

**DEPARTMENT OF LICENSING AND REGULATORY AFFAIRS**

**DIRECTOR'S OFFICE**

**CONSTRUCTION SAFETY STANDARDS**

(By authority conferred on the director of the department of licensing and regulatory affairs by sections 19 and 21 of 1974 PA 154, MCL 408.1019 and 408.1021, and Executive Reorganization Order Nos. 1996-2, 2003-1, 2008-4, and 2011-4, MCL 445.2001, 445.2011, 445.2025, and 445.2030)

**PART 12. SCAFFOLDS AND SCAFFOLD PLATFORMS**

**R 408.41201 Scope.**

Rule 1201. This part pertains to scaffolds and scaffold platforms used in construction operations. The equipment may be commercially manufactured or job-built. This part does not apply to crane or derrick suspended personnel platforms as prescribed in Construction Safety Standard Part 10 "Cranes and Derricks" and Construction Safety Standard Part 32 "Aerial Work Platforms," as referenced in R 408.41202.

History: 1981 AACCS; 1990 AACCS; 1998-2000 AACCS; 2016 AACCS.

**R 408.41202 Adoption; availability of referenced documents.**

Rule 1202. (1) The American national standards institute standard ANSI A10.8 "Scaffolding Safety Requirements," 1977 edition, is adopted in these rules. It is available from Global Engineering Documents, 15 Inverness Way East, Englewood, Colorado, 80112, USA, telephone number: 1-800-854-7179 or via the internet at website: <http://global.ihs.com>; at a cost as of the time of adoption of these rules of \$25.00.

(2) The standard adopted in subrule (1) of this rule is available for inspection at the Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, 530 West Allegan Street, P.O. Box 30643, Lansing, Michigan, 48909-8143.

(3) The standard adopted in these rules may be obtained from the publisher or may be obtained from the Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, 530 West Allegan Street, P.O. Box 30643, Lansing, Michigan, 48909-8143, plus \$20.00 for shipping and handling.

(4) The following Michigan occupational safety and health (MIOSHA) standards are referenced in these rules. Up to 5 copies of these standards may be obtained at no charge from the Department of Licensing and Regulatory Affairs, MIOSHA Regulatory Services Section, 530 West Allegan Street, P.O. Box 30643, Lansing, Michigan, 48909-8143 or via the internet at website: [www.michigan.gov/mioshastandards](http://www.michigan.gov/mioshastandards). For quantities greater than 5, the cost, as of the time of adoption of these rules, is 4 cents per page.

(a) Construction Safety Standard Part 1 "General Rules," R 408.40101 to R 408.40134.

(b) Construction Safety Standard Part 6 “Personal Protect Equipment,” R 408.40601 to R 408.40660.

(c) Construction Safety Standard Part 10 “Cranes and Derricks,” R 408.41001 to R 408.41099a.

(d) Construction Safety Standard Part 11 “Fixed and Portable Ladders,” R 408.41101 to R 408.41140.

(e) Construction Safety Standard Part 16 “Power Transmission and Distribution,” R 408.41601 to R 408.41658.

(f) Construction Safety Standard Part 17 “Electrical Installations,” R 408.41701 to R 408.41734.

(g) Construction Safety Standard Part 21 “Guarding of Walking and Working Areas,” R 408.42101 to R 408.42160.

(h) Construction Safety Standard Part 30 “Telecommunications,” R 408.43001 to R 408.43006.

(i) Construction Safety Standard Part 32 “Aerial Work Platform,” R 408.43201 to R 408.43220.

(j) Construction Safety Standard Part 45 “Fall Protection,” R 408.44501 to R 408.44502.

(5) The appendices are informational only and are not intended to create any additional obligations or requirements not otherwise imposed or to detract from any established obligations or requirements.

History: 2016 AACCS.

### **R 408.41203 Definitions; A to C.**

Rule 1203. (1) "Adjustable multipoint suspension scaffold" means a scaffold that has a continuous platform which is supported by bearers suspended by wire rope from overhead supports that is so arranged and operated as to permit the raising or lowering of a platform to desired working positions.

(2) "Bearer," also called a putlog, means a horizontal transverse scaffold member which may be supported by ledgers or runners, upon which the scaffold platform rests, and which joins scaffold uprights, posts, poles, and similar members.

(3) "Boatswain's chair" means a single-point adjustable suspension scaffold that consists of a seat or sling designed to support 1 employee in a sitting position.

(4) "Brace" means a rigid connection that holds 1 scaffold member in a fixed position with respect to another member or that holds 1 scaffold member to a building or structure.

(5) "Bricklayer's square scaffold" means a supported scaffold that is composed of framed squares that support a platform.

(6) "Carpenter's bracket scaffold" means a supported scaffold that consists of a platform supported by brackets attached to a building or structural walls.

(7) "Carriage" means an assembled steel framework which is affixed to a scaffold and which is used to support a work platform.

(8) "Catenary scaffold" means a suspension scaffold consisting of a platform supported by 2 essentially horizontal and parallel ropes attached to structural members of a building or other structure. Additional support may be provided by vertical pickups.

(9) "Chimney hoist" means a multipoint adjustable suspension scaffold used to provide access to work inside chimneys. See "multipoint suspension scaffold."

(10) "Cleat" means a structural block used at the end of a platform to prevent the platform from slipping off its supports. Cleats are also used-to provide footing on sloped surfaces such as crawling boards.

(11) "Competent person" means a person who is experienced and capable of identifying an existing or potential hazard in surroundings, or under working conditions, that are hazardous or dangerous to an employee and who has the authority and knowledge to take prompt corrective measures to eliminate the hazards.

(12) "Coupler" means a device for locking together the component parts of a tube and coupler scaffold.

(13) "Crawling board," also called a chicken ladder, means a plank that has cleats which are spaced and secured at equal intervals for use by an employee on roofs. A crawling board is not designed to carry any material.

History: 1981 AACS; 1990 AACS; 1998-2000 AACS; 2016 AACS.

#### **R 408.41204 Definitions; D to I.**

Rule 1204. (1) "Double pole or independent pole scaffold" means a supported scaffold that consists of a platform which rests on cross beams or bearers supported by ledgers and a double row of uprights independent of support, except for ties, guys, and braces, from any structure.

(2) "Equivalent" means alternative designs, materials, or methods to protect against a hazard that the employer can demonstrate will provide an equal or greater degree of safety for employees than the methods, materials, or designs specified in these rules.

(3) "Exposed power lines" means electrical power lines which are accessible to employees and which are not shielded from contact. Exposed power lines do not include extension cords or power tool cords.

(4) "Eye" or "eye splice" means a loop that may have a thimble at the end of a wire rope.

(5) "Fabricated decking and planking" means manufactured platforms that are made of wood, including laminated wood, and solid sawn wood planks, metal, or other materials.

(6) "Failure" means load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

(7) "Float" or "ship scaffold" means a scaffold which is hung from an overhead support by means of ropes and which consists of a substantial platform that has diagonal bracing underneath and that rests upon, and is securely fastened to, 2 parallel plank bearers at right angles to the span.

(8) "Forklift truck (industrial)" means a self-loading truck which is equipped with a load carriage and forks and which is used for transporting and tiering loads.

(9) "Form scaffold" means a supported scaffold that consists of a platform supported by brackets attached to the formwork.

(10) "Guardrail" means a horizontal barrier that is erected along the exposed sides and ends of a scaffold.

(11) "Heavy-duty scaffold" means a scaffold that is designed and constructed to carry a working load of not more than 75 pounds per square foot.

(12) "Hoist" means a manual or power-operated mechanical device used to raise or lower a suspended scaffold.

(13) "Horse scaffold" means a supported scaffold that consists of a platform supported by construction horses which are the same as saw horses. Horse scaffolds constructed of metal are sometimes known as trestle scaffolds.

(14) "Interior hung scaffold" means a suspension scaffold that consists of a platform suspended from the ceiling or roof structure by fixed length supports.

History: 1981 AACCS; 1990 AACCS; 1997 AACCS; 1998-2000 AACCS; 2016 AACCS.

### **R 408.41205 Definitions; L, M.**

Rule 1205. (1) "Ladder jack scaffold" means a scaffold that is supported by brackets attached to ladders.

(2) "Ladder safety device" means a device which is installed on a ladder and which, when attached to an employee as prescribed in Construction Safety Standard Part 45 "Fall Protection," which is referenced in R 408.41202, will prevent an accidental fall of the employee.

(3) "Landing" means a platform at the end of a flight of stairs.

(4) "Large area scaffold" means a pole scaffold, tube and coupler scaffold, systems scaffold, or fabricated frame scaffold erected over substantially the entire work area, for example, a scaffold erected over the entire floor area of a room.

(5) "Lean-to scaffold" means a supported scaffold that is kept erect by tilting it toward, and resting it against, a building or structure.

(6) "Ledger" means a horizontal member of a scaffold which extends from post to post and which supports bearers that form a tie between the posts.

(7) "Light-duty scaffold" means a scaffold that is designed and constructed to carry a working load of not more than 25 pounds per square foot.

(8) "Maximum intended load" means the maximum anticipated weight of persons, equipment, material, and scaffold.

(9) "Medium-duty scaffold" means a scaffold that is designed and constructed to carry a working load of not more than 50 pounds per square foot.

(10) "Midrail" means a rail which is located approximately midway between a guardrail and platform and which is secured to uprights erected along the exposed sides and ends of a platform.

(11) "Mobile scaffold" means a powered or unpowered portable caster or wheel-mounted supported scaffold.

(12) "Mobile scaffold tower" means a type of freestanding scaffolding that can be manually moved horizontally from 1 area to another.

(13) "Multi-level suspended scaffold" means a scaffold that is manufactured to have 2 or more work platforms which are 1 above another and which are connected vertically to each other by rigid metal members, all of which are suspended from overhead supports.

(14) "Multi-point adjustable suspension scaffold" means a suspension scaffold consisting of at least 1 platform which is suspended by more than 2 ropes from overhead

supports and equipped with means to raise and lower the platform to desired work levels. These scaffolds include chimney hoists.

History: 1981 AACCS; 1990 AACCS; 1998-2000 AACCS; 2016 AACCS.

**R 408.41206 Definitions; N to R.**

Rule 1206. (1) "Needle beam scaffold" means a scaffold that consists of a platform supported by needle beams.

(2) "Outrigger" means the structural member of a supported scaffold used to increase the base width of a scaffold to provide support for, and increased stability of, the scaffold.

(3) "Outrigger beam, also known as a "thrustout," means the structural member of a suspension scaffold or outrigger scaffold that provides support for the scaffold by extending the scaffold point of attachment to a point out and away from the structure or building.

(4) "Outrigger scaffold" means a platform supported by, and fastened to, outriggers or thrustouts projecting beyond the wall or face of the building or structure, the inboard ends of which are secured inside the building or structure.

(5) "Platform" means a work surface elevated above lower levels. Platforms may be constructed using individual wood planks, fabricated planks, fabricated decks, and fabricated platforms.

(6) "Power-operated hoist" means a hoist that is powered by other than human energy.

(7) "Pump-jack scaffold" means a scaffold for light-duty work that consists of vertical poles, platform planking, and movable brackets for raising or lowering the platform on the vertical poles by a manual pumping action.

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

(9) "Rated load" means the manufacturer's specified maximum load to be lifted by a hoist or to be applied to a scaffold or scaffold component.

(10) "Repair-bracket scaffold" means a supported scaffold that consists of a platform supported by brackets which are secured in place around the circumference or perimeter of a chimney, stack, tank, or other supporting structure by 1 or more wire ropes placed around the supporting structure.

(11) "Roof bracket scaffold" means a rooftop-supported scaffold that consists of a platform resting on angular-shaped supports.

(12) "Rough terrain forklift truck" means a wheeled-type truck which is designed primarily as a fork truck that has a vertical mast or pivoted boom, or both, which has variable fixed length reach and which may be equipped with attachments and that is intended for operation on unimproved natural terrain as well as the disturbed terrain of construction sites. A machine that is designed primarily for earth-moving, such as a loader or dozer, even though its buckets and blades are replaced with forks, or a machine that is designed primarily as an over-the-road truck that has a lifting device is not a rough terrain forklift truck.

(13) "Runner" ledger or ribbon means the lengthwise horizontal spacing or bracing member that may support the bearers.

History: 1981 AACCS; 1997 AACCS; 1998-2000 AACCS; 2016 AACCS.

Editor's Note: An obvious error in R 408.41206 was corrected at the request of the promulgating agency, pursuant to Section 56 of 1969 PA 306, as amended by 2000 PA 262, MCL 24.256. The rule containing the error was published in Annual Administrative Code Supplement, 2016. The memorandum requesting the correction was published in Michigan Register, 2017 MR 9.

### **R 408.41207 Definitions; S.**

Rule 1207. (1) "Scaffold" means a temporary elevated platform which is supported or suspended, including its supporting system and points of anchorage, and which is used for supporting an employee or materials, or both.

(2) "Shore scaffold" means a supported scaffold which is placed against a building or structure and which is held in place with props.

(3) "Single-point adjustable suspension scaffold" means a manual or power-operated unit which is supported by a single rope from an overhead support and which is arranged and operated to permit the raising or lowering of the platform to desired working positions.

