, dismantling, or altering of work platforms shall be under the supervision of a Competent Person (CP). In addition to the CP requirements of the scaffolding section, the CP must have (8-hours or scaffold specific training) on the Scaffold type that is being use. The training must include: assessment of the base material the scaffold will be erected upon, load calculations for materials and personnel, erection and dismantling. See 21.J.02.

Comment [teg3]: Proposed by Doug Tusing, Navy. The 8 hours was used because that is what SAIA accredited trainers offer.

22.A.06 Contractors shall use a scaffold tagging system in which all scaffolds are tagged by the Competent Person. Tags shall be color-coded: green indicates the scaffold has been inspected and is safe to use; yellow indicates scaffold is incomplete and unsafe to use by anybody except erectors (fall protection may be required), red indicates the scaffold is unsafe to use. Tags shall be readily visible, made of materials that will withstand the environment in which they are used, be legible and shall include:

Comment [teg4]: Per ANSI A10.8

- a. The Competent Person's name and signature;
- b. Dates of initial and last inspections.

22.A.07 Work platforms shall not be erected or used in the immediate vicinity of power lines or electrical conductors until such are insulated, de-energized, or otherwise rendered safe against accidental contact. > **See 11.F.**

22.A.08 Where persons are required to work or pass under a working platform, a screen (consisting of No. 18 gauge US Standard wire ½ in (1.2 cm) mesh or the equivalent) shall be provided between the toe board and the guardrail and extending over the entire opening.

22.A.09 Anyone involved in erecting, disassembling, moving, operating, using, repairing, maintaining or inspecting a scaffold shall be trained by a Competent Person to recognize any hazards associated with the work in question. Proof of training shall be Maintained on site and made available to the GDA upon request.

Comment [teg5]: Makes sure inspectors have documentation immediately available.

22.A.10 Scaffolds will be inspected daily by a competent person and the inspection will be recorded on the daily safety inspection required by 01.A.12a.

Comment [teg6]: Eliminates a frequently encountered deficiency. ANSI A10.8 - 4.46

22.B SCAFFOLDS - GENERAL

22.B.01 Capacities.

- a. Scaffolds and their components shall meet the requirements contained in ANSI A10.8 and be capable of supporting without failure at least 4 times the maximum anticipated load.

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b. Direct connections to roofs and floors, and counterweights used to balance adjustable suspension scaffolds, shall be capable of resisting at least 4 times the tipping moment imposed by the scaffold operating at the rated load of the hoist, or 1.5 (minimum) times the tipping moment imposed by the scaffold operating at the stall load of the hoist, whichever is greater.

22.B.02 Design.

a. The dimensions of the members and materials used in the construction of various working platforms or scaffolds shall conform to the sizes shown in the ANSI A10.8 tables.

b. Factory-fabricated scaffolds and components shall be designed and fabricated in accordance with the applicable ANSI standard. When there is a conflict between the ANSI standard and this manual concerning the design or fabrication of factory fabricated scaffolds, the ANSI standard shall prevail.

c. Load-carrying timber members shall be a minimum of 1,500 lb-ft/in² (10,342.1 kPa) (stress grade) construction grade lumber. (1) All dimensions are nominal sizes (except where rough sizes are noted) as provided by Voluntary Product Standard DOC PS 20, published by NIST of the US Department of Commerce.

(1) Where rough sizes are noted, only rough or undressed lumber of the size specified will satisfy minimum requirements.

(2) Lumber shall be reasonably straight-grained and free of shakes, checks, splits, cross grains, unsound knots or knots in groups, decay and growth characteristics, or any other condition that will decrease the strength of the material. [For planking see 22.B.08j.](#)

d. When scaffolds are wrapped with tarps, poly enclosures, or similar materials wind calculations will be calculated by a qualified person to determine the strength and placement of the ties.

Comment [teg7]: Self explanatory

Comment [teg8]: Qualified person is used by SAIA and the ANSI standard. Should we change this to RPE?

22.B.03 Supporting members and foundations shall be of sufficient size and strength to safely distribute loading.

a. Supporting members shall be placed on a firm, smooth foundation that will prevent lateral displacement.

b. Unstable objects such as barrels, boxes, loose bricks, or concrete blocks shall not be used as supports.

c. Vertical members (i.e., poles, legs, or uprights) shall be plumb and securely braced to prevent swaying or displacement.

EM 385-1-1
XX Jun 13

22.B.04 The design and construction or selection of planking and platform for means of access shall be based upon either the number of persons for which they are rated or the uniform load distribution to which they will be subjected, whichever is the more restrictive, in accordance with Tables 22-1 and 22-2.

**TABLE 22-1
SELECTION CRITERIA FOR PLANKING AND PLATFORMS**

Rated Load Capacity	Designed and Constructed To Carry	Load Placed
1 person	250 lb (115 kg)	At center of span
2 persons	250 lb (115 kg)	18 in (45.7 cm) to left of center of span and
		250 lb (115 kg) 18 in (45.7 cm) to right of center of span
3 persons	250 lb (115 kg)	At center of span
	250 lb (115 kg)	18 in (45.7 cm) to left of center of span and
	250 lb (115 kg)	250 lb (115 kg) 18 in (45.7 cm) to right of center of span

**TABLE 22-2
MAXIMUM INTENDED LOAD**

Rated Load Capacity	Maximum Intended Load
light duty	25 lb/ft ² (120 kg/m ²) applied uniformly over entire span area
medium duty	50 lb/ft ² (240 kg/m ²) applied uniformly over entire span area
heavy duty	75 lb/ft ² (360 kg/m ²) applied uniformly over entire span area

22.B.05 Scaffolds shall be plumb and level.

22.B.06 Scaffolds (other than suspended scaffolds) shall bear on base plates upon mudsills or other adequate foundation.

22.B.07 Working levels of work platforms shall be fully planked or decked.

22.B.08 Planking.

a. All wood planking shall be selected for scaffold plank use as recognized by grading rules established by a recognized independent inspection agency for the species of wood used.

EM 385-1-1
XX Jun 13

(1) The maximum permissible spans for 2-in x 10-in (5-cm x 25.4-cm) (nominal) or 2-in x 9-in (5-cm x 22.8-cm) (rough) solid sawn wood planks shall be as shown in Table 22-3:

(2) The maximum permissible span for 1 ¼ in x 9 in (3.1 cm x 22.8 cm) or wider wood plank of full thickness with a maximum intended load of 50 lb/ft² shall be 4 ft (1.2 m).

b. Fabricated planks and platforms may be used in lieu of solid sawn wood planks. Maximum spans for such units shall be as recommended by the manufacturer based on the maximum intended load being calculated as specified in Table 22-3.

c. Planking shall be secured to prevent loosening, tipping, or displacement and supported or braced to prevent excessive spring or deflection. Intermediate beams shall be provided to prevent dislodgement of planks due to deflection. > **See 24.A.04.**

~~d. There will be no spaces through which personnel, equipment, or material could fall. Planking shall be laid with edges close together across the entire access surface. Each platform on all working levels of scaffolds shall be fully planked or decked between the front uprights and the guardrail supports as follows:~~

Comment [teg9]: Unreasonable as written; adopted OSHA verbiage 1926.451(b)(1)

~~Each platform unit (e.g., scaffold plank, fabricated plank, fabricated deck, or fabricated platform) shall be installed so that the space between adjacent units and the space between the platform and the uprights is no more than 1 inch (2.5 cm) wide, except where the employer can demonstrate that a wider space is necessary (for example, to fit around uprights when side brackets are used to extend the width of the platform).~~

~~Where the employer makes the demonstration as described in 22.B.08(d)(1), the platform shall be planked or decked as fully as possible and the remaining open space between the platform and the uprights shall not exceed 9 1/2 inches (24.1 cm).~~

e. When planking is lapped, each plank shall lap its supports at least 12 in (30.4 cm). Scaffold planks shall extend over their end supports not less than 6 in (15.2 cm) (unless the planking is manufactured with restraining hooks or equivalent means of preventing movement) nor more than 12 in (30.4 cm).

f. Where the ends of planks abut each other to form a flush floor, the butt joint shall be at the centerline of a pole and abutted ends shall rest on separate bearers.

g. The front edge of all platforms shall not be more than 14 inches (36 cm) from the face of the work, unless guardrail systems are erected along the front edge and/or personal fall arrest systems are used; the maximum distance from the face for plastering and lathing operations is 18 inches (46cm).

Comment [teg10]: Per OSHA 29 CFR 1926.451(b)(3). Should have been included long ago.

h. Planking shall be supported or braced to prevent excessive spring or deflection and secured and supported to prevent loosening, tipping, or displacement.

i. When a scaffold materially changes its direction, the platform planks shall be laid to prevent tipping.

