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- **Part Number:** 1910
- **Part Title:** Occupational Safety and Health Standards
- **Subpart:** A
- **Subpart Title:** General
- **Standard Number:** 1910.1
- **Title:** Purpose and scope.

1910.1(a)

Section 6(a) of the Williams-Steiger Occupational Safety and Health Act of 1970 (84 Stat. 1593) provides that "without regard to chapter 5 of title 5, United States Code, or to the other subsections of this section, the Secretary shall, as soon as practicable during the period beginning with the effective date of this Act and ending 2 years after such date, by rule promulgate as an occupational safety or health standard any national consensus standard, and any established Federal standard, unless he determines that the promulgation of such a standard would not result in improved safety or health for specifically designated employees." The legislative purpose of this provision is to establish, as rapidly as possible and without regard to the rule-making provisions of the Administrative Procedure Act, standards with which industries are generally familiar, and on whose adoption interested and affected persons have already had an opportunity to express their views. Such standards are either (1) national consensus standards on whose adoption affected persons have reached substantial agreement, or (2) Federal standards already established by Federal statutes or regulations.

1910.1(b)

This part carries out the directive to the Secretary of Labor under section 6(a) of the Act. It contains occupational safety and health standards which have been found to be national consensus standards or established Federal standards.


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• Part Number:	1910
• Part Title:	Occupational Safety and Health Standards
• Subpart:	A
• Subpart Title:	General
• Standard Number:	1910.2
• Title:	Definitions.

As used in this part, unless the context clearly requires otherwise:

1910.2(a)

"Act" means the Williams-Steiger Occupational Safety and Health Act of 1970 (84 Stat. 1590).

1910.2(b)

"Assistant Secretary of Labor" means the Assistant Secretary of Labor for Occupational Safety and Health;

1910.2(c)

"Employer" means a person engaged in a business affecting commerce who has employees, but does not include the United States or any State or political subdivision of a State;

1910.2(d)

"Employee" means an employee of an employer who is employed in a business of his employer which affects commerce;

1910.2(e)

"Commerce" means trade, traffic, commerce, transportation, or communication among the several States, or between a State and any place outside thereof, or within the District of Columbia, or a possession of the United States (other than the Trust Territory of the Pacific Islands), or between points in the same State but through a point outside thereof;

..1910.2(f)

1910.2(f)

"Standard" means a standard which requires conditions, or the adoption or use of one or more practices, means, methods, operations, or processes, reasonably necessary or appropriate to provide safe or healthful employment and places of employment;

1910.2(g)

"National consensus standard" means any standard or modification thereof which (1) has been adopted and promulgated by a nationally recognized standards-producing organization under procedures whereby it can be determined by the Secretary of Labor or by the Assistant Secretary of Labor that persons interested and affected by the scope or provisions of the standard have reached substantial agreement on its adoption, (2) was formulated in a manner which afforded an opportunity for diverse views to be considered, and (3) has been designated as such a standard by the Secretary or the Assistant Secretary, after consultation with other appropriate Federal agencies; and

1910.2(h)

"Established Federal standard" means any operative standard established by any agency of the United States and in effect on April 28, 1971, or contained in any Act of Congress in force on the date of enactment of the Williams-Steiger Occupational Safety and Health Act.

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• Part Number:	1910
• Part Title:	Occupational Safety and Health Standards
• Subpart:	D
• Subpart Title:	Walking-Working Surfaces
• Standard Number:	<u>1910.21</u>
• Title:	Definitions.

1910.21(a)

As used in 1910.23, unless the context requires otherwise, floor and wall opening, railing and toe board terms shall have the meanings ascribed in this paragraph.

1910.21(a)(1)

"Floor hole." An opening measuring less than 12 inches but more than 1 inch in its least dimension, in any floor, platform, pavement, or yard, through which materials but not persons may fall; such as a belt hole, pipe opening, or slot opening.

1910.21(a)(2)

"Floor opening." An opening measuring 12 inches or more in its least dimension, in any floor, platform, pavement, or yard through which persons may fall; such as a hatchway, stair or ladder opening, pit, or large manhole. Floor openings occupied by elevators, dumb waiters, conveyors, machinery, or containers are excluded from this subpart.

1910.21(a)(3)

"Handrail." A single bar or pipe supported on brackets from a wall or partition, as on a stairway or ramp, to furnish persons with a handhold in case of tripping.

..1910.21(a)(4)**1910.21(a)(4)**

"Platform." A working space for persons, elevated above the surrounding floor or ground; such as a balcony or platform for the operation of machinery and equipment.