(4) "Single-pole scaffold" means a type of wood pole scaffold that has a platform which rests on putlogs or cross beams, the outside ends of which are supported on ledgers secured to a single row of posts or uprights and the inner ends of which are supported on or in a wall.

(5) "Stall load" means the load at which the prime mover of a power-operated hoist stalls or the power to the prime mover is automatically disconnected.

(6) "Steel tower" means a vertical assembly of tubular steel post members connected together with welded diagonal and horizontal steel bracing.

(7) "Step, platform, and trestle ladder scaffold" means a platform resting directly on the rungs of step ladders or trestle ladders.

(8) "Stiff arm brace" means a steel horizontal member used to tie a scaffold to a structure to prevent the scaffold from overturning.

(9) "Stilt" means a device which is attached to the leg and foot or shoe of an employee and which is used to elevate the employee from a work surface.

(10) "Supported scaffold" means 1 or more platforms supported by any of the following:

(a) Outrigger beams.

(b) Brackets.

(c) Poles.

(d) Legs.

(e) Uprights.

(f) Posts.

(g) Frames.

(h) Similar rigid support.

(11) "Suspension scaffold" means 1 or more platforms suspended from an overhead structure by ropes or other nonrigid means.

History: 1981 AACCS; 1998-2000 AACCS; 2016 AACCS.

**R 408.41208 Definitions; T to W.**

Rule 1208. (1) "Toeboard" means a horizontal barrier that is erected along the exposed edges of an elevated surface to prevent materials, tools, or equipment from falling.

(2) "Tube and coupler scaffold" means a manufactured assembly that consists of all of the following:

(a) Tubing that serves as posts, bearers, braces, ties, and runners.

(b) A brace supporting the post.

(c) Special couplers that serve to connect the uprights and to join the various members.

(d) A work platform.

(3) "Tubular welded frame scaffold" or "fabricated frame scaffold" means a scaffold platform that is supported by a metal sectional frame that consists of posts and a horizontal bearer that has intermediate members.

(4) "Two-point suspension scaffold" or "swing stage" means a suspension scaffold that consists of a platform which is supported by hangers, also known as stirrups, suspended by 2 ropes from overhead supports and which is equipped with means to permit the raising and lowering of the platform to desired work levels.

(5) "Unstable objects" means items whose strength, configuration, or lack of stability may allow them to become dislocated and shift and, therefore, may not properly support the loads imposed on them. Unstable objects do not constitute a safe base support for scaffolds, platforms, or employees. Examples include, but are not limited to, barrels, boxes, loose brick, and concrete blocks.

(6) "Vertical pickup" means a rope used to support the horizontal rope in catenary scaffolds.

(7) "Window jack scaffold" means a platform which extends through a window opening and which is secured to the structure and supported by braces.

(8) "Working load" means a load that is imposed by persons, materials, and equipment.

History: 1981 AACCS; 1998-2000 AACCS; 2016 AACCS.

**R 408.41209 Training requirements.**

Rule 1209. (1) This rule supplements and clarifies the requirements of Construction Safety Standard Part 1 "General Rules," as referenced in R 408.41202, as the rule relates to the hazards of work on scaffolds. An employer shall have each employee who performs work on a scaffold trained by a person qualified in scaffold safety. The training shall enable an employee to recognize the hazards associated with the type of scaffold being used and to understand the procedures to control or minimize the hazards. The training shall include the following areas, as applicable:

(a) The nature of any electrical hazards, fall hazards, and falling object hazards in the work area.

(b) The correct procedures for dealing with electrical hazards and for erecting, maintaining, and disassembling the fall protection systems and falling object protection systems being used.

(c) The proper use of the scaffold, and the proper handling of materials on the scaffold.

(d) The maximum intended load and the load-carrying capacities of the scaffolds used.

(e) Any other pertinent requirements.

(2) An employer shall have 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 in question. The training shall include the following topics, as applicable:

(a) The nature of scaffold hazards.

(b) The correct procedures for erecting, disassembling, moving, operating, repairing, inspecting, and maintaining the type of scaffold being used.

(c) The design criteria, maximum intended load-carrying capacity, and intended use of the scaffold.

(d) Any other pertinent requirements.

(3) If an employer has reason to believe that an employee lacks the skill or understanding needed to safely perform work that involves the erection, use, or dismantling of scaffolds, then the employer shall retrain the employee so that the requisite proficiency is regained. Retraining is required in all of the following situations:

(a) Where changes at the worksite present a hazard about which an employee has not been previously trained.

(b) Where changes in the types of scaffolds, fall protection, falling object protection, or other equipment present a hazard about which an employee has not been previously trained.

(c) Where inadequacies in an affected employee's work involving scaffolds indicate that the employee has not retained the requisite proficiency for the work involved.

History: 1998-2000 AACCS; 2016 AACCS.

#### **R 408.41210 Construction and capacity generally.**

Rule 1210. (1) A scaffold shall be designed, constructed, erected, and used pursuant to the provisions of this rule. A scaffold shall be designed by a qualified person.

(2) A scaffold shall not be erected, moved, dismantled, or altered, except under the supervision of a competent person.

(3) A scaffold and its components shall be capable of supporting, without failure, not less than 4 times the maximum intended load.

(4) A specially designed scaffold that utilizes methods of bracing other than cross bracing is acceptable if the scaffold and its components comply with the requirements of this rule.

(5) A scaffold shall not be loaded to more than the designed working load.

(6) Scaffolds and scaffold components shall be inspected for visible defects by a competent person before each work shift and after any occurrence that could affect a scaffold's structural integrity. Any scaffold, including accessories such as braces,



brackets, trusses, screw legs, ladders, or platforms, that is damaged or weakened from any cause shall be immediately repaired or replaced. Any scaffold or accessories that are repaired shall have at least the original designed strength of the scaffold or accessory.

(7) An employee on a scaffold who is exposed to an overhead hazard of falling material shall be protected with overhead protection that is sufficient to prevent injury.

(8) All load-carrying wood scaffold framing members shall be a minimum of 1,500 psi fiber stress value.

(9) The poles, legs, or uprights of scaffolds shall be plumb and shall be securely and rigidly braced to prevent swaying and displacement.

(10) The support for a scaffold shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Leveling jack adjusting screws, when used, shall not extend more than 18 inches below the base of the scaffold. Unstable objects, such as barrels, boxes, pallets, brick, or concrete blocks, shall not be used to support a scaffold or work platform. Scaffold poles, legs, posts, frames, and uprights shall bear on base plates, along with mudsills or other adequate support.

(11) Scaffold components that are not designed to be compatible shall not be intermixed.

(12) A shore or lean-to scaffold shall not be used.

(13) Makeshift devices, such as, but not limited to, boxes and barrels, shall not be used on top of scaffold platforms to increase the working level height of employees.

(14) A ladder shall not be used on a scaffold to increase the working level height of employees, except on a large area scaffold where an employer has satisfied all of the following criteria:

(a) When the ladder is placed against a structure that is not a part of the scaffold, the scaffold shall be secured against the sideways thrust exerted by the ladder.

(b) The platform units shall be secured to the scaffold to prevent the units from moving.

(c) Either the ladder legs shall be on the same platform or another means shall be provided to stabilize the ladder against unequal platform deflection.

(d) The ladder legs shall be secured to prevent them from slipping or being pushed off the platform.

History: 1981 AACS; 1990 AACS; 1998-2000 AACS; 2013 AACS; 2016 AACS.

#### **R 408.41211 Access to scaffold platforms.**

Rule 1211. (1) Access to a scaffold platform shall be provided by 1 or more of the following:

(a) A ladder that conforms to Construction Safety Standard Part 11 “Fixed and Portable Ladders,” as referenced in R 408.41202.

(b) Hook-on or attachable metal ladders that are specifically designed for use in construction with manufactured types of scaffolds. If hook-on or attachable metal ladders are used as access to, or egress from, a work platform that is more than 35 feet above the ground or floor level, then a ladder safety device shall be installed or the ladders shall be offset with landing platforms and guardrails that are installed at not more than 35-foot intervals.

(c) Step or hook-on, stair-type accessories that are specifically designed for use with appropriate types of scaffolds.

(d) Direct access from an adjacent scaffold, the structure, or personnel hoist. The direct access to or from another surface shall be used only when the scaffold is not more than 14 inches(36 cm) horizontally and not more than 24 inches(61 cm) vertically from the other surface.

(e) A ramp, runway, or stairway that conforms to Construction Safety Standard Part 21 “Guarding of Walking and Working Areas,” as referenced in R 408.41202.

(2) The intermediate horizontal members of the frame of a manufactured tubular welded frame scaffold may be used instead of a ladder or stairway for access to, and egress from, the work platform, if all of the following conditions are met:

(a) All the frames and component parts are compatible in design.

(b) The intermediate horizontal members of a frame are a minimum of 11 1/2 inches in length.

(c) The horizontal members of each frame shall be uniformly spaced and shall not be more than 18 inches center to center vertically.

(d) When frames are connected vertically to one another, the distance between the bottom horizontal member of the upper end frame and the top horizontal member of the lower end frame shall be within 3 inches of the uniform spacing of the horizontal members of each frame.

(e) The elevation to the lowest horizontal member of the bottom frame shall not be more than 24 inches from the ground or floor.

(f) Each horizontal member shall be capable of supporting 300 pounds applied at its midpoint without bending or cracking.

(g) Each horizontal member shall be inspected for, and found free of, cracks, bends, or bad welds. Cracks, bends, or bad welds shall be corrected.

(h) Only 1 employee at a time shall use a horizontal member of a frame as access to, or egress from, the workstation.

(i) Cross braces shall not be used as a means of access.

(3) The guardrail system located on the side where horizontal members of the scaffold frame are used for access to, or egress from, a work platform shall be constructed as follows:

(a) The intermediate rail shall be omitted between the corner posts at the access location.

(b) The top rail shall be continuous between posts. A scaffold and its components shall be capable of supporting, without failure, not less than 4 times the maximum intended load.

(4) If horizontal members of scaffold frames are used as access to, or egress from, a work platform which is more than 35 feet above ground or floor level, a ladder safety device shall be installed and used or the horizontal members shall be offset with landing platforms and guardrails that are installed at not more than 30-foot intervals.

(5) Steps and rungs of ladder and stairway-type access shall line up vertically with each other between rest platforms.

(6) All of the following provisions apply to erecting or dismantling a scaffold:

(a) An employer shall provide a safe means of access for each employee erecting or dismantling a scaffold if providing safe access is feasible and does not create a greater

hazard. The employer shall have a competent person determine whether it is feasible or would pose a greater hazard to provide, and have employees use, a safe means of access. The determination shall be based on site conditions and the type of scaffold being erected or dismantled.

(b) Hook-on or attachable ladders shall be installed as soon as scaffold erection has progressed to a point that permits safe installation and use.

(c) When erecting or dismantling tubular welded frame scaffolds, endframes, that have horizontal members which are parallel, level, and not more than 22 inches apart vertically as climbing devices for access, the employer shall ensure that the tubular welded frame scaffolds are erected in a manner that creates a usable ladder and provides a good handhold and foot space.

(d) Cross braces on tubular welded frame scaffolds shall not be used as a means of access or egress.

History: 1981 AACS; 1990 AACS; 1998-2000 AACS; 2013 AACS; 2016 AACS.

**R 408.41212 Accumulation of tools, material, or debris prohibited; weather conditions; slippery conditions; electrical hazards; rope protection; fall protection.**

Rule 1212. (1) Excess tools, materials, and debris shall not be permitted to accumulate on a scaffold to create a hazard.

(2) Work on or from scaffolds is prohibited during storms or high winds unless a competent person has determined that it is safe for employees to be on a scaffold and that the employees are protected by a personal fall arrest system. Wind screens shall not be used unless the scaffold is secured against the anticipated wind forces imposed.

(3) A scaffold shall be kept free of slippery conditions such as those caused by ice, snow, oil, grease, or other slippery compounds.

(4) An employee shall not be allowed within 10 feet of uninsulated electrical energized lines.

(5) Before a scaffold is erected within 10 feet of a power line all of the following requirements shall be met, as applicable:

(a) The utility or property owner is consulted.

(b) A power line or electrical apparatus is considered energized unless the property owner or utility indicates it is de-energized and the line or apparatus is visibly grounded. If de-energizing is impractical and the equipment is exposed to contact by an employee, the minimum clearances in table 1 shall be maintained between the scaffold, employee, or material, whichever is closer.

(c) The requirements for employees performing power transmission and distribution work, electrical work, or telecommunications work are found in Construction Safety Standard Part 16 "Power Transmission and Distribution," Construction Safety Standards Part 17 "Electrical Installations," and in Construction Safety Standards Part 30 "Telecommunications," as referenced in R 408.41202.