(1) The planks that meet the corner bearer at an angle shall be laid first, and extend over the diagonally placed bearer far enough to have a good safe bearing but not far enough to involve any danger from tipping, and

(2) The planking running in the opposite direction at an angle shall be laid so as to extend over and rest on the first layer of planking.

j. Planks shall be maintained in good condition. When cracks exceed 1.5 times the width of the board the plank will not be used. Planks with notches deeper than 1/3 the width of the plank will not be used. Planks with saw kerfs shall not be used.

22.B.09 Work platforms shall be [properly lapped or](#) securely fastened to the scaffold.

Comment [teg11]: Per OSHA Eliminates confusion

**TABLE 22-3
WOOD PLANK SELECTION**

Maximum Intended Load lb/ft² (kg/m²)	Maximum Permissible Span - Full Thickness Undressed Lumber ft (m)	Maximum Permissible Span - Nominal Thickness Undressed Lumber ft (m)
25 (122)	10 (3.0)	8 (2.4)
50 (244)	8 (2.4)	6 (1.8)
75 (366)	6 (1.8)	n/a

22.B.10 When moving platforms to the next level, the old platform shall be left undisturbed until the new bearers have been set to receive the platform planks.

[22.B.11 Materials shall not be stored on scaffolds or runways in excess of supplies needed for that shift.](#)

Comment [teg12]: Per 29 CFR 1926.250(b)(5)

22.B.11 Access.

a. An access ladder or equivalent safe access shall be provided.

b. Where a built-in ladder is part of a scaffold system, it shall conform to the requirements for ladders.

c. Climbing of braces shall be prohibited.

EM 385-1-1
XX Jun 13

d. ~~Where end frames are designed to be used as a ladder. When hook-on or attachable ladders are used on a supported scaffold more than 20 feet in height they shall have rest platforms every 20 feet or fall protection will be used.~~

Comment [teg13]: Per OSHA 451(e)

e. Hook-on or attachable ladders shall be specifically designed for use with the type of scaffold and they shall be positioned so as not to tip the scaffold.

Comment [teg14]: Per OSHA 451(e)

f. ~~or where bolted-on ladders are used, the maximum height will be limited to 20 ft (12 m) unless fall protection is used.~~ The distance between rungs shall not exceed 12 in (30.5 cm) and shall be uniform throughout the length of the ladder. The minimum clear length of the rungs shall be 16 in (40.7 cm).

Comment [teg15]: There have been suggestions to adopt OSHA's distance of 35 feet rather than use 20 feet derived from the fixed ladder standard. Opinions vary on this, ANSI A10.8, 4.23 recommends 35 feet also. The Work Platform group believes 35 feet is too far to fall. Comments?

g. The distance from the supporting surface to the first step of a ladder, stair, or frame designed to be climbed shall not exceed 2 feet (.6 m).

Comment [teg16]: Corrected error

Comment [teg17]: Per ANSI A10.8 & 1926.415(e)(1)

22.B.12 When the scaffold height exceeds four times the minimum scaffold base dimension (and including the width added by outriggers, if used), the scaffold shall be secured to the wall or structure.

a. The first vertical and horizontal tie shall be placed at this point.

b. Vertical ties shall be repeated at intervals not greater than 26 ft (7.9 m) with the top tie placed no lower than four times the base dimension from the top of the scaffold.

c. Horizontal ties shall be placed at each end and at intervals not greater than 30 ft (9.1 m).

22.B.13 When scaffolds are to be partially or fully enclosed, a qualified person shall verify the adequacy of the number, placement, and strength of ties attaching the scaffold to the structure taking into consideration wind loads and weather.

Comment [teg18]: Per ANSI A10.8 &

22.B.14³ The use of brackets on scaffolds shall be prohibited unless the tipping effect is controlled.

22.B.15⁴ Use of the following types of scaffolding are permitted if they are designed and constructed in accordance with ANSI A10.8:

- a. Outrigger scaffolds;
- b. Needle beam scaffolds;
- c. Interior hung scaffolds;
- d. Bricklayer's square scaffolds;
- e. Float/ship scaffolds;
- f. Boatswain's scaffolds;
- g. Window jack scaffolds, and
- h. Carpenter's bracket scaffolds.

22.B.165 Other types of scaffolding not included in ANSI A10.8 may be approved by the GDA provided the design is approved by a Registered Professional Engineer (RPE) or they meet a nationally recognized design standard.

22.C METAL SCAFFOLDS AND TOWERS

22.C.01 Scaffold components made of dissimilar metals shall not be used together unless a Competent Person has determined that galvanic action will not reduce the strength of any component to a level below that required by 22.B.01.

22.C.02 The sections of metal scaffolds shall be securely connected and all braces shall be securely fastened.

22.C.03 A ladder or stairway shall be provided for access and shall be affixed or built into all metal scaffolds and so located that, when in use, it will not have a tendency to tip the scaffold.

22.C.04 Tube and coupler scaffolds.

a. Tube and coupler scaffolds shall have posts, runners, and bracing of nominal 2 in (5-cm) (outside diameter) steel tubing or pipe; other structural metals, when used, must be designed to carry an equivalent load. The size of bearers (outside diameter) and the spacing of posts shall meet the requirements contained in ANSI A10.8.

b. Tube and coupler scaffolds shall be limited in heights and working levels to those permitted in ANSI A10.8. Drawings and specifications for tube and coupler scaffolds that exceed the limitations in ANSI A10.8 shall be designed by a RPE.

c. All tube and coupler scaffolds shall be constructed to support four times the maximum intended loads, as set forth by ANSI A10.8 or as specified by a RPE (with knowledge in structural design).

d. Runners shall be erected along the length of the scaffold and shall be located on both the inside and the outside posts at even heights.

(1) When tube and coupler guardrails and midrails are used on outside posts, they may be used in lieu of outside runners. If guardrail systems are removed to other levels, extra runners shall be installed to compensate.

(2) Runners shall be interlocked to form continuous lengths and coupled to each post.

(3) The bottom runners shall be located as close to the base as possible.

(4) Runners shall be placed not more than 6 ft - 6 in (1.9 m) on center.

e. Bearers.

EM 385-1-1
XX Jun 13

(1) Bearers shall be installed transversely between posts.

(2) When coupled to the post, the inboard coupler shall bear directly on the runner coupler. When coupled to the runners, the couplers shall be kept as close to the post as possible.

(3) Bearers shall extend beyond the posts and runners and shall provide full contact with the coupler.

f. Bracing across the width of the scaffold shall be installed at the ends of the scaffold at least every fourth level vertically and repeated every third set of posts horizontally.

(1) Such bracing shall extend diagonally from the outer post or runner at this level upward to the inner post or runner at the next level.

(2) Building ties shall be installed adjacent to bracing.

g. Longitudinal diagonal bracing across the inner and outer rows of poles shall be installed at approximately a 45° angle in both directions from the base of the end post upward to the extreme top of the scaffold.

(1) Where the longitudinal length of the scaffold permits, such bracing shall be repeated beginning at every fifth post.

(2) On scaffolds where the length is shorter than the height the longitudinal bracing shall extend diagonally from the base of the end posts upward to the opposite end posts and then in alternating directions until reaching the top of the scaffold.

(3) Where conditions preclude the attachment of bracing to the posts, it may be attached to the runners.

22.C.05 Metal frame scaffolds.

a. Spacing of tubular welded panels or frames shall be consistent with the loads imposed.

b. Scaffolds shall be properly braced by cross, horizontal, or diagonal braces (or combination of these) to secure vertical members together laterally, and the cross braces shall be of such length as will automatically square and align vertical members so that the erected scaffold is always plumb, square, and rigid. All brace connections shall be made secure.

c. Scaffold legs shall be set on adjustable bases or plain bases placed on mudsills or other foundations adequate to support the maximum rated loads.

d. Frames shall be placed one on top the other with coupling or stacking pins to provide vertical alignment of the legs.

e. Where uplift may occur, panels shall be locked together vertically by pins or other equivalent suitable means.

f. Drawings and specifications for all frame scaffolds over 125 ft (38.1 m) in height above the base plates shall be designed by a RPE.

22.C.06 Manually propelled mobile scaffolds, including mobile work stands, such as "baker scaffolds".

Comment [teg19]: Clarification

a. All wheels and casters on rolling scaffolds shall have a positive locking device, securely fastened to the scaffold, to prevent accidental movement.

b. All casters or wheels shall be locked when a scaffold is occupied.

c. The force necessary to move the mobile scaffold shall be applied as close to the base as practical and provision shall be made to stabilize the tower during movement from one location to another.

d. Rolling scaffolds shall be used only on firm, level, clean and clean surfaces.