1910.21(a)(5)

"Runway." A passageway for persons, elevated above the surrounding floor or ground level, such as a footwalk along shafting or a walkway between buildings.

1910.21(a)(6)

"Standard railing." A vertical barrier erected along exposed edges of a floor opening, wall opening, ramp, platform, or runway to prevent falls of persons.

1910.21(a)(7)

"Standard strength and construction." Any construction of railings, covers, or other guards that meets the requirements of 1910.23.

1910.21(a)(8)

"Stair railing." A vertical barrier erected along exposed sides of a stairway to prevent falls of persons.

1910.21(a)(9)

"Toeboard." A vertical barrier at floor level erected along exposed edges of a floor opening, wall opening, platform, runway, or ramp to prevent falls of materials.

1910.21(a)(10)

"Wall hole." An opening less than 30 inches but more than 1 inch high, of unrestricted width, in any wall or partition; such as a ventilation hole or drainage scupper.

..1910.21(a)(11)

1910.21(a)(11)

"Wall opening." An opening at least 30 inches high and 18 inches wide, in any wall or partition, through which persons may fall; such as a yard-arm doorway or chute opening.

1910.21(b)

As used in 1910.24, unless the context requires otherwise, fixed industrial stair terms shall have the meaning ascribed in this paragraph.

1910.21(b)(1)

"Handrail." A single bar or pipe supported on brackets from a wall or partition to provide a continuous handhold for persons using a stair.

1910.21(b)(2)

"Nose, nosing." That portion of a tread projecting beyond the face of the riser immediately below.

1910.21(b)(3)

"Open riser." The air space between the treads of stairways without upright members (risers).

1910.21(b)(4)

"Platform." An extended step or landing breaking a continuous run of stairs.

1910.21(b)(5)

"Railing." A vertical barrier erected along exposed sides of stairways and platforms to prevent falls of persons. The top member of railing usually serves as a handrail.

1910.21(b)(6)

"Rise." The vertical distance from the top of a tread to the top of the next higher tread.

..1910.21(b)(7)**1910.21(b)(7)**

"Riser." The upright member of a step situated at the back of a lower tread and near the leading edge of the next higher tread.

1910.21(b)(8)

"Stairs, stairway." A series of steps leading from one level or floor to another, or leading to platforms, pits, boiler rooms, crossovers, or around machinery, tanks, and other equipment that are used more or less continuously or routinely by employees, or only occasionally by specific individuals. A series of steps and landings having three or more risers constitutes stairs or stairway.

1910.21(b)(9)

"Tread." The horizontal member of a step.

1910.21(b)(10)

"Tread run." The horizontal distance from the leading edge of a tread to the leading edge of an adjacent tread.

1910.21(b)(11)

"Tread width." The horizontal distance from front to back of tread including nosing when used.

1910.21(c)

As used in 1910.25, unless the context requires otherwise, portable wood ladders terms shall have the meanings ascribed in this paragraph.

1910.21(c)(1)

"Ladders." A ladder is an appliance usually consisting of two side rails joined at regular intervals by cross-pieces called steps, rungs, or cleats, on which a person may step in ascending or descending.

..1910.21(c)(2)**1910.21(c)(2)**

"Steppladder." A steppladder is a self-supporting portable ladder, nonadjustable in length, having flat steps and a hinged back. Its size is designated by the overall length of the ladder measured along the front edge of the side rails.

1910.21(c)(3)

"Single ladder." A single ladder is a non-self-supporting portable ladder, nonadjustable in length, consisting of but one section. Its size is designated by the overall length of the side rail.

1910.21(c)(4)

"Extension ladder." An extension ladder is a non-self-supporting portable ladder adjustable in length. It consists of two or more sections traveling in guides or brackets so arranged as to permit length adjustment. Its size is designated by the sum of the lengths of the sections measured along the side rails.

1910.21(c)(5)

"Sectional ladder." A sectional ladder is a non-self-supporting portable ladder, nonadjustable in length, consisting of two or more sections of ladder so constructed that the sections may be combined to function as a single ladder. Its size is designated by the overall length of the assembled sections.

1910.21(c)(6)

"Trestle ladder." A trestle ladder is a self-supporting portable ladder, nonadjustable in length, consisting of two sections hinged at the top to form equal angles with the base. The size is designated by the length of the side rails measured along the front edge.

..1910.21(c)(7)

1910.21(c)(7)

"Extension trestle ladder." An extension trestle ladder is a self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable single ladder, with suitable means for locking the ladders together. The size is designated by the length of the trestle ladder base.

1910.21(c)(8)

"Special-purpose ladder." A special-purpose ladder is a portable ladder which represents either a modification or a combination of design or construction features in one of the general-purpose types of ladders previously defined, in order to adapt the ladder to special or specific uses.