(6) Table 1 reads as follows:

TABLE 1
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<b>INSULATED LINES</b>		
<b>VOLTAGE</b>	<b>MINIMUM DISTANCE</b>	<b>ALTERNATIVES</b>
Less than 300 volts	3 feet (0.9 meters)	
300 volts to 50 kilovolts	10 feet (3.1 meters)	
More than 50 kilovolts	10 feet (3.1 meters) plus 0.4 inches (1.0 centimeter) for each kilovolt over 50 kilovolts	2 times the length of the line insulator, but not less than 10 feet (3.1 meters)
<b>UNINSULATED LINES</b>		
<b>VOLTAGE</b>	<b>MINIMUM DISTANCE</b>	<b>ALTERNATIVES</b>
Less than 50 kilovolts	10 feet (3.1 meters)	
More than 50 kilovolts	10 feet (3.1 meters) Plus 0.4 inches (1.0 centimeter) for each kilovolt over 50 kilovolts	2 times the length of the line insulator, but not less than 10 feet (3.1 meters)

(7) Welding, burning, riveting, or open flame work shall not be performed within 10 feet of fiber or synthetic rope that is used to suspend a scaffold, unless the rope is protected from sparks, flame, or hot metal. Only treated or protected fiber or synthetic ropes shall be used for or near any work that involves the use of corrosive substances or chemicals.

(8) A suspension rope, including connecting hardware, used on nonadjustable or adjustable suspension scaffolds shall be capable of supporting, without failure, not less than 6 times the maximum intended load applied or transmitted to the rope.

(9) If personal fall arrest systems are required by these rules for the protection of employees, then the arrest system equipment shall be as prescribed in Construction Safety Standard Part 45 "Fall Protection," as referenced in R 408.41202.

(10) To reduce the possibility of welding current arcing through the suspension wire rope when performing welding from suspended scaffolds, a welder shall take the following precautions, as applicable:

(a) An insulated thimble shall be used to attach each suspension wire rope to its hanging support, such as a cornice hook or outrigger. Excess suspension wire rope and any additional independent lines from grounding shall be insulated.

(b) The suspension wire rope shall be covered with insulating material extending not less than 4 feet (1.2 meters) above the hoist. If there is a tail line below the hoist, it shall be insulated to prevent contact with the platform. The position of the tail line that hangs

free below the scaffold shall be guided or retained, or both, so that it does not become grounded.

(c) Each hoist shall be covered with insulated protective covers.

(d) In addition to a work lead attachment required by the welding process, a grounding conductor shall be connected from the scaffold to the structure. The size of the conductor shall be at least the size of the welding process work lead, and the conductor shall not be in series with the welding process or the workpiece.

(e) If the scaffold grounding lead is disconnected, the welding machine shall be shut off.

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

History: 1981 AACCS; 1990 AACCS; 1996 AACCS; 1998-2000 AACCS; 2016 AACCS.

### **R 408.41213 Guardrails; fall arrest devices.**

Rule 1213. (1) A guardrail shall be installed on any open side or end of a scaffold work platform that is 10 feet (3.1 meters) or more above the floor or ground, except for any of the following:

(a) A boatswain's chair.

(b) A catenary scaffold.

(c) A float scaffold.

(d) A ladder jack scaffold.

(e) A needle beam scaffold.

The guardrail shall be as prescribed in R 408.42150.

(2) An employee on a boatswain's chair, catenary scaffold, float scaffold, needle beam scaffold, or ladder jack scaffold shall be protected by a personal fall arrest system. An employee on a single-point or 2-point adjustable suspension scaffold shall be protected by both a personal fall arrest system and guardrail system.

(3) A personal fall arrest device as prescribed in Construction Safety Standard Part 45 "Fall Protection," as referenced in R 408.41202, shall be worn and attached to a substantial portion of a scaffold when the work platform of an adjustable suspension scaffold with overhead protection is 10 feet (3.1 meters) or more above the floor, water, or ground. Separate safety lines shall be attached to a substantial portion of the structure above and to the scaffold by an approved fall prevention device to prevent the scaffold from falling more than 12 inches if the scaffold suspension system fails.

(4) A top rail or an intermediate rail may be eliminated if the configuration of the scaffold and the material deck provides equivalent protection to prevent an employee falling from the platform or if a personal fall arrest device is worn.

(5) A cross brace may be used as part of the guardrail system as follows:

(a) If the pivot point occurs from 36 inches to 48 inches above the platform, then a midrail shall be added midway between the platform and the brace pivot point.

(b) If the pivot point occurs from 18 inches above the platform, then a top rail shall be added.

(c) If the pivot point occurs less than 18 inches or more than 48 inches above the platform, then both a top rail and midrail shall be provided.

(6) An employer shall have a competent person determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds. An employer shall provide fall protection for employees erecting or dismantling supported scaffolds where the installation and use of the protection is feasible and does not create a greater hazard.

(7) If vertical lifelines are used, then they shall be fastened to a fixed safe point of anchorage and shall be protected from sharp edges and abrasion. Safe points of anchorage include structural members of buildings, but do not include any of the following:

- (a) Standpipes.
- (b) Vents.
- (c) Other piping systems.
- (d) Electrical conduit.
- (e) Outrigger beams.
- (f) Counterweights.

(8) If horizontal lifelines are used, they shall be secured to 2 or more structural members of the scaffold or may be looped around both suspension and independent support lines equal in number to the number of points supported and equivalent in strength to the strength of the suspension ropes. Independent support lines and suspension ropes shall not be attached to the same points of anchorage

History: 1981 AACS; 1990 AACS; 1996 AACS; 1998-2000 AACS; 2016 AACS.

#### **R 408.41214 Hoisting machines generally.**

Rule 1214. (1) A hoisting machine shall carry a label of an approved nationally recognized testing laboratory, such as underwriters laboratories or factory mutual engineering corporation, which states that the machine is approved for use on a suspension scaffold, swinging scaffold, or powered mobile elevating platform.

(2) If wire rope is used to suspend an adjustable scaffold, then the rope shall be in compliance with all of the following requirements.

(a) Have the fixed end equipped with a proper size thimble and attached to the upper support member.

(b) Have the running rope securely attached to the hoisting drum and have not less than 4 wraps of the rope remain on the drum at all times.

(c) When other types of hoists are used, either the suspension ropes shall be long enough to allow the scaffold to be lowered to the level below without the rope end passing through the hoist or the rope end shall be configured or provided with means to prevent the end from passing through the hoist.

(3) A hoisting machine shall be inspected daily when in use and shall not be put in service unless it is free of defects which would affect the operation of the machine.

(4) The stall load of any scaffold hoist shall not be more than 3 times its rated load.

History: 1981 AACS; 1998-2000 AACS.

#### **R 408.41215 Powered hoisting machines.**

Rule 1215. (1) Gears and brakes of a powered hoisting machine shall be enclosed.

(2) In addition to the operating brake, a machine shall have an emergency brake which engages automatically when the normal speed of descent is exceeded.

History: 1981 AACCS; 2013 AACCS.

**R 408.41216 Manually powered hoisting machines.**

Rule 1216. (1) A manually powered hoisting device shall be equipped with a positive locking device.

(2) A manually powered machine shall be designed to prevent free-spooling of the cable drum.

History: 1981 AACCS.

**R 408.41217 Planking and scaffold platforms generally.**

Rule 1217. (1) If wood planks are used for a work platform, then the planks shall be scaffold-grade lumber that has a minimum of 1,500 pounds per square inch fiber stress value. The planks shall be not less than 2 inches by 10 inches. The platform shall consist of a minimum of 2 planks laid side by side. Each platform on all working levels of scaffolds shall be fully planked or decked between uprights where practicable. Spaces between the platform and the uprights shall not be more than 9 1/2 inches. The maximum permissible spans for 2- by 10-inch or wider planks are as follows:

	Material full thickness undressed lumber				Material nominal thickness lumber			
Working load (per square foot)	25	50	62	75	25	37	50	62
Permissible span (feet)	10	8	7	6	8	7	6	4

(2) Wood scaffold planks, laminated planks, manufactured work platforms, and picks that are found to be defective shall be removed from service and shall not be used.

(3) A manufactured pick shall be permanently marked or tagged to indicate the maximum working load and shall not be less than 14 inches wide when used in single width, except that a ladder jack scaffold may be used with a minimum 12-inch manufactured pick.

(4) Platform planks shall be laid with their edges together so the platform is tight and does not have spaces through which tools or fragments of materials can fall.

(5) Planking shall comply with all of the following provisions:

(a) Extend over the end bearer not less than 6 inches, but not more than 12 inches.

(b) Be cleated or otherwise fastened to prevent shifting and be uniform in thickness, except where lapped as prescribed in subrule (8) of this rule.

(c) Where 16-foot planks are used as prescribed in subrule (7) of this rule, tie downs are not required unless wind uplift may occur.

(6) Hook-on-type manufactured work platforms may be used if they are secured to the bearer.

(7) Where planks are lapped, each plank shall lap its bearer not less than 6 inches, which will provide a minimum overlap of 12 inches.

(8) Where a scaffold turns a corner, the planks shall be laid to prevent tipping. The planks that meet the corner bearer at an angle shall be laid first and shall extend over the diagonally placed bearer far enough to have a good bearing, but not far enough to tip. The planks that run in the different direction shall be laid so as to extend over the rest on the first layer of planks.

(9) When moving a platform to the next level, an employee shall leave the old platform undisturbed until the new platform supports have been set in place and are ready to receive the platform planks.

(10) A platform shall not deflect more than 1/60 of the span when loaded.

(11) A wood platform shall not be covered with opaque finishes, except that platform edges may be covered or marked for identification. A platform may be coated periodically with wood preservatives, fire-retardant finishes, and slip-resistant finishes; however, the coating may not obscure the top or bottom wood surfaces.

(12) The front of a platform shall be not more than 14 inches from the face of the work unless a guardrail system is erected along the front edge, or unless a personal fall arrest system is used pursuant to Construction Safety Standard Part 45 "Fall Protection," as referenced in R 408.41202, except that the maximum distance from the face of the work for plastering and lathing operations shall be not more than 18 inches.

History: 1981 AACS; 1990 AACS; 1998-2000 AACS; 2013 AACS; 2016 AACS.

#### **R 408.41218 Plywood scaffold platforms.**

Rule 1218. (1) If plywood is used as a work platform, the plywood shall be supported by 2- by 10-inch planks. The planks shall support 2 parallel edges of the plywood and shall also be spaced not more than 24 inches center to center.

(2) The plywood work surface shall be secured to the planks.

(3) If the plywood work surface is a load-carrying member, it shall have a minimum thickness of 5/8 inch.

History: 1981 AACS.

#### **R 408.41219 Protection from falling objects.**

Rule 1219. (1) In addition to wearing a hard hat, an employer shall provide an employee on a scaffold with additional protection from falling hand tools, debris, and other small objects through the installation of toeboards, screens, or guardrail systems or through the erection of debris nets, catch platforms, or canopy structures that contain or deflect the falling objects. If the falling objects are too large or heavy to be contained or deflected by any of the measures specified in this subrule, then the employer shall place



the potential falling objects away from the edge of the surface from which they could fall and shall secure the objects as necessary to prevent them from falling.

(2) If there is a danger of tools, materials, or equipment falling from a scaffold and striking employees below, then all of the following provisions apply:

(a) The area below the scaffold to which objects can fall shall be barricaded and employees shall not be permitted to enter the hazard area.

(b) A toeboard shall be erected along the edge of a platform that is more than 10 feet (3.1 meters) above lower levels. The toeboard shall span a distance sufficient to protect employees below, except on a float (ship) scaffold, where an edging of (3/4-inch by 1-1/2-inch (2- by 4- centimeters) wood or equivalent may be used in place of a toeboard.

(c) If tools, materials, or equipment are piled to a height higher than the top edge of the toeboard, then paneling or screening extending from the toeboard or platform to the top of the guardrail shall be erected for a distance sufficient to protect employees below.

(d) A guardrail system shall be installed with openings small enough to prevent the passage of potential falling objects.

(e) A canopy structure, debris net, or catch platform that is strong enough to withstand the impact forces of potential falling objects shall be erected over the employees below.

(3) Canopies, when used for falling object protection, shall comply with all of the following criteria, as applicable:

(a) A canopy shall be installed between the falling object hazard and employees.

(b) If a canopy is used on a suspension scaffold for falling object protection, then the scaffold shall be equipped with additional independent support lines equal in number to the number of points supported and equivalent in strength to the strength of the suspension ropes.

(c) Independent support lines and suspension ropes shall not be attached to the same points of anchorage.

(4) If used, toeboards shall be in compliance with both of the following provisions:

(a) Be capable of withstanding, without failure, a force of not less than 50 pounds (222 nano) applied in any downward or horizontal direction at any point along the toeboard.

(b) Be not less than 3-1/2 inches (9 centimeters) high from the top edge of the toeboard to the level of the walking/working surface. A toeboard shall be securely fastened in place at the outermost edge of the platform and have not more than 1/4 inch (0.7 centimeter) of clearance above the walking/working surface. A toeboard shall be solid or have openings of not more than 1 inch (2.5 centimeter) in the greatest dimension.

History: 1998-2000 AACCS; 2016 AACCS.

## **FLOOR AND GROUND SUPPORTED SCAFFOLDS**

### **R 408.41221 Stilts.**

Rule 1221. (1) A stilt shall be inspected for damage, wear, and corrosion. A defective stilt, including the pins and straps, shall be repaired or replaced before being placed in use.