Comment [teg20]: grammar

e. Free-standing mobile scaffold working platform heights shall not exceed three times the smallest base dimension.

f. No person shall be allowed to ride on manually propelled scaffolds unless all of the following conditions exist:

(1) The ground surface is within 3° of level and free from pits, holes, or obstructions;

(2) The minimum dimension of the scaffold base (when ready for rolling) is at least one-half of the height and outriggers, if used, are installed on both sides of staging;

(3) The wheels are equipped with rubber or similar resilient tires; and

4) All tools and materials are secured or removed from the platform before the scaffold is moved.

22.D WOOD POLE SCAFFOLDS (Reference 29 CFR 1926.452(a)).

Comment [teg21]: Deleted entire section & referenced OSHA std. In 22 years I have never seen a wood pole scaffold on a Corps job.

22.E SUSPENDED SCAFFOLDS

22.E.01 Suspended scaffolds are scaffolds/work platforms that are suspended from anchorage points/hoists that allow the scaffold to move up and down as needed for work to be performed. Suspended scaffolds shall be designed, constructed, operated,

EM 385-1-1
XX Jun 13

inspected, tested, and maintained as specified in the operating manual for the device.

22.E.02 Inspections.

a. Suspended scaffold systems shall be inspected prior to being placed in service to determine that the system conforms to this manual and the manufacturer's specifications.

b. ~~Every suspended scaffold shall be tested with twice the maximum anticipated load before being put into operation. Before the scaffold is used, direct connections shall be evaluated by a competent person who shall confirm, based on the evaluation, that the supporting surfaces are capable of supporting the loads imposed.~~
(Reference ANSI A10.8) > See 22.B.

Comment [teg22]: Deleted-could not find any reference in ANSI or OSHA.

Comment [teg23]: Ref:OSHA 1926.451(d)(3)(i)

c. Each hoist shall be inspected before, and trial operated after, every installation and re-rigging in accordance with the manufacturer's specifications by a competent person.

Comment [g24]: Add: Inspected by a competent person

d. Connection and anchorage systems of suspended scaffold shall be inspected at the beginning of each shift.

e. All wire ropes, fiber and synthetic ropes, slings, hangers, hoists, rigging, fall protection equipment, platforms, anchorage points and their connections, and other supporting parts shall be inspected before every installation, daily thereafter, and periodic while the scaffold is in use.

f. Governors and secondary brakes for powered hoists shall be inspected and tested per the manufacturer's recommendations: at the minimum, inspections shall be made annually.

(1) Inspections and tests shall include a verification that the initiating device for the secondary braking operates as intended.

(2) A copy of the latest inspection and test report shall be maintained on the job site.

g. Records of inspections conducted while the unit is at the work site shall be maintained at the work site.

22.E.03 Only personnel trained in the use of the suspended work platform shall be authorized to operate it. Anyone involved in erecting, disassembling, moving, operating, using, repairing, maintaining or inspecting a suspended scaffolds shall be trained by a Competent Person to recognize any hazards associated with the work in question. Proof of training shall be maintained on site and made available to the GDA upon request.

Comment [teg25]: Makes sure inspectors have documentation immediately available.

Training shall include:

a. Reading and understanding the manufacturer's operating manual and any associated rules and instructions, or training by a Qualified Person on the contents on these documents, and

b. Reading and understanding all decals, warnings, and instructions on the device.

Comment [teg26]: Should we require documentation of qualifications on site? Certificate, card, resume', letter from Ktr?

22.E.04 All parts of all suspended scaffolds shall have a minimum safety factor of 4. A minimum safety factor of 6 is required for support ropes.

22.E.05 Support ropes.

a. Support ropes shall be attached at the vertical centerline of the outrigger and the attachment shall be directly over the hoist machine.

b. Support ropes shall be vertical for their entire length. The scaffold shall not be swayed nor the support ropes fixed to any intermediate points to change the original path of travel.

c. Support ropes shall have the fixed end equipped with a proper size thimble and secured by eye splicing or equivalent means. Free ends shall be brazed or secured to prevent fraying.

d. The wire rope for traction hoists shall be of such length that the operator may descend to the lowest point of travel without the end of the wire rope entering the hoist. Where the wire rope is inadequate for the lowest descent, provision shall be made to prevent the hoist from running off the wire rope.

e. On winding drum type hoists, running ends of suspension ropes shall be attached by positive means to the hoisting drum and at least four wraps of the rope shall remain on the drum at all times.

f. Support ropes shall be capable of resisting chemicals or conditions to which they are exposed.

g. No welding, burning, riveting, or open flame work shall be performed on any platform suspended by fiber or synthetic rope.

h. Defective or damaged rope shall not be used as lifelines or suspension lines. The repairing of wire rope is prohibited.

22.E.06 All suspension scaffold support devices such as outrigger beams, cornice hooks, parapet clamps, or similar devices shall:

a. Be made of mild steel, wrought iron, or equivalent materials;

b. Be supported by bearing blocks;

EM 385-1-1
XX Jun 13

c. Rest on surfaces capable of supporting the reaction forces imposed by the scaffold hoist operating at its maximum rated load; and

d. Be secured against movement by tiebacks installed at right angles to the face of the building whenever possible and secured to a structurally sound portion of the building. Tiebacks shall be equivalent in strength to the hoisting rope.

22.E.07 Outrigger beams.

a. Outrigger beams shall be made of structural metal and shall be restrained to prevent movement.

b. The inboard ends of outrigger beams shall be stabilized by bolts or other direct connections to the floor or roof deck, or they shall have their inboard ends stabilized by counterweights, except mason's multiple point adjustable suspension scaffold outrigger beams shall not be stabilized by counterweights.

c. Before use, direct connections shall be evaluated by a Competent Person who shall affirm that the supporting surfaces are capable of supporting the loads to be imposed. Mason's multiple point adjustable suspension scaffold connections shall be designed by a licensed engineer experienced in scaffold design.

d. Counterweights shall be made of non-flowable solid material, shall be secured to the outrigger beams by mechanical means, and shall not be removed until the scaffold is disassembled.

e. Outrigger beams shall be secured by tiebacks equivalent in strength to the suspension ropes. Tiebacks shall be secured to a structurally sound portion of the building or structure and shall be installed parallel to the centerline of the beam.

f. Outrigger beams shall be provided with stop bolts or shackles at both ends.

g. When channel iron beams are used in place of I-beams, the channels shall be securely fastened together with the flanges turned outward.

h. Outrigger beams shall be installed with all bearing supports perpendicular to the beam centerline.

i. Outrigger beams shall be set and maintained with the web in a vertical position.

j. Where a single outrigger beam is used, the steel shackle or clevises with which the wire ropes are attached to the beam shall be placed directly over the hoisting machines.

22.E.08 Hoisting machines

a. Hoisting machines shall be of a type tested and listed by a nationally recognized testing laboratory.

b. Each hoist shall contain a name plate(s) containing:

- (1) Manufacturer's name;
- (2) Maximum load rating;
- (3) Identification number; and
- (4) Wire rope specifications.

c. Powered hoists shall be electric-, air-, hydraulic-, or propane powered. Gasoline-powered hoists are prohibited.

d. All powered hoists shall be equipped with speed reducers and shall be provided with a primary brake and a secondary brake.

(1) The primary brake shall automatically engage whenever power is interrupted or whenever the operator ceases to apply effort;

(2) The secondary brake shall stop and hold the hoist under over speed or abnormal conditions. Every secondary brake shall be periodically tested under simulated conditions in accordance with the manufacturer's recommendations.

e. Each powered hoist shall have its own separate control.

(1) If the control is of the push-button type, it shall be constant pressure;

(2) If the control is of the fixed-position type, it shall have provision for automatic locking when in the off position, or shall be guarded against accidental actuation; and

(3) If the control is of the lever type, it may be of the constant pressure type or of the fixed-position type.

f. Manual operation of powered hoists may be provided if the hoist is designed so that not more than one person per hoist is required to perform this operation.

(1) During manual operation, a means shall be provided to make the prime mover inoperative.

(2) Instruction shall be provided advising personnel to disconnect the power source before using a manual crank.

g. Manually-operated hoists.

EM 385-1-1
XX Jun 13

(1) Manual operation shall provide a means to prevent rapid handle movement or fast un-spooling. Mechanisms used to allow fast un-spooling during the erection process shall not be in place on the scaffold.

(2) In the event a controlled descent device is used, it shall not bypass the secondary brake.

(3) All winding drum hoists shall be provided with a driving pawl and a locking pawl that automatically engages when the driving pawl is released.

(4) Gripping-type hoists shall be designed so that the hoist is engaged on the suspension rope at all times, including all travel actuations of the operating lever.

(5) Each winding drum hoist shall be provided with a positive means of attachment of the suspension hoist. The drum attachment shall develop a minimum of four times the rated capacity of the hoist.

(6) Each hoist shall require a positive crank force to descend.

22.E.09 Platforms.

a. Light metal platforms, when used, shall be of a type tested and listed by a nationally recognized testing laboratory.

b. Ladder-type platforms.

(1) Ladder-type platforms shall be constructed in accordance with Table 22-6.

(2) The side stringer for ladder-type platforms shall be of clear straight-grained spruce or materials of equivalent strength and durability.

(3) The rungs shall be of straight-grained oak, ash, or hickory, at least 1-1/8 in (2.8 cm) in diameter, with 7/8-in (2.2-cm) tenons mortised into the side stringers at least 7/8 in (2.2 cm).

**TABLE 22-6
LADDER-TYPE PLATFORMS**

Component	Length of platform (feet, m)				
	12 (3.7)	14 & 16 (4.3 & 4.9)	18 & 20 (5.5 & 6.1)	22 & 24 (6.7 & 7.3)	28 & 30 (8.5 & 9.1)
Side stringers, minimum cross sections	1-3/4 x 2-3/4 (4.4 x 6.9)	1-3/4 x 2-3/4 (4.4 x 6.9)	1-3/4 x 3 (4.4 x 7.6)	1-3/4 x 3 (4.4 x 7.6)	1-3/4 x 3-1/2 (4.4 x 8.9)

(finished sizes, inches,): at ends					
Side stringers, minimum cross sections (finished sizes, inches,): at middle	1-3/4 x 3-3/4 (4.4 x 9.5)	1-3/4 x 3-3/4 (4.4 x 9.5)	1-3/4 x 4 (4.4 x 10.1)	1-3/4 x 4-1/4 (4.4 x 10.8)	1-3/4 x 5 (4.4 x 12.7)
Reinforcing Strips	(1)	(1)	(1)	(1)	(1)
Rungs	(2)	(2)	(2)	(2)	(2)
Tie rods: number (minimum) diameter (minimum) (in/cm)	3 1/4 (0.6)	4 1/4 (0.6)	4 1/4 (0.6)	5 1/4 (0.6)	6 1/4 (0.6)
Flooring, minimum finished sizes (in/cm)	1/2 x 2-3/4 (1.2 x 6.9)	1/2 x 2-3/4 (1.2 x 6.9)	1/2 x 2-3/4 (1.2 x 6.9)	1/2 x 2-3/4 (1.2 x 6.9)	1/2 x 2-3/4 (1.2 x 6.9)

NOTE:

- (1) A 1/8 x 7/8 in (0.3 x 2.2 cm) steel reinforcing strip or its equivalent shall be attached to the side or underside, full length.
- (2) Rungs shall be 1-1/8 in (2.8 cm) diameter tenons and the maximum spacing shall be 12 in (30.4 cm) center to center.
- (3) The stringers shall be tied with tie rods not less than 1/4 in (0.6 cm) diameter passing through the stringers and riveted up tight against washers on both ends.
- (4) The flooring strips shall be spaced not more than 5/8 in (1.5 cm) apart except at the side rails where the space may be 1 in (2.5 cm).

Comment [teg27]: Corrected numbering error

c. Plank platforms.

- (1) Plank platforms shall be composed of not less than nominal 2-in x 10-in (5-cm x 25.4-cm) unspliced planks, cleated together on the underside, starting 6 in (15.2 cm) from each end at intervals not to exceed 4 ft (1.2 m).
- (2) The plank platform shall not extend beyond the hangers more than 12 in (30.4 cm). A bar or other effective means shall be securely fastened to the platform at each end to prevent its slipping off the hanger.

EM 385-1-1
XX Jun 13

(3) The span between hangers for plank platforms shall not exceed 8 ft (2.4 m).

d. Beam platforms.

(1) Beam platforms shall have side stringers of lumber not less than 2 in x 6 in (5 cm x 15.2 cm), set on edge.

(2) The span between hangers shall not exceed 12 ft (3.6 m) when beam platforms are used.

(3) The flooring shall be of 1-in x 6-in (2.5-cm x 15.2-cm) material properly nailed. Floor boards shall not be spaced more than 1/2 in (1.2 cm) apart.

(4) The flooring shall be supported on 2-in x 6-in (5-cm x 15.2-cm) cross beams, laid flat and set into the upper edge of the stringers with a snug fit, at intervals of not more than 4 ft (1.2 m), nailed securely in place.

22.E.10 Suspended scaffolds shall be guyed, braced, guided, or equipped with tag line to prevent swaying.

22.E.11 Two-point suspension scaffolds.

a. Two-point suspension scaffold platforms shall not be less than 20 in (50.8 cm) or more than 36 in (91.4 cm) wide. The platform shall be securely fastened to the hangers by U-bolts or by other equivalent means.

b. The hangers of two-point suspension scaffolds shall be made of mild steel, or equivalent materials, having a cross sectional area capable of sustaining four times the maximum rated load and shall be designed with a support for a standard railing.

c. Two-point suspension scaffolds shall be securely lashed to the structure. Window cleaner's anchors shall not be used.

d. The platform on every two-point suspension scaffolds shall be of the light metal-, ladder-, plank-, or beam-type.

e. Two-point suspension scaffolds shall not be joined by bridging.

f. Two-point suspension scaffold platforms, when in use, shall be level within 1 in (2.5 cm) for every 1 ft (0.3 m) of platform length.

22.E.12 Mason's multiple-point adjustable suspension scaffolds.

- a. When employees on the scaffold are exposed to overhead hazards, overhead protection equivalent in strength to 2-in (5-cm) planking shall be provided on the scaffold not more than 9 ft (2.7 m) above the platform, laid tight and extending the entire width of the scaffold.
- b. The scaffold shall be capable of sustaining a load of 50 psf (2394 Pa) and shall not be overloaded.
- c. The platform shall be suspended by wire ropes from overhead outrigger beams.

22.E.13 Stonesetters' multiple-point adjustable suspension scaffolds.

- a. Stonesetters' multiple-point adjustable suspension scaffolds shall be capable of sustaining a load of 25 psf (1197 Pa) and shall not be overloaded.
- b. Stonesetters' multiple-point adjustable suspension scaffolds shall not be used for storage of stone or other heavy materials.
- c. The scaffold platform shall be securely fastened to the hangers by U-bolts or other equivalent means.
- d. Stonesetters' multiple-point adjustable suspension scaffolds shall be suspended from metal outriggers, iron brackets, wire rope slings, or iron hooks.
- e. When two or more stonsetters' multiple-point adjustable suspension scaffolds are used on a structure, they shall not be bridged one to the other, but shall be maintained at even height with platforms abutting closely.

22.E.14 Working capacities.

- a. On suspension scaffolds designed for a working load of 500 lb (226.8 kg), no more than two employees shall be permitted to work at one time.
- b. On suspension scaffolds with a working load of 750 lb (340.2 kg), no more than three people shall be permitted to work at one time.

22.F HANGING SCAFFOLDS

22.F.01 A hanging scaffold is a scaffold/work platform that is hung from a location (such as a lock gate) for work to be performed and that remains stationary until it is then repositioned with a crane/hoisting device. Hanging scaffolds shall be designed by a Registered Professional Engineer (RPE) competent in structural design. Scaffold performance and components shall meet or exceed those for general scaffolds and platforms found in ANSI A10.8-2001. > **See Figure 22-1.**

22.F.02 Hanging scaffolds shall meet the following requirements:

EM 385-1-1
XX Jun 13

a. The scaffold shall be securely fastened to a vertical structure (i.e. wall, lock gate, etc.) by hooks over a secured structural supporting member, bolt-on brackets, or other secure attachment. The maximum span between secure attachments is 8 ft (2.4 m). Fasteners shall be of adequate size to achieve design strength of scaffold.

b. The scaffold must be secured against an uplift force equal to two times the weight of the scaffold and its rated load by means of hooks, brackets, or other secure attachments designed and placed to counteract uplift.

c. The scaffold shall have a secondary attachment method to secure it against falling if the primary attachment fails. This should be a flexible attachment, such as wire rope or chain, designed to withstand a minimum of five (5) times the weight of the scaffold and its rated load. The secondary attachment shall be connected to an anchor point of the same load rating or greater.

d. The scaffold shall have only one working level. Working platform decks shall be slip resistant and securely attached to the scaffold frame. The maximum width, front to back, of decks is 42 in (106.6 cm). Grating used for deck surfaces shall have a maximum width opening between bars small enough to prevent the rigging components used (slings, chains) from entering.

e. Standard guardrails systems meeting the requirements of 21.E.01 shall be installed on all open sides and ends of the platform.

f. The scaffold shall be conspicuously posted with a plate or other permanent marking that indicates:

(1) the weight of the scaffold;

(2) the number of personnel it was designed for;

(3) the rated weight capacity;

(4) the specific structure(s) it was designed to be attached to – this may be a code or other form of identification when designed for a number of different structures with similar structural attachment points;

(5) the name of the RPE who designed the scaffold;

(6) the date of manufacture;

g. Hanging scaffolds designed to also function as crane-supported work platforms shall meet the requirements of Section 16.T. This includes scaffolds that require a person to stand/ ride on the platform while the initial attachment to the structure is made.

h. The space between the platform deck edge and the face of the vertical structure shall not be more than 14 in. Prior to use on each jobsite application, the Competent Person shall determine if this space constitutes a hazard by being large enough to allow tools/objects to fall on workers below, or if crane rigging may enter and entangle in the space. In these situations, the space shall be closed or blocked to remove the hazard.