- (2) Stilts shall be used only if all of the following conditions exist:
- (a) Floors are level.
  - (b) All floor holes are securely covered.
  - (c) When an employee is using stilts, the top edge height of the top rail, or equivalent member, shall be increased an amount equal to the height of the stilts.
  - (d) The floor is capable of supporting a load on the stilt's base plate without deformation of more than 1/4 of an inch.
  - (e) The floor is cleared of debris, materials, or liquids that could cause a slipping or tripping hazard.
- (3) Stilts shall not be used while going from one level to another.
- (4) An employee may wear stilts on a scaffold only if it is a large area scaffold.

History: 1981 AACS; 1990 AACS; 1996 AACS; 1998-2000 AACS; 2013 AACS.

#### **R 408.41222 Wood pole scaffolds.**

Rule 1222. (1) Where a pole of a wood pole scaffold is spliced, the ends shall be squared and the upper section shall rest squarely on the lower section. Wood splice plates shall be fastened on not less than 2 adjacent sides, shall be not less than 4 feet in length, shall overlap the abutted ends equally, shall have the same width and same total cross-sectional area of the pole, and shall be capable of preventing displacement of the abutted ends. Splice plates of other materials of equivalent strength may be used.

(2) A bearer shall be set with its greater end dimension vertical and shall be long enough to project over the ledgers not less than 3 inches for proper support.

(3) The inner end of a bearer for a single pole scaffold shall be supported in accordance with 1 of the following:

(a) Rest in a wall of a building with not less than a 40 inch bearing. Notching of the bearer is not permitted.

(b) Rest on a 12- by 2- by 6- inch wood block. The block shall be notched at the center to the width of the bearer and 2 inches deep. The bearer shall be nailed to both the block and the building.

(c) At a wall opening by a plank capable of supporting the loaded bearer and fastened to the building. The bearer shall be braced against displacement.

(4) A ledger shall be long enough to extend over 2 pole spaces. The ledger shall not be spliced between the poles. The ledger shall be reinforced by bearing blocks securely nailed to the side of the pole to form a support for the ledger.

(5) Diagonal bracing shall be provided to prevent the poles of a single pole scaffold from moving in a direction parallel with the wall of the building or from buckling.

(6) Bracing shall be provided between the inner and outer sets of poles in independent pole scaffolds. The free ends of pole scaffolds shall be cross braced.

(7) Full diagonal face bracing, in both directions, shall be erected across both faces of pole scaffold. The braces shall be spliced at the poles.

(8) Pole scaffolds over 60 feet in height shall be designed by a registered professional engineer, and shall be constructed and loaded in accordance with that design. Non-mandatory Appendix A to this standard contains examples of criteria that will enable an employer to comply with design and loading requirements for pole scaffolds under 60 feet in height.

History: 1981 AACCS; 2013 AACCS.

**R 408.41223 Tube and coupler scaffolds.**

Rule 1223. (1) A tube and coupler scaffold shall have all posts, bearers, runners, and bracing of not less than a nominal 2-inch (1.90 inches outside dimension) steel tubing or equivalent.

(2) The material used for couplers shall be of a structural type, such as a drop-forged steel, malleable iron, or structural grade aluminum. Dissimilar metals shall not be used.

(3) The posts of a tube and coupler scaffold shall not be spaced more than 6 feet apart in width and not more than 10 feet along the length for a light-duty rated scaffold, 8 feet along the length for a medium-duty rated scaffold, and 6 feet along the length for a heavy-duty rated scaffold.

(4) Drawings and specifications for a tube and coupler scaffold over 125 feet in height above the base plate shall be designed by a qualified engineer who is knowledgeable in scaffolding. Drawings and specifications shall be readily available at the jobsite. A scaffold that is less than 125 feet in height shall conform to the requirements of table 3.

(5) Runners shall be erected along the length of the scaffold and located on both the inside and the outside posts at even heights. When tube and coupler guardrails and midrails are used on outside posts, they may be used in place of outside runners. Runners shall be interlocked to form a continuous length and coupled to each post. The bottom runner shall be located as close to the base as possible. The runners shall be placed not more than 6 feet 6 inches on centers.

(6) A bearer shall be installed transversely between posts and shall be securely coupled either to a post bearing on a runner coupler or directly to a runner and shall be kept as close to the post as possible.

(7) A bearer shall be not less than 4 inches, but not more than 12 inches, longer than the post spacing or runner spacing. A bearer may be cantilevered for use as brackets to carry 2 2-inch by 10-inch planks. The bearer for a cantilevered section shall be not more than 24 inches and the section shall be limited to 25 pounds per square foot.

(8) Cross bracing shall be installed across the width of the scaffold at both ends and at least every third set of posts horizontally and every fourth runner vertically. The bracing shall extend diagonally from the inner and outer runners upward to the next outer and inner runners.

(9) Longitudinal diagonal bracing on the outer rows of poles shall be installed at a 45-degree angle from near the base of the first outer post upward to the extreme top of the scaffold. Where the longitudinal length of the scaffold permits, the bracing shall be duplicated beginning at every fifth post. In a similar manner, longitudinal diagonal bracing shall also be installed from the last post extending back and upward toward the first post. Where conditions preclude the attachment of this bracing to the posts, it may be attached to the runners.

(10) Guys, ties, and braces shall be installed according to the scaffold manufacturer's recommendations or at the closest horizontal member to the 4-to-1 ratio height and be repeated vertically at locations of horizontal members every 20 feet (6.1 meters) or less thereafter for a scaffold 3 feet (0.91 meters) wide or less and every 26 feet (7.9 meters) or less thereafter for a scaffold more than 3 feet (0.9 meters) wide. The top

guy, tie, or brace of a completed scaffold shall be placed no farther than a 4-to-1 ratio from the top. The top guys, ties, and braces shall be installed at each end of the scaffold and at horizontal intervals of not more than 30 feet (9.1 meters), measured from 1 end, not both, towards the other end. Outriggers, when used, may be considered a part of the base dimension. The outriggers shall be installed on both sides of the scaffold at each frame line.

(11) Table 3 reads as follows:

TABLE 3						
TUBE AND COUPLER SCAFFOLDS	LIGHT DUTY		MEDIUM		HEAVY	
Maximum uniformly distributed load	25 pounds per square foot		50 pounds per square foot		75 pounds per square foot	
Post spacing (longitudinal)	10 feet		8 feet		6 feet	
Post spacing (transverse)	6 feet		6 feet		6 feet	
Work levels	1	2	3	1	2	1
Maximum allowable additional planked levels	8	4	0	6	0	6
Maximum height (feet)	125	125	91	125	75	125

History: 1981 AACCS; 1990 AACCS; 1998-2000 AACCS; 2016 AACCS.

**R 408.41224 Tubular welded frame scaffold; fabricated frame scaffold.**

Rule 1224. (1) A tubular welded frame scaffold, also known as a fabricated frame scaffold, shall be braced by cross bracing or diagonal braces, or both, for securing vertical members together laterally. The cross braces shall be of sufficient length so that the erected scaffold is always plumb, square, and rigid. All brace connections shall be made secure.

(2) The frames shall be placed one on top of the other with coupling or stacking pins to provide proper vertical alignment of the legs.

(3) Where uplift may occur, frames shall be locked together vertically by pins or other equivalent suitable means.

(4) A guy, tie, and brace shall be installed according to the scaffold manufacturer's recommendations or at the closest horizontal member to the 4-to-1 ratio height and be repeated vertically at locations of horizontal members every 20 feet (6.1 meters) or less thereafter for a scaffold 3 feet (0.91 meters) wide or less and every 26 feet (7.9 meters) or less thereafter for a scaffold more than 3 feet (0.91 meters) wide. The top guy, tie, or brace of a completed scaffold shall be placed no farther than a 4-to-1 ratio height from the top. A guy, tie, and brace shall be installed at each end of the scaffold and at

horizontal intervals of not more than 30 feet (9.1 meters) measured from one end, not both, towards the other. Outriggers, when used, may be considered as part of the base dimension when installed on each corner of the long side at intervals of not more than 20 feet.

(5) Drawings and specifications for all tubular welded frame scaffolds over 125 feet in height above the base plates shall be designed by a qualified engineer who is knowledgeable in scaffolding. The plans shall be available at the jobsite.

(6) Brackets used to support cantilevered loads shall comply with all of the following provisions:

(a) Be seated with side brackets parallel to the frames and end brackets at 90 degrees to the frames.

(b) Not be bent or twisted from the positions specified in subdivision (a) of this subrule.

(c) Be used only to support personnel, unless the scaffold has been designed for other loads by a qualified engineer and built to withstand the tipping forces caused by the other loads being placed on the bracket-supported section of the scaffold.

History: 1981 AACS; 1990 AACS; 1998-2000 AACS; 2013 AACS; 2016 AACS.

#### **R 408.41225 Horse scaffolds.**

Rule 1225. (1) Scaffolds shall not be constructed or arranged more than 2 tiers or 10 feet (3.0 m) in height, whichever is less.

(2) When horses are arranged in tiers, each horse shall be placed directly over the horse in the tier below.

(3) When horses are arranged in tiers, the legs of each horse shall be nailed down or otherwise secured to prevent displacement.

(4) When horses are arranged in tiers, each tier shall be crossbraced.

History: 1981 AACS; 2013 AACS.

#### **R 408.41226 Bricklayer's square scaffold.**

Rule 1226. (1) Scaffolds made of wood shall be reinforced with gussets on both sides of each corner.

(2) Diagonal braces shall be installed on all sides of each square.

(3) Diagonal braces shall be installed between squares on the rear and front sides of the scaffold, and shall extend from the bottom of each square to the top of the next square.

(4) Scaffolds shall not exceed 3 tiers in height, and shall be so constructed and arranged that 1 square rests directly above the other. The upper tiers shall stand on a continuous row of planks laid across the next lower tier, and shall be nailed down or otherwise secured to prevent displacement.

History: 1981 AACS; 2013 AACS.

**R 408.41227 Pump jack scaffolds.**

Rule 1227. (1) Pump jack brackets, braces, and accessories shall be fabricated from metal plates and angles. Each bracket shall have 2 positive gripping mechanisms to prevent any failure or slippage.

(2) A pole shall comply with both of the following provisions:

(a) Be secured to the structure by rigid triangular bracing, or equivalent, at the bottom, top, and other points as necessary to provide a maximum vertical spacing of not more than 10 feet between braces. Each brace shall be capable of supporting not less than 225 pounds tension or compression.

(b) Be made of 2, 2 by 4s of Douglas fir, or the equivalent, or 2 continuous lengths made of 2 by 4s spiked together, with the seam parallel to the bracket, with 10D common nails at not more than 12 inches center to center, staggered uniformly from opposite outside edges. Each 2 by 4 may be spliced to make up a pole if the splice is constructed to develop the full strength of the member.

(3) Where the bracket must pass bracing already installed, an extra brace shall be used approximately 4 feet above the one to be passed until the original brace is reinstalled.

(4) If poles are made of wood, then the pole lumber shall be straight-grained and free of shakes, large loose or dead knots, and other defects that might impair strength.

History: 1981 AACCS; 1990 AACCS; 1998-2000 AACCS; 2013 AACCS; 2016 AACCS.

**R 408.41228 Rescinded.**

History: 1981 AACCS; 2013 AACCS.

**SUSPENDED SCAFFOLDS**

**R 408.41229 Suspended scaffolds; tipping moment requirement; support devices; outrigger beams; counterweights tiebacks; suspension ropes; use of certain equipment on scaffolds prohibited; securing scaffolds; use of emergency escape and rescue devices.**

Rule 1229. (1) Direct connections to roofs and floors, and counterweights used to balance an adjustable suspension scaffold, shall be capable of resisting not less than 4 times the tipping moment imposed by the scaffold operating at either the rated load of the hoist or not less than 1.5 times the tipping moment imposed by the scaffold operating at the stall load of the hoist, whichever is greater.

(2) A suspension scaffold support device, such as an outrigger beam, cornice hook, parapet clamp, and a similar device shall rest on a surface capable of supporting not less than 4 times the load imposed on them by the scaffold operating at the rated load of the hoist or not less than 1.5 times the load imposed on them by the scaffold at the stall capacity of the hoist, whichever is greater.

(3) A suspension scaffold outrigger beam, when used, shall be made of structural metal or equivalent strength material and shall be restrained to prevent movement.

(4) The inboard end of a suspension scaffold outrigger beam shall be stabilized by bolts or other direct connection to the floor or roof deck or shall be stabilized by counterweights, except that a multipoint adjustable suspension scaffold outrigger beam shall not be stabilized by counterweights.

(5) Before a scaffold is used, a competent person shall evaluate direct connections. The person shall confirm, based on the evaluation, that the support surfaces are capable of supporting the loads to be imposed. In addition, an engineer who is experienced in multipoint adjustable suspension scaffold design shall design the multipoint adjustable suspension scaffold connections.

(6) Counterweights shall be made of non-flowable material. Sand, gravel, and similar materials that can be easily dislocated shall not be used as counterweights.

(7) Only items specifically designed as counterweights shall be used to counterweight scaffold systems. Construction materials, such as, but not limited to, masonry units and rolls of roofing felt, shall not be used as counterweights.

(8) Counterweights shall be secured by mechanical means to the outrigger beams to prevent accidental displacement.

(9) Counterweights shall not be removed from an outrigger beam until the scaffold is disassembled.

(10) Outrigger beams that are not stabilized by bolts or other direct connections to the floor or roof deck shall be secured by tiebacks.