22.F.03 Testing

a. Prior to initial use and after any modification of the structural members or secure attachment points, the platform shall be proof tested to 125% of its rated capacity. The test shall take place on a structure the scaffold was designed for or a test structure with similar support member characteristics.

b. Prior to use on each jobsite or placement location, hanging scaffolds shall be performance tested to 100% of the maximum intended load for the expected work. This test shall be performed with the scaffold attached to the structure in the work location.

22.F.04 Operations

a. Scaffolds and their attachments shall be inspected by a Competent Person prior to initial use on a worksite, before use on each work shift, and regularly during use until they are removed.

b. Workers shall use properly selected and anchored personal fall protection when accessing and working on hanging scaffolds. Personal fall protection system components shall meet the requirements of 21.H.05. No part of a hanging scaffold shall be used as an anchor point for personal fall protection.

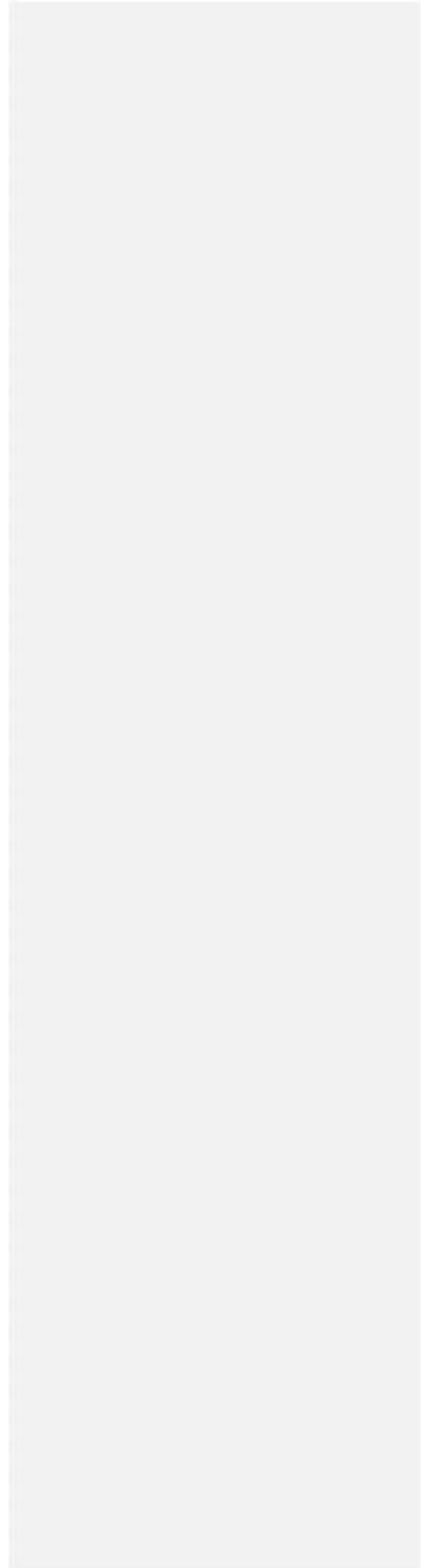
c. The number of workers on the platform shall not exceed the number listed on the scaffold.

d. Ladders may not be used on hanging scaffolds, except as a means of access from above the deck. Ladders used for access must meet the requirements of 24.B.

e. Hanging scaffolds shall be coated or painted to minimize corrosion of the components. Storage between uses shall be designed to minimize damage to the scaffold.

FIGURE 22-1
Hanging Scaffold
(drawing didn't transfer)

EM 385-1-1
XX Jun 13



22.G FORM AND CARPENTER'S BRACKET SCAFFOLDS

22.G.01 ~~At the minimum, Form~~ scaffolds shall be designed in accordance with Table 22-7.

22.G.02 Each bracket, except for wooden-bracket form scaffolds, shall be attached to the supporting formwork or structure by means of one or more of the following:

- a. Nails;
- b. A metal stud attachment device;
- c. Welding;
- d. Hooking over a secured structural supporting member, provided the form walers are bolted to the form or secured by snap ties or tie-bolts extending through the form and securely anchored; or
- e. For carpenter's bracket scaffolds only, by a bolt extending through to the opposite side of the structure's wall.

22.G.03 Wooden form scaffolds shall be an integral part of the form panel.

22.G.04 Folding-type metal brackets, when extended for use, shall be either bolted or secured with a locking-type pin.

22.G.05 Brackets shall consist of a triangular shaped frame made of wood with a cross-section not less than 2-in x 3-in (5-cm x 7.6-cm) or of 1-1/4-in x 1-1/4-in x 1/8-in (3.1-cm x 3.1-cm x 0.3-cm) structural angle iron.

TABLE 22-7
FORM SCAFFOLDS
Minimum design criteria for light-duty wooden bracket form scaffolds

Members	Dimensions
Bracket uprights	2 x 4 in or 2 x 6 in (5 x 10.1 cm or 5 x 15.2 cm)
Bracket support ledgers	2 x 6 in (5 x 15.2 cm)
Maximum bracket width	3 ft 6 in (1 m)
Bracket braces	1 x 6 in (2.5 x 15.2 cm)
Guardrail post	2 x 4 in (5 x 10.1 cm)
Guardrail height	36 to 42 in (91.4 to 106.6 cm)
Midrail	1 x 6 in (2.5 x 15.2 cm)
Toeboards	1 x 6 in (2.5 x 15.2 cm)
Bracket upright spacing	8 ft (2.4 m) (on centers)

Comment [teg28]: Unnecessary wording

**TABLE 22-7 (CONTINUED)
FORM SCAFFOLDS
Minimum design criteria for light-duty figure-four form scaffolds**

Members	Dimensions
Bracket uprights	2 x 4 in or 2 x 6 in (5 x 10.1 cm or 5 x 15.2 cm)
Bracket outrigger ledgers	(2) 1 x 6 in (2.5 x 15.2 cm)
Bracket braces	(2) 1 x 6 in (2.5 x 15.2 cm)
Maximum length of ledgers	3 ft 6 in (1 m) (unsupported)
Bracket upright spacing	8 ft (2.4 m) (on centers)

**TABLE 22-7 (CONTINUED)
FORM SCAFFOLDS
Minimum design criteria for light-duty metal bracket form scaffolds**

Members	Dimensions
Guardrail post	2 x 4 in (5 x 10.1 cm)
Guardrail	2 x 4 in (5 x 10.1 cm)
Guardrail height	36 to 45 in (91.4 to 114.3 cm)
Midrail	1 x 6 in (2.5 x 15.2 cm)
Toeboards	1 x 6 in (2.5 x 15.2 cm)
Metal bracket spacing (metal bracket or scaffold jack dimensions in accordance with manufacturer's design)	8 ft (2.4 m)

22.G.06 Bolts used to attach brackets to structures shall not be less than 5/8 in (1.5 cm) in diameter.

22.G.07 Maximum bracket spacing shall be 8 ft (2.4 m) on centers.

22.G.08 Figure-four form scaffolds shall have bearers consisting of two pieces of 1-in x 6-in (2.5-cm x 15.2-cm) lumber nailed on opposite sides of the vertical support; bearers shall project not more than 3.5 ft (1 m) from the outside of the form support and shall be braced and secured to prevent tipping or turning.

22.G.09 The knee or angle brace for figure four form scaffolds shall intersect the bearer at least 3 ft (0.9 m) from the form at an angle of 45° and the lower end shall be nailed to a vertical support.

22.G.10 Form and Carpenter bracket scaffolds, when over 6 feet (1.8m) high will be equipped with a standard guardrail or other means of fall protection shall be used.

Comment [teg29]: Reiterates our 6 foot rule

22.H HORSE SCAFFOLDS

22.H.01 Horse scaffolds shall not be constructed or arranged more than two tiers or 10 ft (3 m) in height: scaffolds shall be 5° feet or less in height and 5 ft (1.5 m) or more in width. When heights exceed 6 feet (1.8m) some type of fall protection shall be used.

Comment [teg30]: Reiterates our 6 foot rule

22.H.02 The members of horse scaffolds shall not be less than those specified in Table 22-8.

**TABLE 22-8
MINIMUM DIMENSIONS FOR HORSE SCAFFOLD MEMBERS**

Members	Dimensions
Horizontal members of bearers	3 x 3.9 in (7.6 x 10 cm)
Legs	2 x 3.9 in (5 x 10 cm)
Longitudinal brace between legs	1 x 5.9 in (2.5 x 15 cm)
Gusset brace at top of legs	1 x 7.9 in (2.5 x 20 cm)
Half diagonal braces	2 x 3.9 in (5 x 10 cm)

22.H.03 Horse scaffolds shall be spaced not more than 5 ft (1.5 m) for medium duty and not more than 8 ft (2.4 m) for light duty.

22.H.04 When arranged in tiers, each horse scaffold shall be placed directly over the horse scaffold in the tier below. The legs shall be nailed or otherwise secured to the planks to prevent displacement or thrust and each tier shall be cross braced.

22.H.05 Weakened or defective components shall not be used.

Comment [teg31]: Per ANSI A10.8

22.I PUMP JACK SCAFFOLDS

~~22.I.01 Pump jack scaffolds shall not carry a working load exceeding 500 lb (226.8 kg). The components shall not be loaded in excess of the manufacturer's recommended limits. Pump jack scaffolds shall be designed for a minimum working load of 500 lbs. (226.8 kg) and not more than two (2) workers shall be allowed on the scaffold at one time.~~

Comment [teg32]: Clarified the intent; used ANSI A10.8 wording.

22.I.02 Pump jack brackets, braces, and accessories shall be fabricated from metal plates and angles and installed in accordance with the manufacturer's recommendations. Installation and operational manuals shall be available upon request of the GDA.

22.I.03 The standing platform shall be fully decked and the planking secured. Platforms thicker than two (2) inches (5.08 cm) shall not be overlapped.

Comment [teg33]: 22.I.03 thru 22.I.10 are per ANSI A10.8

22.I.04 The minimum width of a standing platform shall be 18 inches (45.7 cm) and the work bench shall be 12 inches (30.4 cm).

EM 385-1-1
XX Jun 13

22.1.05 All materials on the work bench shall be secured from falling.

22.1.06 Pump jack scaffolds shall be provided with a guardrail system as specified by the manufacturer. Personal fall arrest systems may be used in lieu of guardrails.

22.1.07 When a workbench is used at an approximate height of 42 inches (1.06 m) the top rail may be eliminated if the workbench is fully decked, if the workbench is secured, and if it is capable of withstanding 200 pounds (90.7 kg) force in any direction.

22.1.08 Workbenches shall not be used as a standing platform.

22.1.09 A ladder shall be provided for access to the platform.

22.1.10 All poles shall be supported by sills or other foundations adequate to support the load.

Poles.

a. Pole lumber shall be two 2-in x 4-in (5-cm x 10.1-cm) stock, of Douglas fir, or equivalent, straight-grained, clear, free of cross-grain, shakes, large loose or dead knots, and other defects that might impair strength.

b. Wood poles shall not exceed 30 ft (9.1 m) in height; and spacing cannot exceed 7 feet (2.13 m).

c. Metal poles shall not exceed 50 feet (15.2 m) in height unless the design is approved by an RPE. The spacing of metal poles in excess of 7 feet (2.13 m) must also be determined by an RPE.

c. When poles are constructed of two continuous lengths they shall be of 2-in x 4-in (5-cm x 10.1-cm) (kiln dried straight grain fir) or equivalent stock, spiked together with the seam parallel to the pump jack, bracket, and with 10d common nails, ~~no more than~~ 12 in (30.4 cm) center-to-center, staggered uniformly from opposite outside edges.

d. ~~If 2-in x 4-in (5-cm x 10.1-cm) stock is spliced to make up the pole, the splices shall be so constructed as to develop the full strength of the member. 4-inch by 4-inch (10.1 cm by 10.1 cm) wood poles may not be spliced to increase the length of any individual member.~~

e. Poles shall be secured to the wall by triangular bracing, or equivalent, at the bottom, top, and other points to provide a maximum vertical spacing of not more than 10 ft (3 m) between braces. Each brace shall be capable of supporting a minimum of 225-lb (102-kg) tension or compression.

f. When wood scaffold planks are used as platforms, poles used for pump jacks shall not be spaced more than 10 ft (3 m) on center. When fabricated platforms are used that

Comment [teg34]: Per ANS A10.8

Comment [teg35]: Deleted portion not in ANSI A10.8; added portion is in ANSI.

comply with all other provisions of this Section, pole spacing may exceed 10 ft on center if permitted by the manufacturer.

g. Poles shall not be used in the immediate vicinity (> 10 feet; 3.04 m) of power lines or electrical conductors until such are insulated, de-energized, or otherwise rendered safe against contact. (Reference table 11-1)

22.I.04 Brackets.

a. Each pump jack bracket shall have two positive gripping mechanisms to prevent any failure or slippage.

~~b. Platform brackets shall be fully decked and the planking secured.~~

Comment [teg36]: Moved to 22.I.03

~~be.~~ For the pump jack bracket to pass bracing already installed, an extra brace shall be used approximately 4 ft (1.2 m) above the one to be passed until the original brace is reinstalled.

~~22.I.05 Not more than two persons shall be permitted at one time upon a pump jack scaffold between any two supports.~~

Comment [teg37]: Addressed in 22.I.01

~~22.I.06 When a work bench is used at an approximate height of 42 in (106.6 cm), the top guardrail may be eliminated if the work bench is fully decked, the planking secured, and is capable of withstanding 200 lb (90.7 kg) pressure in any direction. Employees shall not be permitted to use a workbench as a scaffold platform.~~

Comment [teg38]: Moved to 22.I.07

~~22.I.07 A ladder shall provide access to the platform during use.~~

Comment [teg39]: Moved to 22.I.09

22.J ADJUSTABLE SCAFFOLDS

22.J.01 Adjustable scaffolds shall be designed and constructed in accordance with ANSI/SIA A10.8.

22.J.02 A copy of the user's manual shall be kept of site at all times.

22.J.03 Adjustable scaffolds will be secured to the structure in accordance with the manufacturer's user manual.

22.J.04 Safe access: ~~will be provided in accordance with Section 24.~~

a. If portable ladders are used they will be removed every time the platform is raised or lowered, repositioned to ensure that the 4:1 ratio is maintained and and secured to prevent movement.

Comment [TEG40]: Based on a manufacturers suggestion; he preferred not allowing portable ladder access at all because what is suggested here doesn't happen and the ladder ends up separating or being pulled out of the 4:1 angle.

b. Stair towers will not be used for access to adjustable scaffolds.

Comment [TEG41]: Based on suggestion of a manufacturer; stair landings end at fixed elevations. Mast-climbers and adjustable scaffolds have platforms that can be positioned at any elevation. This often leads to a transition between the stair landing and the platform that exceeds the acceptable 24 inches allowed by OSHA (1926.451(e)(8))

c. Self-retracting lanyard, if allowed by the manufacturer, can be used to provide fall protection when climbing the tower. A vertical lifeline with a

rope grab cannot be used because three points of contact must be maintained when climbing a ladder.

d. On towers over 35 feet (10.7m) rest platforms will be provided at intervals no more than 35 feet (10.7).

Comment [TEG42]: Consistent with 1926.451(e)(6)(v)

22.J.05 The leveling of adjustable scaffold will be accomplished by using leveling jacks.

~~22.J.06 Bridges will not be permitted on a single tower and used as a "mini-mast climbing scaffold".~~ 22.J.06 When bridges are used on a single tower it will be done in strict compliance with the manufacturer's recommendations.

Comment [TEG43]: Delete: this as worded. It was included based on a serious, non-corps accident that resulted in fatalities. The scaffold was poorly maintained and overloaded. The practice of using it as a mini mast-climber was not the direct cause and according to the manufacturer of the scaffold that failed it is designed for such use.

22.J.06 Ratchet driven winding drum hoist shall be equipped with a driving pawl and a locking pawl. The locking pawl must automatically engage when the driving pawl is released.

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Comment [teg44]: Per ANSI A10.8

22.J.07 All crank-driven winding drum hoists shall employ a positively actuated locking pawl that engages the drive train of the hoist and is actuated by reverse descending movement of the crank handle. This mechanism shall not be rendered inoperative by outside contamination.

Comment [teg45]: Per ANSI A10.8

22.J.08 Every winding drum shall contain not less than three wraps of the suspension wire rope at the lowest point of hoist travel.