(11) Tiebacks shall be equivalent in strength to the suspension ropes.

(12) An outrigger beam shall be placed perpendicular to its bearing support, usually the face of the building or structure. However, if an employer can demonstrate that it is not possible to place an outrigger beam perpendicular to the face of the building or structure because of obstructions that cannot be moved, then the outrigger beam may be placed at some other angle if opposing angle tiebacks are used.

(13) Tiebacks shall be secured to a structurally sound anchorage on the building or structure. Sound anchorages include structural members, but do not include any of the following items:

- (a) Standpipes.
- (b) Vents.
- (c) Other piping systems.
- (d) Electrical conduit.

(14) Either tiebacks shall be installed perpendicular to the face of the building or structure or opposing angle tiebacks shall be installed. Single tiebacks installed at an angle are prohibited.

(15) A suspension scaffold outrigger beam shall comply with all of the following provisions:

- (a) Have stop bolts or shackles at both ends.
- (b) Be securely fastened together with the flanges turned out when channel iron beams are used in place of I-beams.
- (c) Be installed with all bearing supports perpendicular to the beam center line.
- (d) Be set and maintained with the web in a vertical position.
- (e) When an outrigger beam is used, the shackle or clevis with which the rope is attached to the outrigger beam shall be placed directly over the center line of the stirrup.

(16) A suspension scaffold support device, such as a cornice hook, roof hook, roof iron, parapet clamp, or similar device shall comply with the following provisions, as applicable:

(a) Be made of steel, wrought iron, or materials of equivalent strength.

(b) Be supported by bearing blocks.

(c) Either be secured against movement by tiebacks installed at right angles to the face of the building or structure or have opposing angle tiebacks installed and secured to a structurally sound point of anchorage on the building or structure. Sound points of anchorage include structural members, but do not include any of the following items:

(i) Standpipes.

(ii) Vents.

(iii) Other piping systems.

(iv) Electrical conduit.

(d) Tiebacks shall be equivalent in strength to the hoisting rope.

(17) A suspension rope that supports an adjustable suspension scaffold shall be of a diameter large enough to provide sufficient surface area for the functioning of brake and hoist mechanisms.

(18) Repaired wire rope shall not be used as suspension rope.

(19) Wire suspension ropes shall not be joined together, except through the use of eye splice thimbles connected with shackles or cover plates and bolts.

(20) Swaged attachments or spliced eyes on wire suspension ropes shall not be used unless the attachments or eyes are made by the wire rope manufacturer or a qualified person.

(21) The load end of a wire suspension rope shall be equipped with proper size thimble and shall be secured by eye splicing or an equivalent means.

(22) Gasoline-powered equipment and hoists shall not be used on suspension scaffolds.

(23) A suspension scaffold shall be tied or otherwise secured to prevent it from swaying. A competent person shall evaluate the scaffold and determine if it needs to be tied or otherwise secured. Window cleaner's anchors shall not be used to tie or otherwise secure a suspension scaffold.

(24) A device that functions solely to provide emergency escape and rescue shall not be used as a working platform. This subrule does not preclude the use of a system that is designed to function both as a suspension scaffold and an emergency system.

History: 1998-2000 AACS; 2016 AACS.

## **SUSPENDED SCAFFOLDS**

### **R 408.41231 Adjustable multipoint suspension scaffolds.**

Rule 1231. (1) Only wire rope shall be used for suspending an adjustable multipoint suspension scaffold.

(2) The steel shackles or clevises with which the wire ropes are attached to the outrigger beams shall be placed directly over the hoisting drums.



History: 1981 AACCS; 1990 AACCS; 1998-2000 AACCS; 2013 AACCS.

**R 408.41232 Multipoint suspended scaffold.**

Rule 1232. (1) A multipoint suspended scaffold shall be suspended from structural components that are capable of supporting 4 times the maximum intended load.

(2) A multipoint suspended scaffold shall be light- or medium-duty scaffold only.

(3) If wire rope is used for the suspension of a multipoint suspended scaffold, a minimum of 2 wraps around the supporting structural members and around put logs shall be used and secured with the proper number of wire rope clips or fist grips.

(4) Softeners shall be used to prevent damage to wire rope that is used for suspension.

History: 1981 AACCS; 1990 AACCS; 2013 AACCS; 2016 AACCS.

**R 408.41233 Two-point adjustable suspension scaffold; swing stage scaffold.**

Rule 1233. (1) A 2-point adjustable suspension scaffold, also known as a swing stage scaffold platform, shall not be less than 20 inches nor more than 36 inches wide overall. The platform shall be securely fastened to the stirrups by U-bolts or by other equivalent means.

(2) The stirrups shall be designed with a support for a guardrail, intermediate rails, and toeboard.

(3) Rope and blocks that are used to support a 2-point adjustable scaffold shall have all of the following:

(a) Supporting ropes of 3/4-inch, first-quality manila rope or a synthetic rope of equivalent strength used with at least one 6-inch single and one 6-inch double block.

(b) Blocks that have sheaves which fit the size of the rope the blocks carry.

(c) Live ropes made fast to the scaffold in a manner to prevent displacement.

(d) The dead-end of the supporting rope connected to the block at the stirrup by means of an eye splice incorporating a thimble.

(4) A swing stage scaffold shall be limited to the following number of employees:

(a) For a scaffold designed for a working load of 500 pounds, not more than 2 employees shall be permitted to work at 1 time.

(b) For a scaffold designed for a working load of 750 pounds, not more than 3 employees shall be permitted to work at 1 time.

(5) Two or more scaffolds shall not be combined by bridging with planks or similar connecting links.

(6) Rollers or fenders shall be provided to prevent striking the building and to facilitate raising and lowering.

(7) The platform of a swing stage scaffold shall be 1 of the following types:

(a) Ladder-type platforms - The ladder-type platform shall be constructed to meet ANSI standard A10.8 "Scaffolding Safety Requirements," 1977 edition, as adopted in R 408.41202.

(b) Plank-type platform - The plank-type platform shall be composed of not less than two 2 by 10-inch unspliced planks which are laid straight and which are cleated

together on the underside, with the cleats starting 6 inches from each end and spaced at 12-inch intervals.

(c) Beam-type platform - The beam platform shall have side stringers made of lumber that is not less than 2 by 6 inches set on edge. The span between hangers shall not be more than 12 feet. The flooring shall be supported on 2 by 6-inch crossbeams which are laid flat, which are set into the upper edge of the stringers with a snug fit at intervals of not more than 4 feet center to center, and which are securely nailed in place. The flooring shall be 1 by 6-inch lumber or 3/4-inch plywood and shall be securely nailed. Floorboards shall not be spaced more than 1/2 of an inch apart.

(d) Manufactured picks - When used, a manufactured pick shall conform to the requirements of R 408.41217(2) and (3).

History: 1981 AACCS; 1990 AACCS; 1998-2000 AACCS; 2013 AACCS; 2016 AACCS.

#### **R 408.41234 Multilevel suspension scaffolds.**

Rule 1234. (1) A multilevel suspension scaffold shall have a separate fall prevention device that allows a drop of not more than 12 inches installed at each support point connected with a line to the scaffold.

(2) The device shall be attached to a wire rope safety line equivalent to the support rope, and the safety line shall be secured to a substantial member of the structure separate from the support rope and to the ground. If it is not possible to attach a safety line to the structure, then the safety line shall be attached to the outrigger.

(3) The multilevel suspension scaffold shall be in compliance with the provisions of R 408.41229 and R 408.41233.

(4) A support for a platform shall be attached directly to the support stirrup and not to any other platform.

History: 1981 AACCS; 1990 AACCS; 1996 AACCS; 1998-2000 AACCS; 2013 AACCS.

#### **R 408.41235 Single-point adjustable suspension scaffolds.**

Rule 1235. A single-point adjustable suspension scaffold shall travel only in a vertical line.

History: 1981 AACCS; 1990 AACCS; 1998-2000 AACCS; 2013 AACCS.

#### **R 408.41236 Needle beam scaffolds.**

Rule 1236. (1) A needle beam scaffold shall not be altered or moved while in use.

(2) The scaffold planking shall be secured against displacement. Cleats are not an adequate means of attachment.

(3) Ropes or hangers shall be used for supports, except that 1 end of a needle beam scaffold may be supported by and secured to a permanent structural member.

History: 1981 AACCS; 1990 AACCS; 1998-2000 AACCS; 2013 AACCS; 2016 AACCS.

**R 408.41237 Boatswain's chair.**

Rule 1237. (1) Two 5/8-inch, first-quality manila rope slings or synthetic rope of equivalent strength shall be reeved through the 4 seat holes so as to cross each other on the underside. Where an employee is using a heat or spark-producing process, such as gas welding or cutting, a protected 3/8-inch wire rope shall be used in place of fiber rope.

(2) The tackle shall consist of bearing or bushed blocks and 5/8-inch, first grade manila rope or its equivalent. The block shall be secured to roof irons, hooks, or other objects that are secured. Tiebacks shall be installed at right angles to the face of the building and shall be secured to the roof hooks and the building.

History: 1981 AACCS; 1990 AACCS; 1996 AACCS; 2013 AACCS.

**R 408.41238 Float scaffolds.**

Rule 1238. (1) A float scaffold shall be constructed of not less than 3/4-inch exterior plywood or equivalent material. The platform shall be not more than 3 by 6 feet in size, and the ends of the platform shall project 6 inches beyond the outer edge of the bearers.

(2) The plywood shall be securely fastened to 2 2- by 4-inch bearers which are made of select lumber that is free of knots and other defects and which project 6 inches beyond the platforms on each side. The plywood shall be reinforced with a diagonal brace that runs from bearer to bearer beneath the platform.

(3) An edging of wood not less than 1 by 2 inches, or its equivalent, shall be secured around all sides of the platform to prevent tools from rolling off.

(4) Supporting ropes shall be 1-inch manila rope, or its equivalent, and shall be free of defects.

(5) Rope connections shall be made in a manner that prevents the platform from shifting or slipping. The rope shall be arranged to do all of the following:

(a) Pass under the platform.

(b) Be hitched around the end of each bearer on each side.

(c) Provide 4 ends that shall be securely fastened to an overhead support.

(6) Not more than 2 employees and necessary light tools shall occupy a float scaffold.

(7) Each employee on a float scaffold shall be protected by a personal fall arrest system.

History: 1981 AACCS; 1990 AACCS; 1996 AACCS.

**R 408.41239 Catenary scaffolds.**

Rule 1239. (1) Not more than 1 platform shall be placed between consecutive vertical pickups, and not more than 2 platforms shall be used on a catenary scaffold.

(2) A platform supported by wire ropes shall have hook-shaped stops on each end of the platform to prevent it from slipping off the wire ropes.

The hooks shall be placed to prevent the platform from falling if 1 of the horizontal wire ropes breaks.

(3) A wire rope shall not be tightened to the extent that the application of a scaffold load will overstress the wire rope.

(4) A wire rope shall be continuous and not have splices between anchors.

History: 1998-2000 AACCS.

#### **R 408.41240 Interior hung scaffolds.**

Rule 1240. (1) An interior scaffold shall be suspended only from the roof structure or other structural member such as a ceiling beam.

(2) An overhead supporting member (roof structure, ceiling beams, or other structural members) shall be inspected and checked for strength before the scaffold is erected.

(3) Suspension ropes and cables shall be connected to the overhead supporting members by shackles, clips, thimbles, or other means that meet the strength and durability of the suspension ropes and cables.

History: 1998-2000 AACCS.

## **MOBILE SCAFFOLDS**

#### **R 408.41241 Mobile scaffolds.**

Rule 1241. (1) When a freestanding mobile scaffold is used, the height shall not be more than 4 times the minimum base dimension.

(2) Outriggers, when used, may be considered as part of the base dimension. The outriggers shall be installed on both sides of the scaffold at each frame line.

(3) Locking devices shall be used to secure the casters to the frame or adjusting screw. The adjusting screw shall not extend more than 12 inches. The casters shall be provided with a positive locking device to prevent movement of the scaffold. The device shall be used when the scaffold is in use, except where the work platform is 4 feet or less from the floor.

(4) Vertical members of the scaffold shall be braced by cross bracing and diagonal bracing. Not less than 2 horizontal diagonal braces shall be installed, 1 as close to the casters as possible, at intervals of not more than 4 times the least-based dimension. The horizontal diagonal brace may be omitted on a scaffold that is specifically designed to absorb racking.

(5) A scaffold platform shall cover the full width of the scaffold, except for a necessary entrance opening. A platform shall be secured in place. A platform shall not extend outward beyond the base supports of the scaffold unless outrigger frames or equivalent devices are used to ensure stability.

(6) A ladder or stairway that is provided on a manually propelled mobile scaffold shall be affixed or built into the scaffold and shall be so located that, when in use, the ladder or stairway does not have a tendency to tip the scaffold. A landing platform shall be provided at intervals of not more than 30 feet.

(7) In place of a ladder or stairway, the requirements of R 408.41211(2) may be complied with.

(8) Only manual force shall be used to move a scaffold covered by this rule. The force shall be applied near or as close to the base as practical, except for a scaffold with a work platform that is 4 feet or less from the floor.