Comment [teg46]: Per ANSI A10.8

22.J.09 Each hoist shall be provided with positive wire rope attachments. Wire rope attachments shall develop a minimum of 80% of the wire rope breaking strength. Wire rope termination methods shall be according to the manufacturer's recommendation. U-type wire rope clips shall not be used as a wire rope termination method.

Comment [teg47]: Per ANSI A10.8

22.J.10 The wire rope shall be capable of supportable at least six times the scaffold's design load.

Comment [teg48]: Per ANSI A10.8

22.J.11 Employers shall instruct and supervise their employees in the safe use of the adjustable scaffolding provided and shall supply them with all of the manufacture's instructional material.

Comment [teg49]: Per ANSI A10.8

22.J.12 Personnel shall not work on scaffolds during storms, high winds or other adverse weather conditions.

Comment [teg50]: ANSI A10.8

**22.K CRANE SUPPORTED WORK (PERSONNEL)
PLATFORMS.** See Section 16.T

22.L ELEVATING WORK PLATFORMS

22.L.01 Elevating work platforms shall be designed and constructed in accordance with ANSI/Scaffold Industry Association (SIA) A92.3, ANSI/SIA A92.5, and ANSI/SIA A92.6, as appropriate.

22.L.02 Elevating work platforms shall be operated, inspected, and maintained as specified in the operating manual for the equipment.

a. Elevating work platforms shall also comply with requirements of this Section and 18.G.

b. Records of inspections conducted while the unit is at the work site shall be maintained at the work site.

c. Height to base width ratio of the scaffold during movement is 2:1 or less, or per manufacturer's instructions.

d. All elevating work platforms shall have the manufacturer's operating manual readily available on the equipment.

e. Elevating work platforms will not be operated unless the access door or chains are in the closed position.

f. Fall protection shall be used in accordance with section 21.J.04 of this manual.

g. Climbing of the rails is prohibited.

22.L.03 All boom-supported elevating work platforms shall be equipped with an alarm, or other suitable warning device, at the platform. The alarm shall be in operable condition and shall automatically activate when the machine base is more than 5° out of level in any direction.

22.L.04 Only personnel trained in the use of the elevating work platform shall be authorized to operate it. Training shall consist of:

a. Reading and understanding the manufacturer's operating manual and any associated rules and instructions, or training by a Qualified Person on the contents on these documents, and

b. Reading and understanding all decals, warnings, and instructions on the elevating work platform.

Comment [teg51]: ANSI/SIA A92.3, 4.21; ANSI/SIA A92.5, 4.17 & ANSI/SIA A92.6, 7.2.1 all require a weather tight storage compartment for the operator's manuals. While they fall short on specifying that the manual be kept on the machine in these compartments I believe the intent is clear.

Comment [teg52]: Suggested by Mr. Mark Nelson, San Juan Construction.

Comment [teg53]: Issue raised by Mr. Nelson, San Juan Construction. Reiterated here to reinforce fall protection requirement when using this equipment.

Comment [teg54]: Suggested by Mr. Mark Nelson, San Juan Construction.

EM 385-1-1
XX Jun 13

22.L.05 Before operating the work platform the operator shall:

- a. Survey the work area for loose or soft ground, ditches, drop-offs or holes, bumps and floor obstructions, debris, overhead obstructions, ground and elevated energy sources, and other possible hazards;
- b. Ensure the elevating work platform is on a firm, level surface;
- c. Ensure the work platform is loaded in accordance with the manufacturer's specifications;
- d. Ensure that outriggers and/or stabilizers are used if required by the manufacturer;
- e. Ensure that, if the vehicle is on wheels, the wheels are locked or chocked; and
- f. Ensure that fall protection systems are in place.

22.L.06 Elevating work platforms shall not be used by persons working on energized electrical wiring and/or equipment.

22.M VEHICLE-MOUNTED ELEVATING AND ROTATING WORK PLATFORMS (Aerial Devices/Lifts).

22.M.01 Vehicle-mounted elevating and rotating work platforms (aerial lifts, to include articulating boom platforms/lifts (knuckle boom lifts), trailer-mounted boom lifts) shall be designed and constructed per ANSI/SIA A92.2.

22.M.02 Vehicle-mounted elevating and rotating work platforms shall be operated, inspected, tested, and maintained as specified in the operating manual for that piece of equipment.

a. Vehicle-mounted elevating and rotating work platforms shall also comply with requirements ~~of this s~~Section ~~and~~ 18.G and section 21.

b. Records of inspections conducted while the unit is at the work site shall be maintained at the work site.

c. All aerial devices shall have manufacturer's operating manual readily available in or on the vehicle.

d. If the unit is considered rated, and used as an insulating device, copies of the electrical insulating components and system tests conducted while the unit is at the work site shall be maintained at the work site.

e. All required safety decals, labels and signs shall be in place and readable.

22.M.03 Only personnel trained in the use of the vehicle-mounted elevating and rotating work platform shall be authorized to operate it. Training shall consist of:

- a. Reading and understanding the manufacturer's operating manual and any associated rules and instructions, or training by a Qualified Person on the contents on these documents; and
- b. Reading and understanding all decals, warnings, and instructions on the vehicle-mounted elevating and rotating work platform.

22.M.04 Transporting.

- a. An aerial lift truck, to include cherry pickers, shall not be moved when the boom is elevated in a working position with personnel in the basket except for equipment that is specifically designed for this type of operation.
- b. Before moving an aerial lift, the boom(s) shall be inspected to see that it is properly cradled and outriggers are in stowed positions, except as provided in a, above.
- c. Aerial ladders shall be secured in the lower traveling position by the locking device on top of the truck cab and the manually operated device at the base of the ladder before the truck is moved for highway travel.

22.M.05 Operating practices.

- a. Brakes shall be set and outriggers, when used, shall be positioned on pads or a solid surface.
- b. Wheel chocks shall be installed before using an aerial lift on an incline.
- c. Lift controls shall be tested each day prior to use to ensure safe working condition.
- d. Boom and basket load limits specified by manufacturer shall not be exceeded.
- e. Articulating boom and extensible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls.
 - (1) Upper controls shall be in or beside the platform within easy reach of the operator.
 - (2) Lower controls shall provide for overriding the upper controls.
 - (3) Controls shall be plainly marked as to their function.
 - (4) Lower level controls shall not be operated unless permission has been obtained from the employee in the lift except in case of emergency.

EM 385-1-1
XX Jun 13

- f. Climbers shall not be worn while performing work from an aerial lift.
- g. The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.
- h. Occupants shall always stand firmly on the floor of the basket and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.

22.N MAST CLIMBING WORK PLATFORMS

22.N.01 Mast Climbing work platforms shall be erected, used, inspected, tested, maintained, and repaired in accordance with ANSI A 92.9-2011 (henceforth referred to as 'ANSI'), the IPAF/SAIA Safe Use Guidelines for Mast Climbing Work Platforms-2010 (henceforth referred to as 'IPAF/SAIA') and the manufacturer's recommendations as outlined in the operating manual, henceforth referred to as 'manual'.

Comment [teg55]: Per Clint Bridges, EZ Scaffold

22.N.02 A pre-use inspection will be performed prior to erecting the work platform, according to requirements set out in IPAF/SAIA and the manual.

Comment [teg56]: Per Clint Bridges, EZ Scaffold

a. An overhead inspection will be done to ensure that the work platform will not come in contact with any obstructions while moving up or down the mast. Special attention will be given to high voltage conductors. Once the voltage of the line(s) is established the minimum safe approach distance in table 11-1 of EM 385-1-1 will be used.

Comment [teg57]: Proposed by Clint Bridges; however, EM 385-1-1 has the same table and rather than reference ANSI we have referenced table 11-1 of EM 385-1-1. The tables are the same.

b. An inspection of the ground will be done to ensure that there are no obstacles around the work platform and in the path of travel (if the unit is on a mobile chassis) such as holes, drop-offs, debris, ditches, or soft fill. For static and mobile units, compaction will be sufficient to support the static and live loads for the configuration. The perimeter around the base of the unit, matching the length and width of the platform area above, shall be identified as restricted access by use of danger signs, tape, fences, or other suitable means.

Comment [teg58]: Per Clint Bridges, EZ Scaffold

c. Daily maintenance and inspections will be performed by a qualified person and documented. Copies will be maintained on the job site.

Comment [teg59]: Per Clint Bridges, EZ Scaffold

22.N.03 Only a designated, trained and familiarized operators wishall operateuse the mast climbing work platform. Training records shall be maintained for for at least three (3) years and maintained on-site. All personnel on the platform shall be trained as operators.