(9) When being used, a mobile scaffold shall rest upon a suitable footing and shall stand plumb. Where leveling of the scaffold is necessary, screw jacks or an equivalent means shall be used.

(10) An employer shall not allow an employee to ride on a mobile scaffold, unless all of the following conditions exist:

(a) The floor or surface is within 3 degrees of level and is free from pits, holes, or obstructions.

(b) The minimum base dimension of the scaffold when ready for rolling is not less than 1/2 of the height.

(c) The casters are equipped with rubber or similar resilient tires.

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

(e) The scaffold is equipped with guardrails on all sides.

(f) Before a scaffold is moved, each employee on the scaffold is made aware of the move.

(11) A mobile scaffold shall be in compliance with the applicable provisions of R 408.41217, R 408.41218, R 408.41223, and R 408.41224.

(12) A power system used to propel a mobile scaffold shall be designed to propel a mobile scaffold. A forklift, truck, similar motor vehicle, or add-on motor shall not be used to propel a scaffold unless the scaffold is designed to be propelled by a forklift, truck, similar motor vehicle, or add-on motor.

(13) If a power system is used to propel a scaffold, then the propelling force shall be applied directly to the wheels and shall not produce a speed of more than 1 foot per second (.3 meters per second).

(14) An employee shall not be on any part of a powered mobile scaffold that extends outward beyond the wheels, casters, or other supports.

(15) A powered mobile scaffold shall be stabilized to prevent tipping during movement.

History: 1981 AACCS; 1990 AACCS; 1998-2000 AACCS; 2016 AACCS.

Editor's Note: An obvious error in R 408.41241 was corrected at the request of the promulgating agency, pursuant to Section 56 of 1969 PA 306, as amended by 2000 PA 262, MCL 24.256. The rule containing the error was published in Annual Administrative Code Supplement, 2016. The memorandum requesting the correction was published in Michigan Register, 2017 MR 9.

**R 408.41243 Rough terrain forklift truck scaffolds; equipment requirements; employee safety requirements.**

Rule 1243. (1) The scaffold platform shall be attached to the forks by enclosed sleeves and shall be secured against the back of the forks with a mechanical device so that the platform cannot tip or slip.

(2) A work platform shall be in compliance with all of the following requirements:

(a) Except for the guardrail system as specified in Construction Safety Standard Part 21 “Guarding of Walking and Working Areas,” as referenced in R 408.41202, be of welded mild steel construction that has a minimum safety factor of 4 times the maximum intended load.

(b) Have a continuous guardrail system constructed as follows:

(i) Have a top rail which is located not less than 36 inches, nor more than 42 inches, above the platform floor and which is constructed to withstand a minimum of 200 pounds of force in any direction.

(ii) Have a midrail which is installed at mid-height between the top rail and platform floor and which is constructed to withstand a 200-pound side thrust.

(iii) Have a toeboard which is not less than 4 inches in nominal height and which is installed not more than 1/4 of an inch above the floor around the periphery of the work platform. If the platform has a gate, then the toeboard shall be installed on the gate.

(c) Have a wood planking, steel plate, or a steel grating bolted or welded to the bottom of the platform and be maintained free of slip or trip hazards.

(d) Have a permanently affixed sign on the platform that specifies the maximum number of passengers allowed, the work platform identification number, and the maximum rated load.

(e) Be easily identifiable by high-visibility color or marking.

(3) The work platform shall be level when in use.

(4) If an employee is elevated in a platform on a variable reach lift truck, a personal fall arrest system, including the anchorage required in Construction Safety Standard Part 45 “Fall Protection,” and Construction Safety Standard Part 6 “Personal Protective Equipment,” as referenced in R 408.41202, is required and shall be worn when an employee is elevated.

(5) The rough terrain fork truck or the lift truck shall rest on firm footing. Leveling devices and outriggers shall be used where provided on equipment.

(6) A trained operator shall remain at the operator station of a lift truck to control the lift truck while an employee is elevated. The lift truck control or controls shall be in neutral and the parking brake set. The operator of the lift truck scaffold platform shall be able to see the elevated platform at all times.

(7) A lift truck platform shall be returned to the ground before a lift truck is repositioned. The forklift shall be moved as close to the work area as possible for final positioning. An employee shall exit the landed platform and reboard the platform only after the lift truck repositioning is completed.

(8) The combined mass weight of the platform, load, and the employee shall not be more than 1/3 of the rated capacity of the rough terrain forklift truck on which the platform is used.

(9) An employee shall maintain firm footing on the platform floor. Railings, planks, ladders, or other materials shall not be used on the platform to achieve reach or height.

(10) The guardrail system of the platform shall not be used to support any of the following:

(a) Materials.

(b) Other work platforms.

(c) Employees.

(11) The platform shall be lowered to ground level for an employee to enter or exit, except where elevated work areas are inaccessible or hazardous to reach. An employee may exit the platform with the knowledge and consent of the employer. When exiting to unguarded work areas, fall protection shall be provided and used as required in Construction Safety Standard Part 45 “Fall Protection,” as referenced in R 408.41202. An employee shall not climb on any part of a lift truck when attempting to enter or exit the platform.

(12) A platform shall not be modified if the modification is detrimental to its safe use.

(13) Floor dimensions parallel to the truck longitudinal centerline shall not be more than 2 times the load center distance listed on the rough terrain forklift truck nameplate. The floor dimension width shall not be more than the overall width of the truck measured across the load-bearing tires plus 10 inches (250 mm) on either side. The minimum space for each employee on the platform shall be not less than 18 inches (450 mm) in either direction.

(14) A wood pallet shall not be used as a platform for lift truck scaffolds.

(15) If arc welding is performed by an employee on the platform, then the electrode holders shall be protected from contact with the metal components of the work platform.

(16) A work platform shall not be used during high winds, electrical storms, snow, ice, sleet, or other adverse weather conditions that could affect the safety of the employees on the work platform or the operator of the truck.

History: 1981 AACS; 1990 AACS; 1997 AACS; 2013 AACS; 2016 AACS.

#### **R 408.41244 Rescinded.**

History: 1997 AACS; 2013 AACS.

#### **R 408.41245 Operator training.**

Rule 1245. An employer shall ensure that an employee has been trained before the employee’s assignment as an operator of a rough terrain forklift truck that is used to elevate employees. An employee shall be trained in all of the following areas:

- (a) The capabilities of the equipment and its attachments.
- (b) The purpose, use, and limitations of the controls.
- (c) How to make daily checks.

History: 1997 AACS; 2013 AACS.

#### **R 408.41246 Rescinded.**

History: 1997 AACS; 2013 AACS.

### **AUXILIARY SUPPORTED SCAFFOLDS**

**R 408.41251 Outrigger scaffolds.**

Rule 1251. (1) The inboard end of an outrigger beam measured from the fulcrum point to anchorage point shall be not less than 1 1/2 times the outboard end in length. The beams shall rest on edge, the sides shall be plumb, and the edges shall be horizontal. The fulcrum point of the beam shall rest on a secure bearing not less than 6 inches in each horizontal dimension. The beam shall be secured in place against movement and shall be securely braced at the fulcrum point against tipping.

(2) The inboard end of an outrigger beam shall be securely anchored either by means of struts bearing against sills in contact with the overhead beams or ceiling or by means of tension members secured to the floor joists underfoot, or by both if necessary. The inboard end of an outrigger beam shall be secured against tipping, and the entire supporting structure shall be securely braced in both directions to prevent any horizontal movement.

(3) An outrigger scaffold shall be constructed as prescribed in table 4.

(4) Planking shall be laid tight and shall extend to within 3 inches of the building wall. Planking shall be secured to the outriggers.

(5) A scaffold and scaffold components shall be designed by a qualified person who is knowledgeable in scaffolding and shall be constructed and loaded pursuant to the design.

(6) Table 4 reads as follows:

TABLE 4 SPACING AND LENGTH OF OUTRIGGER SCAFFOLDS			
Maximum Load	Scaffold	Light Duty 25 p.s.f.	Medium Duty 50 p.s.f.
	Outrigger size	2 inches by 10 inches	3 inches by 10 inches
	Maximum outrigger spacing	8 feet	6 feet
	Maximum outrigger length	6 feet	6 feet

History: 1981 AACCS; 1998-2000 AACCS; 2016 AACCS.

**R 408.41253 Roofing brackets and crawling boards.**

Rule 1253. (1) A roofing bracket shall be installed in a manner to maintain a level working surface.

(2) In addition to the pointed metal projections, the brackets shall be secured in place by nailing. When it is impractical to nail brackets, rope supports shall be used. When rope supports are used, they shall consist of first-quality manila rope of at least 3/4-inch diameter or its equivalent.



(3) A crawling board shall not be less than 1 by 10 inches, shall extend from the eave to the ridge of the roof, and shall be secured against displacement.

History: 1981 AACCS; 2013 AACCS.

**R 408.41254 Carpenter's bracket scaffold.**

Rule 1254. (1) Each bracket, except those for wooden bracket-form scaffolds, shall be attached to the supporting formwork or structure by means of 1 or more of the following:

(a) Nails.

(b) A metal stud attachment device.

(c) Welding, hooking over a secured structural supporting member, with the form wales either bolted to the form or secured by snap ties or tie bolts extending through the form and securely anchored.

(d) For carpenters' bracket scaffolds only, by a bolt extending through to the opposite side of the structure's wall.

(2) The supporting brackets shall be fastened to the structure by 1 of the following:

(a) Three-eighths-inch diameter bolts extending through the studs at the top of the bracket and projecting 3/4 inch beyond the nut and washer when in place.

(b) Welding to a metal tank.

(c) Hooked over a secured supporting member of the structure.

History: 1981 AACCS; 2013 AACCS; 2016 AACCS.

**R 408.41255 Form Scaffolds.**

Rule 1255. Metal brackets that are an integral part of the form shall be bolted or welded to the form. A folding-type bracket shall be secured by bolts or locking pins when in the extended position. Clip-on hook-on brackets may be used if the form walers are bolted to the form or secured by snap ties or shea-bolts extending through the form and anchored.

History: 1981 AACCS; 1990 AACCS; 2013 AACCS.

**R 408.41256 Ladder jack scaffolds.**

Rule 1256. (1) A ladder jack scaffold shall be used only for light duty on type I manufactured ladders at heights not more than 20 feet from the ground or floor level. The ladder shall be used as prescribed in Construction Safety Standard Part 11 "Fixed and Portable Ladders," as referenced in R 408.41202.

(2) All bearing points of a ladder jack shall be designed to bear on the side rails and the rungs, but if bearing on the rungs only, the bearing area shall be not less than 10 lineal inches per rung.

History: 1981 AACCS; 2013 AACCS; 2016 AACCS.

**R 408.41256a Step, platform, and trestle ladder scaffolds.**

Rule 1256a. (1) A scaffold platform shall not be placed higher than the second highest rung or step of the ladder supporting the platform.

(2) A ladder used in conjunction with a step, platform, and trestle ladder scaffold shall comply with the pertinent requirements of Construction Safety Standard Part 11 “Fixed and Portable Ladders,” as referenced in R 408.41202, except that job-made ladders shall not be used to support a step, platform, or trestle scaffold.

(3) A ladder used to support a step, platform, and trestle ladder scaffold shall be placed, fastened, or equipped with a device to prevent slipping.

(4) A scaffold shall not be bridged to another scaffold.

History: 1998-2000 AACCS; 2016 AACCS.

**R 408.41256b Repair bracket scaffolds.**

Rule 1256b. (1) Brackets shall be secured in place by at least 1 wire rope that is at least 1/2 of an inch (1.27 centimeter) in diameter.

(2) Each bracket shall be attached to the securing wire rope or ropes by either a positive locking device capable of preventing the unintentional detachment of the bracket from the rope or by equivalent means.

(3) Each bracket, at the contact point between the supporting structure and the bottom of the bracket, shall have a shoe (heel block or foot) capable of preventing the lateral movement of the bracket.

(4) A platform shall be secured to the brackets in a manner that will prevent the separation of the platform from the brackets and the movement of the platform or the brackets on a completed scaffold.

(5) If a wire rope is placed around the structure to provide a safe anchorage for personal fall arrest systems used by employees erecting or dismantling scaffolds, then the wire rope shall comply with the requirements of Construction Safety Standard part 45 “Fall Protection,” as referenced in R 408.41202, or this standard, but shall be at least 5/16 of an inch (0.8 centimeter) in diameter.

(6) A wire rope used for securing brackets in place or as an anchorage for personal fall arrest systems shall be protected from damage due to contact with edges, corners, protrusions, or other discontinuities of the supporting structure or scaffold components.

(7) The tensioning of a wire rope used for securing brackets in place or as an anchorage for personal fall arrest systems shall be accomplished either by means of a turnbuckle at least 1 inch (2.54 centimeter) in diameter or by equivalent means.

(8) A turnbuckle shall be connected to the other end of its rope using an eye splice thimble of a size appropriate to the turnbuckle to which it is attached.

(9) U-bolt wire rope clips shall not be used on any wire rope used to secure brackets or to serve as an anchor for personal fall arrest systems.

(10) An employer shall ensure that materials are not dropped to the outside of the supporting structure.

(11) Scaffold erection shall progress in only 1 direction around any structure.

History: 1998-2000 AACCS; 2016 AACCS.

## WIRE, FIBER, AND SYNTHETIC ROPE

### **R 408.41261 Wire rope.**

Rule 1261. (1) A wire rope shall be inspected for defects by a competent person before each work shift and after every occurrence that could affect a rope's integrity. A rope shall be replaced if any of the following conditions exist:

- (a) Physical damage that impairs the function and strength of the rope.
  - (b) Kinks that might impair the tracking or wrapping of rope around the drum or sheaves.
  - (c) Six randomly distributed broken wires in 1 rope lay or 3 broken wires in 1 strand in 1 rope lay.
  - (d) Abrasion, corrosion, scrubbing, flattening, or peening that has caused the loss of more than 1/3 of the original diameter of the outside wires.
  - (e) Heat damage caused by a torch or any damage caused by contact with electrical wires.
  - (f) Evidence that the secondary brake has been activated during an overspeed condition and has engaged the suspension rope.
- (2) Wire rope that is bent to form an eye over a bolt or rod which has a diameter of less than 4 times the rope diameter shall be equipped with a metal thimble.
- (3) Swaged attachments or spliced eyes on wire suspension ropes shall not be used unless they are made by the wire rope manufacturer or a qualified person.
- (4) If wire rope clips are used on suspension scaffolds, then all of the following provisions apply:
- (a) Clips shall be installed according to the manufacturer's recommendations.
  - (b) Clips shall be retightened to the manufacturer's recommendations after the initial loading.
  - (c) Clips shall be inspected and retightened to the manufacturer's recommendations at the start of each work shift.
  - (d) U-bolt clips shall not be used at the point of suspension for any scaffold hoist.
  - (e) If U-bolt clips are used, then the U-bolt shall be placed over the dead end of the rope and the saddle shall be placed over the live end of the rope.
- (5) Wire rope shall not come in contact with sharp edges.

History: 1981 AACS; 1990 AACS; 1998-2000 AACS; 2013 AACS; 2016 AACS.

### **R 408.41262 Rescinded.**

History: 1981 AACS; 1998-2000 AACS; 2013 AACS.

### **R 408.41263 Rescinded.**

History: 1981 AACS; 2013 AACS.

**R 408.41264 Window jack scaffolds.**

Rule 1264. (1) A window jack scaffold shall be used as a work platform for not more than 1 employee and only for the purpose of working at the window opening through which the jack is placed.

(2) A window jack shall not be used to support planks placed between one window jack and another or for other elements of scaffolding.

Non-mandatory Appendix A

This Appendix provides non-mandatory guidelines to assist employers in complying with the requirements of MIOSHA Construction Safety Standard Part 12. Scaffolds and Scaffold Platforms. An employer may use these guidelines and tables as a starting point for designing scaffold systems. However, the guidelines do not provide all the information necessary to build a complete system, and the employer is still responsible for designing and assembling these components in such a way that the completed system will meet the requirements of R 408.41210 (3), except as provided in R 408.41213 (1) and (2), R 408.41214 (4), R 408.41229 (1), and R 408.41229 (17). Scaffold components which are not selected and loaded in accordance with this Appendix, and components for which no specific guidelines or tables are given in this Appendix (e.g., joints, ties, components for wood pole scaffolds more than 60 feet in height, components for heavy-duty horse scaffolds, components made with other materials, and components with other dimensions, etc.) must be designed and constructed in accordance with the capacity requirements of R 408.41210 (3), except as provided in R 408.41213 (1) and (2), R 408.41214 (4), R 408.41229 (1), and R 408.41229 (17), and loaded in accordance with R 408.41229 (2).

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1. General guidelines and tables.
2. Specific guidelines and tables.
  - (a) Pole scaffolds:
    - Single-pole wood pole scaffolds.
    - Independent wood pole scaffolds.
  - (b) Tube and coupler scaffolds.
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  - (h) Roof bracket scaffolds.
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  - (k) Ladder jack scaffolds.
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- (n) Step, platform and trestle ladder scaffolds.
- (o) Single-point adjustable suspension scaffolds.
- (p) Two-point adjustable suspension scaffolds.
- (q) (1) Stonesetters' multi-point adjustable suspension scaffolds.
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- (r) Catenary scaffolds.
- (s) Float (ship) scaffolds.
- (t) Interior hung scaffolds.
- (u) Needle beam scaffolds.
- (v) Multi-level suspension scaffolds.
- (w) Mobile scaffolds.
- (x) Repair bracket scaffolds.
- (y) Stilts.
- (z) Tank builders' scaffolds.

## 1. General Guidelines and Tables

(a) The following tables, and the tables in Part 2 -- Specific guidelines and tables, assume that all load-carrying timber members (except planks) of the scaffold are a minimum of 1,500 lb-f/in (2) (stress grade) construction grade lumber. All dimensions are nominal sizes as provided in the American Softwood Lumber Standards, dated January 1970, except that, where rough sizes are noted, only rough or undressed lumber of the size specified will satisfy minimum requirements.

(b) Solid sawn wood used as scaffold planks shall be selected for such use following the grading rules established by a recognized lumber grading association or by an independent lumber grading inspection agency. Such planks shall be identified by the grade stamp of such association or agency. The association or agency and the grading rules under which the wood is graded shall be certified by the Board of Review, American Lumber Standard Committee, as set forth in the American Softwood Lumber Standard of the U.S. Department of Commerce.

(i) Allowable spans shall be determined in compliance with the National Design Specification for Wood Construction published by the National Forest Products Association; paragraph 5 of ANSI A10.8-1988 Scaffolding-Safety Requirements published by the American National Standards Institute; or for 2-x 10-inch (nominal) or 2-x 9-inch (rough) solid sawn wood planks, as shown in the following table:

Maximum intended nominal load (lb/ft (2))	Maximum permissible span using full thickness undressed lumber (ft)	Maximum permissible span using nominal thickness lumber (ft)
25	10	8
50	8	6

(ii) The maximum permissible span for 1 1/4 x 9-inch or wider wood plank of full thickness with a maximum intended load of 50 lb/ft. (2) shall be 4 feet.

(c) 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 follows:

Rated load capacity	Intended load
Light-duty	* 25 pounds per square foot applied uniformly over the entire span area.
Medium-duty	* 50 pounds per square foot applied uniformly over the entire span area.
Heavy-duty	* 75 pounds per square foot applied uniformly over the entire span area.
One-person	* 250 pounds placed at the center of the span (total 250 pounds).
Two-person	* 250 pounds placed 18 inches to the left and right of the center of the span (total 500 pounds).
Three-person	* 250 pounds placed at the center of the span and 250 pounds placed 18 inches to the left and right of the center of the span (total 750 pounds).

Note: Platform units used to make scaffold platforms intended for light-duty use shall be capable of supporting at least 25 pounds per square foot applied uniformly over the entire unit-span area, or a 250-pound point load placed on the unit at the center of the span, whichever load produces the greater shear force.

(d) Guardrails shall be as follows:

(i) Toprails shall be equivalent in strength to 2-inch by 4-inch lumber; or 1 1/4-inch x 1/8-inch structural angle iron; or 1-inch x .070-inch wall steel tubing; or 1.990-inch x .058-inch wall aluminum tubing.

(ii) Midrails shall be equivalent in strength to 1-inch by 6-inch lumber; or 1 1/4-inch x 1 1/4-inch x 1/8-inch structural angle iron; or 1-inch x .070-inch wall steel tubing; or 1.990-inch x .058-inch wall aluminum tubing.

(iii) Toeboards shall be equivalent in strength to 1-inch by 4-inch lumber; or 1 1/4-inch x 1 1/4-inch structural angle iron; or 1-inch x .070-inch wall steel tubing; or 1.990-inch x .058-inch wall aluminum tubing.

(iv) Posts shall be equivalent in strength to 2-inch by 4-inch lumber; or 1 1/4-inch x 1 1/4-inch x 1/8-inch structural angle iron; or 1-inch x .070-inch wall steel tubing; or 1.990-inch x .058-inch wall aluminum tubing.

(v) Distance between posts shall not exceed 8 feet.

(e) Overhead protection shall consist of 2-inch nominal planking laid tight, or 3/4-inch plywood.

(f) Screen installed between toeboards and midrails or top rails shall consist of No. 18 gauge U.S. Standard wire one inch mesh.

2. Specific guidelines and tables.

(a) Pole Scaffolds.

Single Pole Wood Pole Scaffolds

	Light duty up to 20 feet high	Light duty up to 60 feet high	Medium duty up to 60 feet high	Heavy duty up to 60 feet high
Maximum intended load (lbs/ft <sup>2</sup> )	25	25	50	75
Poles or uprights	2x4 in.	4x4 in.	4x4 in.	4x6 in.
Maximum pole spacing (longitudinal)	6 feet	10 feet	8 feet	6 feet
Maximum pole spacing (transverse)	5 feet	5 feet	5 feet	5 feet
Runners	1x4 in.	1 ¼ x 9 in.	2x10 in.	2x10 in.
Bearers and maximum spacing of bearers:				
3 feet	2x4 in.	2x4 in.	2x10 in. or 3x4 in.	2x10 in. or 3x5 in.
5 feet	2x6 in. or 3x4 in.	2x6 in. or 3x4 in. (rough)	2x10 in. or 3x4 in.	2x10 in. or 3x5 in.
6 feet			2x10 in. or 3x4 in.	2x10 in. or 3x5 in.
8 feet			2x10 in. or 3x4 in.	
Planking	1 ¼ x 9 in.	2x10 in.	2x10 in.	2x10 in.
Maximum vertical spacing of horizontal members	7 feet	9 feet	7 feet	6 ft. 6 in.
Bracing horizontal	1x4 in.	1x4 in.	1x6 in. or 1 ¼ x 4 in.	2x4 in.

Bracing diagonal	1x4 in.	1x4 in.	1x4 in.	2x4 in.
Tie-ins	1x4 in.	1x4 in.	1x4 in.	1x4 in.

Note: All members except planking are used on edge. All wood bearers shall be reinforced with 3/16-x 2-inch steel strip, or the equivalent, secured to the lower edges for the entire length of the bearer.

#### Independent Wood Pole Scaffolds

	Light duty up to 20 feet high	Light duty up to 60 feet high	Medium duty up to 60 feet high	Heavy duty up to 60 feet high
Maximum intended load	25 lbs/ft <sup>2</sup>	25 lbs/ft <sup>2</sup>	50 lbs/ft <sup>2</sup>	75 lbs/ft <sup>2</sup>
Poles or uprights	2x4 in.	4x4 in.	4x4 in.	4x4 in.
Maximum pole spacing (longitudinal)	6 feet	10 feet	8 feet	6 feet
Maximum (transverse)	6 feet	10 feet	8 feet	8 feet
Runners	1 ¼ x4 in.	1 ¼ x 9 in.	2x10 in.	2x10 in.
Bearers and maximum spacing or bearers:				
3 feet	2x4 in.	2x4 in.	2x10 in.	2x10 in. (rough).
6 feet	2x6 in. or 3x4 in.	2x10 in. (rough) or 3x8 in.	2x10 in.	2x10 in. (rough).
8 feet	2x6 in. or 3x4 in.	2x10 in. (rough) or 3x8 in.	2x10 in. or 3x4 in.	
10 feet	2x6 in. or 3x4 in.	2x10 in. (rough) or 3x3 in.		
Planking	1 ¼ x 9 in.	2x10 in.	2x10 in.	2x10 in.
Maximum vertical spacing of horizontal members	7 feet	7 feet	6 feet	6 feet
Bracing horizontal	1x4 in.	1x4 in.	1x6 in. or 1 ¼ x 4 in.	2x4 in.
Bracing diagonal	1x4 in.	1x4 in.	1x4 in.	2x4 in.



Tie-ins	1x4 in.	1x4 in.	1x4 in.	1x4 in.
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Note: All members except planking are used on edge. All wood bearers shall be reinforced with 3/16-x 2-inch steel strip, or the equivalent, secured to the lower edges for the entire length of the bearer.

(b) Tube and coupler scaffolds.

#### Minimum Size of Members

	Light Duty	Medium Duty	Heavy Duty
Maximum intended load	25 lbs/ft <sup>2</sup>	50 lbs/ft <sup>2</sup>	75 lbs/ft <sup>2</sup>
Posts, runners and braces	Nominal 2 in. (1.90 inches) OD steel tube or pipe	Nominal 2 in. (1.90 inches) OD steel tube or pipe.	Nominal 2 in. (1.90 inches) OD steel tube or pipe.
Bearers	Nominal 2 in. (1.90 inches) OD steel tube or pipe and a maximum post spacing of 4 ft.x10 ft.	Nominal 2 in. (1.90 inches) OD steel tube or pipe and a maximum post spacing of 4 ft.x7 ft. or, Nominal 2 ½ in. (2.375 in.) OD steel tube or pipe and a maximum post spacing of 6 ft.x8 ft.*	Nominal 2 ½ in. (2.375 in.) OD steel tube or pipe and a maximum post spacing of 6 ft.x6 ft.
Maximum runner spacing vertically	6 ft. 6 in.	6 ft. 6 in.	6 ft. 6 in.

\*Bearers shall be installed in the direction of the shorter dimension.

Note: Longitudinal diagonal bracing shall be installed at an angle of 45 deg. (+/- 5 deg.).