Comment [teg60]: Comments from Kevin O'Shea< Mast Climbers, LLC and member of SAIA and ANSI committee member and Clint Bridges, EZ Scaffold.

22.N.04 The platform will not be raised on uneven or sloped surfaces unless outriggers are used to level the platform and the ground is suitable to support the load.

22.N.05 Platforms shwill not be raised without outriggers extended and locked in proper operating position, all outriggers shall be under pressure. The unit shwill be leveled before raising the platform (mast should be vertical in both planes). **NOTE: Not all Mast Climbing Work Platforms are designed with freestanding capability.**
Check the machine and manual to see if the machine being operated has a freestanding height.

Comment [teg61]: Per Clint Bridges, EZ Scaffold

Comment [teg62]: Per Clint Bridges, EZ Scaffold

22.N.06 If the unit is on a powered chassis, tThe platform must be lowered to it's lowest position priorwhen to it being moved, additionally all material and tools must be removed from the platform, the outriggers must be fully extended, open and the lacks must be raised no more than 1 inch from the ground. When moved into its new working position, the unitand must be set up and leveled againeach time before it is elevated. The work platform shall remain horizontal within 2 degrees during normal movement of the platform.

Comment [teg63]: Per Clint Bridges, EZ Scaffold

Comment [g64]: ANSI 92.9 5.3.1.1

22.N.07 A mast climbing work platform, with platform elevated or personnel on the platform, shwill not be driven. The manufacturer's instructions will be followedreferred to when moving a mast climbing work platform to determine the safe mast height for ground conditions, ground slope, and overhead obstructions.

Comment [teg65]: Per Clint Bridges, EZ Scaffold

22.N.08 Mast climbing work platforms will be properly tied to the building (or structure) within the manufacturer's recommended guidelines unless it is designed to be freestanding. A qualified person shall demonstrate the correct anchoring method based on tensile, shear and torsion forces as advised by the manufacturer, and with respect to the strength of the structure to be tied to, following all relevant advice on installation from the anchor manufacturer's data.

Comment [teg66]: Per Clint Bridges, EZ Scaffold

22.N.09 Mast climbing work platforms will not be moved unless everyone on the platform is aware of the direction the platform is being moved and when movement will commence.

Comment [teg67]: Per Clint Bridges, EZ Scaffold

22.N.10 No ladders or structures of any kind will be used to increase the size or working height of platform.

22.N.11 Access

a. Climbing of braces and guardrails is prohibited. When access ladders, including masts designed as ladders, exceed 20 ft (6 m) in height, positive fall protection shall be used.

b. All access gates shall either close autmotically or be electronically interlocked to prevent operation of the work platform unless they are closed. Chains or ropes shall not be used as access gates

Comment [g68]: ANSI 92.9 5.3.3.1

EM 385-1-1
XX Jun 13

22.N.12 The work platform will not be raised in windy or gusty conditions. The operation manual will be followed to determine maximum in-service wind speed conditions. A copy of the operation manual will be available on the job site.

22.N.## Loads and forces shall be accounted for and followed per manufacturer instructions.

Comment [g69]: ANSI 92.9

22.N.13 Platforms will not be altered or modified in any way, unless done by a qualified person. Changing the configuration may change load capacity, freestanding height, and tie frequency. Mechanical, hydraulic, or electrical changes can only be done by a qualified person as they may adversely affect operation of ~~this machine~~ the unit.

22.N.14 A Competent Person will perform daily maintenance and inspections.

22.N.15 Training. Personnel will be trained and familiarized by a Qualified Operator (Qualified by either a manufacturer or an Industry recognized training course), before using and/or operating mast climbing work platforms. Anyone involved in erecting, disassembling, moving, operating, using, repairing, maintaining or inspecting a scaffold shall be trained by a Competent Person to recognize any hazards associated with the work in question. Proof of training shall be

Comment [g70]: Kevin O'Shea

Each user and operator will:

a. Read and understand all cautions and danger warnings on the machine and in the operator's manual, including the maximum uniformly distributed load allowable for the specific configuration, the maximum point load allowed for the configuration, information relating to the placement of these loads on the platform, and any load reductions or restrictions (e.g., planking and cantilevers).

Comment [teg71]: Per Clint Bridges, EZ Scaffold

b. ~~Have a~~ Demonstrate a comprehensive solid working understanding of the controls and safety systems.

Comment [teg72]: Kevin O'Shea

c. Understand the hazards associated with the use of mast climbing work platforms.

d. Ensure that only authorized personnel use the platform.

e. Successfully demonstrate a comprehensive knowledge of pre-use inspection criteria, specific for the make and model.

Comment [teg73]: Kevin O'Shea

22.N.17 Operators shall have specific equipment familiarization prior to operation to include distributed loading and point loading characteristics.

Comment [g74]: Request from Kevin O'Shea

22.N.18 ~~6~~. A damaged or malfunctioning machine will not be used. Operation of damaged equipment shall be discontinued until the unit is repaired.

Comment [g75]: Change to add 22.N.17

22.N.19 Mast climbing work platforms shall be equipped with a permanently installed device on the workplatform to switch off the workplatform and secure it from unauthorized use.

Comment [g76]: ANSI 92.9 5.2.1.2

22.N.20 Planking & decking) shall follow the guidelines set forth in OSHA regulation (29 CFR 1926)

22.N.21 Guarding

a. All sides of platform shall be equipped with a guardrail which can be securely fastened in place. Guard rails shall be secured per thewith manufacturer's instructions shall withstand without failure a force of 300lbs, applied in any outward or downward direction.

be If the platform is erected towards a wall and the distance is more than 14 in (0.36 M) a guardrail shall be required . The maximum distance between wall and platform shall increase to 18 inches (0.46 m) for plastering and lathing operations. When it is possible to have a horizontal distance between the wall and platform of not more than 14 inches (036 m) then a guardrail is not necessary.

Comment [g77]: ANSI 92.9 5.3.2.3

22.N.22 Annual inspection. An annual inspection will be performed in accordance with the manufacturer's manual no later than thirteen months from the date of the prior inspection. The inspection shall be performed by a person qualified on the specific make and model of mast climbing work platform. A copy of the inspection shall be maintained on site with the owner's manual.??

Comment [teg78]: Per ANSI A92.9, 6.5

22.N.23 Guarding of center mast on the work platform?? The platform shall include a mast guard around at least three sides of the mast contiguous with the platform. The guard shall provide protection from not more than 1 inch (2.5cm) above the platform floor to a minimum height of 6 feet 6 inches (1.98 m) above the platform floor.

22.O ROOFING BRACKETS

22.O.01 Roofing brackets shall be secured by nailing in addition to the pointed metal projections. Nails will be driven into a rafter or beam; not just into the decking. Fasteners will be selected in accordance with the manufacturer's recommendations.

22.O.02 When it is impractical to nail brackets, rope supports shall be used. When rope supports are used, they shall consist of first-grade manila rope, 3/4 in (1.9 cm) diameter or equivalent.

22.P STILTS

22.P.01 Stilts shall not be used on scaffolds.

EM 385-1-1
XX Jun 13

22.P.02 Surfaces on which stilts are used shall be flat and free of pits, holes, obstructions, debris and other tripping or slipping hazards.

22.P.03 Stilts shall be properly maintained. Any alteration of the equipment shall be approved by the manufacturer.

22.P.04 Stilts shall not be used on stairs. When used adjacent to stairs or ramps where a fall to a different level could occur, guardrails or other fall protection shall be provided (increased in height by an amount equal to the height of the stilts).

22.P.05 Employees shall be trained in the proper use of stilts.

22.P.06 When using stilts exposes workers to a fall of 6 ft. (1.8m) or more in areas protected by guardrails, the height of the guardrails must be raised accordingly to maintain a protective height of 42 in (107cm) above the stilt. See 21.E.06)

[Appendix Q proposed change relative to scaffolding:](#)

Competent Person for scaffolding: A person meeting the competent person requirements as defined in the definitions of EM 385-1-1 and 29 CFR Part 1926 who has been designated in writing by the employer to be responsible for the immediate supervision, implementation and monitoring of the scaffolding program, who through training, knowledge and experience in scaffolding is capable of identifying, evaluating and addressing existing and potential hazards and, who has the authority to take prompt corrective measures with regard to such hazards. [Acceptable proof of qualifications may include training certificates for specific types of scaffolding, wallet card for a specific type of scaffolding, a letter from the contractor stating the individual is a competent person, or a letter from the manufacturer or a manufacturer's representative. Regardless of what documentation is submitted it shall be specific to the type of scaffold being used, i.e., tubular frame, suspended, etc. The decision regarding whether or not an individual is considered a competent person for scaffolding will be the GDA's.](#)

Comment [teg79]: The person that suggested this wanted specific classes mentioned.