#### Maximum Number of Planked Levels

Number of working levels:	Maximum number of additional planked levels			Maximum height of scaffold (in feet)
	Light duty	Medium duty	Heavy duty	
1	16	11	6	125
2	11	1	0	125
3	6	0	0	125
4	1	0	0	125

(c) "Fabricated frame scaffolds." Because of their prefabricated nature, no additional guidelines or tables for these scaffolds are being adopted in this Appendix.

(d) "Plasterers', decorators', and large area scaffolds." The guidelines for pole scaffolds or tube and coupler scaffolds (Appendix A (a) and (b)) may be applied.

(e) "Bricklayers' square scaffolds."

Maximum intended load: 50 lb/ft. (2) (\*)

Maximum width: 5 ft.

Maximum height: 5 ft.

Gussets: 1 x 6 in.

Braces: 1 x 8 in.

Legs: 2 x 6 in.

Bearers (horizontal members): 2 x 6 in.

Footnote (\*) The squares shall be set not more than 8 feet apart for light duty scaffolds and not more than 5 feet apart for medium duty scaffolds.

(f) Horse scaffolds.

Maximum intended load (light duty): 25 lb/ft. (2) (\*\*)

Maximum intended load (medium duty): 50 lb/ft. (2) (\*\*)

Footnote (\*\*) Horses shall be spaced not more than 8 feet apart for light duty loads, and not more than 5 feet apart for medium duty loads.

Horizontal members or bearers:

Light duty: 2 x 4 in.

Medium duty: 3 x 4 in.

Legs: 2 x 4 in.

Longitudinal brace between legs: 1 x 6 in.

Gusset brace at top of legs: 1 x 8 in.

Half diagonal braces: 2 x 4 in.

(g) "Form scaffolds and carpenters' bracket scaffolds."

(1) Brackets shall consist of a triangular-shaped frame made of wood with a cross-section not less than 2 inches by 3 inches, or of 1 ¼-inch x 1 ¼-inch x 1/8-inch structural angle iron.

(2) Bolts used to attach brackets to structures shall not be less than 5/8 inches in diameter.

(3) Maximum bracket spacing shall be 8 feet on centers.

(4) No more than two employees shall occupy any given 8 feet of a bracket or form scaffold at any one time. Tools and materials shall not exceed 75 pounds in addition to the occupancy.

(5) Wooden figure-four scaffolds:

Maximum intended load: 25 lb/ft. (2)

Uprights: 2 x 4 in. or 2 x 6 in.

Bearers (two): 1 x 6 in.

Braces: 1 x 6 in.

Maximum length of bearers (unsupported): 3 ft. 6 in.

(i) Outrigger bearers shall consist of 2 pieces of 1-x 6-inch lumber nailed on opposite sides of the vertical support.

(ii) Bearers for wood figure-four brackets shall project not more than 3 feet 6 inches from the outside of the form support, and shall be braced and secured to prevent tipping or turning. The knee or angle brace shall intersect the bearer at least 3 feet from the form at an angle of approximately 45 degrees, and the lower end shall be nailed to a vertical support.

(6) Metal bracket scaffolds:

Maximum intended load: 25 lb/ft. (2)

Uprights: 2 x 4 inch

Bearers: As designed.

Braces: As designed.

(7) Wood bracket scaffolds:

Maximum intended load: 25 lb/ft. (2)

Uprights: 2 x 4 in or 2 x 6 in

Bearers: 2 x 6 in

Maximum scaffold width: 3 ft 6 in

Braces: 1 x 6 in

(h) "Roof bracket scaffolds." No specific guidelines or tables are given.

(i) "Outrigger scaffolds (single level)." No specific guidelines tables are given.

(j) "Pump jack scaffolds." Wood poles shall not exceed 30 feet in height. Maximum intended load -- 500 lbs between poles; applied at the center of the span. Not more than 2 employees shall be on a pump jack scaffold at one time between any two supports. When 2 x 4's are spliced together to make a 4-x 4-inch wood pole, they shall be spliced with "10 penny" common nails no more than 12 inches center to center, staggered uniformly from the opposite outside edges.

(k) "Ladder jack scaffolds." Maximum intended load -- 25 lb/ft (2). However, not more than 2 employees shall occupy any platform at any one time. Maximum span between supports shall be 8 feet.

(l) "Window jack scaffolds." Not more than 1 employee shall occupy a window jack scaffold at any one time.

(m) "Crawling boards (chicken ladders)." Crawling boards shall be not less than 10-inches wide and 1-inch thick, with cleats having a minimum 1-x 1 ½-inch cross-sectional area. The cleats shall be equal in length to the width of the board and spaced at equal intervals not to exceed 24 inches.

(n) "Step, platform, and trestle ladder scaffolds." No additional guidelines or tables are given.

(o) "Single-point adjustable suspension scaffolds." Maximum intended load -- 250 lbs. Wood seats for boatswains' chairs shall be not less than 1-inch thick if made of non-laminated wood, or 5/8-inches thick if made of marine quality plywood.

(p) "Two-point adjustable suspension scaffolds." (1) In addition to direct connections to buildings (except window cleaners' anchors) acceptable ways to prevent scaffold sway include angulated roping and static lines. Angulated roping is a system of platform suspension in which the upper wire rope sheaves or suspension points are closer to the plane of the building face than the corresponding attachment points on the platform, thus causing the platform to press against the face of the building. Static lines are separate ropes secured at their top and bottom ends closer to the plane of the building face than the outermost edge of the platform. By drawing the static line taut, the platform is drawn against the face of the building.

(2) On suspension scaffolds designed for a working load of 500 pounds, no more than 2 employees shall be permitted on the scaffold at one time. On suspension scaffolds with a working load of 750 pounds, no more than 3 employees shall be permitted on the scaffold at one time.

(3) Ladder-type platforms. The side stringer shall be of clear straight-grained spruce. The rungs shall be of straight-grained oak, ash, or hickory, at least 1 1/8 inches in diameter, with 7/8-inch tenons mortised into the side stringers at least 7/8 inch. The stringers shall be tied together with tie rods not less than 1/4 inch in diameter, passing through the stringers and riveted up tight against washers on both ends. The flooring strips shall be spaced not more than 5/8 inch apart, except at the side rails where the space may be 1 inch. Ladder-type platforms shall be constructed in accordance with the following table:

Schedule for Ladder-Type Platforms

Length of Platform	12 feet	14 & 16 feet	18 & 20 feet
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Side stringers, minimum cross section (finished sizes):			
At ends	1 ¾ x 2 ¾ in.	1 ¾ x 2 ¾ in.	1 ¾ x 3 in.
At middle	1 ¾ x 3 ¾ in.	1 ¾ x 3 ¾ in.	1 ¾ x 4 in.
Reinforcing strip (minimum)	A 1/8-x 7/8-inch steel reinforcing strip shall be attached to the side or underside, full length.		
Rungs	Rungs shall be 1 1/8-inch minimum diameter with at least 7/8-inch diameter tenons, and the maximum spacing shall be 12 inches to center.		
Tie rods:			
Number (minimum)	3	4	4
Diameter (minimum)	¼ inch	¼ inch	¼ inch
Flooring, minimum finished size	½ x 2 ¾ in.	½ x 2 ¾ in.	½ x 2 ¾ in.

#### Schedule for Ladder-Type Platforms

Length of Platform	22 & 24 feet	28 & 30 feet
Side stringers, minimum cross section (finished sizes):		
At ends	1 ¾ x 3 in.	1 ¾ x 3 ½ in.
At middle	1 ¾ x 4 ¼ in.	1 ¾ x 5 in.
Reinforcing strip (minimum)	A 1/8-x 7/8-inch steel reinforcing strip shall be attached to the side or underside, full length.	
Rungs	Rungs shall be 1 1/8-inch minimum diameter with at least 7/8-inch diameter tenons, and the maximum spacing shall be 12 inches to center.	
Tie rods:		
Number (minimum)	5	6
Diameter (minimum)	¼ inch	¼ inch
Flooring, minimum finished size	½ x 2 ¾ in.	½ x 2 ¾ in.

(4) Plank-Type Platforms. Plank-type platforms shall be composed of not less than nominal 2-x 8-inch unspliced planks, connected together on the underside with cleats at intervals not exceeding 4 feet, starting 6 inches from each end. A bar or other effective means shall be securely fastened to the platform at each end to prevent the platform from slipping off the hanger. The span between hangers for plank-type platforms shall not exceed 10 feet.

(5) Beam-Type Platforms. Beam platforms shall have side stringers of lumber not less than 2-x 6-inches set on edge. The span between hangers shall not exceed 12 feet

when beam platforms are used. The flooring shall be supported on 2-x 6-inch cross beams, laid flat and set into the upper edge of the stringers with a snug fit, at intervals of not more than 4 feet, securely nailed to the cross beams. Floor-boards shall not be spaced more than 1/2 inch apart.

(q) (1) "Multi-point adjustable suspension scaffolds and stonemasons' multi-point adjustable suspension scaffolds." No specific guidelines or tables are given for these scaffolds.

(q) (2) "Masons' multi-point adjustable suspension scaffolds." Maximum intended load -- 50 lb/ft (2). Each outrigger beam shall be at least a standard 7-inch, 15.3 pound steel I-beam, at least 15 feet long. Such beams shall not project more than 6 feet 6 inches beyond the bearing point. Where the overhang exceeds 6 feet 6 inches, outrigger beams shall be composed of stronger beams or multiple beams.

(r) "Catenary scaffolds."

(1) Maximum intended load -- 500 lbs.

(2) Not more than 2 employees shall be permitted on the scaffold at one time.

(3) Maximum capacity of come-along shall be 2,000 lbs.

(4) Vertical pickups shall be spaced not more than 50 feet apart.

(5) Ropes shall be equivalent in strength to at least 1/2 inch (1.3 cm) diameter improved plow steel wire rope.

(s) "Float (ship) scaffolds."

(1) Maximum intended load -- 750 lbs.

(2) Platforms shall be made of 3/4-inch plywood, equivalent in rating to American Plywood Association Grade B-B, Group I, Exterior.

(3) Bearers shall be made from 2-x 4-inch, or 1-x 10-inch rough lumber. They shall be free of knots and other flaws.

(4) Ropes shall be equivalent in strength to at least 1-inch (2.5 cm) diameter first grade manila rope.

(t) Interior hung scaffolds.

Bearers (use on edge): 2 x 10 in.  
Maximum intended load: Maximum span  
25 lb/ft. (2): 10 ft.

50 lb/ft. (2): 10 ft.

75 lb/ft. (2): 7 ft.

(u) "Needle beam scaffolds."

Maximum intended load: 25 lb/ft. (2)

Beams: 4 x 6 in.

Maximum platform span: 8 ft.

Maximum beam span: 10 ft.

(1) Ropes shall be attached to the needle beams by a scaffold hitch or an eye splice. The loose end of the rope shall be tied by a bowline knot or by a round turn and a half hitch.

(2) Ropes shall be equivalent in strength to at least 1-inch (2.5 cm) diameter first grade manila rope.

(v) "Multi-level suspension scaffolds." No additional guidelines or tables are being given for these scaffolds.

(w) "Mobile Scaffolds." Stability test as described in the ANSI A92 series documents, as appropriate for the type of scaffold, can be used to establish stability for the purpose of 1926.452 (w) (6).

(x) "Repair bracket scaffolds." No additional guidelines or tables are being given for these scaffolds.

(y) "Stilts." No specific guidelines or tables are given.

(z) "Tank builder's scaffold."

(1) The maximum distance between brackets to which scaffolding and guardrail supports are attached shall be no more than 10-feet 6-inches.

(2) Not more than 3 employees shall occupy a 10-feet 6-inch span of scaffold planking at any time.

(3) A taut wire or synthetic rope supported on the scaffold brackets shall be installed at the scaffold plank level between the innermost edge of the scaffold platform and the curved plate structure of the tank shell to serve as a safety line in lieu of an inner guardrail assembly where the space between the scaffold platform and the tank exceeds 12 inches (30.48 cm). In the event the open space on either side of the rope exceeds 12 inches (30.48 cm), a second wire or synthetic rope appropriately placed, or guardrails in accordance with 1926.451 (e) (4), shall be installed in order to reduce that open space to less than 12 inches (30.48 cm).

(4) Scaffold planks of rough full-dimensioned 2-inch (5.1 cm) x 12-inch (30.5 cm) Douglas Fir or Southern Yellow Pine of Select Structural Grade shall be used. Douglas Fir planks shall have a fiber stress of at least 1900 lb/in (2) (130,929 n/cm (2)) and a modulus of elasticity of at least 1,900,000 lb/in (2) (130,929,000 n/cm (2)), while Yellow Pine planks shall have a fiber stress of at least 2500 lb/in (2) (172,275 n/cm (2)) and a modulus of elasticity of at least 2,000,000 lb/in (2) (137,820,000 n/cm (2)).

(5) Guardrails shall be constructed of a taut wire or synthetic rope, and shall be supported by angle irons attached to brackets welded to the steel plates. These guardrails shall comply with 1926.451 (e) (4). Guardrail supports shall be located at no greater than 10-foot 6-inch intervals.

History: 1990 AACCS; 1998-2000 AACCS; 2013 AACCS.