1910.21(c)(9)

"Trolley ladder." A trolley ladder is a semifixed ladder, nonadjustable in length, supported by attachments to an overhead track, the plane of the ladder being at right angles to the plane of motion.

1910.21(c)(10)

"Side-rolling ladder." A side-rolling ladder is a semifixed ladder, nonadjustable in length, supported by attachments to a guide rail, which is generally fastened to shelving, the plane of the ladder being also its plane of motion.

1910.21(c)(11)

"Wood characteristics." Wood characteristics are distinguishing features which by their extent and number determine the quality of a piece of wood.

1910.21(c)(12)

"Wood irregularities." Wood irregularities are natural characteristics in or on wood that may lower its durability, strength, or utility.

..1910.21(c)(13)

1910.21(c)(13)

"Cross grain." Cross grain (slope of grain) is a deviation of the fiber direction from a line parallel to the sides of the piece.

1910.21(c)(14)

"Knot." A knot is a branch or limb, imbedded in the tree and cut through in the process of lumber manufacture, classified according to size, quality, and occurrence. The size of the knot is determined as the average diameter on the surface of the piece.

1910.21(c)(15)

"Pitch and bark pockets." A pitch pocket is an opening extending parallel to the annual growth rings containing, or that has contained, pitch, either solid or liquid. A bark pocket is an opening between annual growth rings that contains bark.

1910.21(c)(16)

"Shake." A shake is a separation along the grain, most of which occurs between the rings of annual growth.

1910.21(c)(17)

"Check." A check is a lengthwise separation of the wood, most of which occurs across the rings of annual growth.

1910.21(c)(18)

"Wane." Wane is bark, or the lack of wood from any cause, on the corner of a piece.

1910.21(c)(19)

"Decay." Decay is disintegration of wood substance due to action of wood-destroying fungi. It is also known as dote and rot.

..1910.21(c)(20)**1910.21(c)(20)**

"Compression failure." A compression failure is a deformation (buckling) of the fibers due to excessive compression along the grain.

1910.21(c)(21)

"Compression wood." Compression wood is an aberrant (abnormal) and highly variable type of wood structure occurring in softwood species. The wood commonly has density somewhat higher than does normal wood, but somewhat lower stiffness and tensile strength for its weight in addition to high longitudinal shrinkage.

1910.21(c)(22)

"Low density." Low-density wood is that which is exceptionally light in weight and usually deficient in strength properties for the species.

1910.21(d)

As used in 1910.26, unless the context requires otherwise, portable metal ladder terms shall have the meanings ascribed in this paragraph.

1910.21(d)(1)

"Ladder." A ladder is an appliance usually consisting of two side rails joined at regular intervals by cross-pieces called steps, rungs, or cleats, on which a person may step in ascending or descending.

1910.21(d)(2)

"Step ladder." A step ladder is a self-supporting portable ladder, nonadjustable in length, having flat steps and a hinged back. Its size is designated by the overall length of the ladder measured along the front edge of the side rails.

..1910.21(d)(3)**1910.21(d)(3)**

"Single ladder." A single ladder is a non-self-supporting portable ladder, nonadjustable in length, consisting of but one section. Its size is designated by the overall length of the side rail.

1910.21(d)(4)

"Extension ladder." An extension ladder is a non-self-supporting portable ladder adjustable in length. It consists of two or more sections travelling in guides or brackets so arranged as to permit length adjustment. Its size is designated by the sum of the lengths of the sections measured along the side rails.

1910.21(d)(5)

"Platform ladder." A self-supporting ladder of fixed size with a platform provided at the working level. The size is determined by the distance along the front rail from the platform to the base of the ladder.

1910.21(d)(6)

"Sectional ladder." A sectional ladder is a non-self-supporting portable ladder, non-adjustable in length, consisting of two or more sections so constructed that the sections may be combined to function as a single ladder. Its size is designated by the overall length of the assembled sections.

1910.21(d)(7)

"Trestle ladder." A trestle ladder is a self-supporting portable ladder, non-adjustable in length, consisting of two sections, hinged at the top to form equal angles with the base. The size is designated by the length of the side rails measured along the front edge.

..1910.21(d)(8)**1910.21(d)(8)**

"Extension trestle ladder." An extension trestle ladder is a self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable single ladder, with suitable means for locking the ladders together. The size is designated by the length of the trestle ladder base.

1910.21(d)(9)

"Special-purpose ladder." A special-purpose ladder is a portable ladder which represents either a modification or a combination of design or construction features in one of the general-purpose types of ladders previously defined, in order to adapt the ladder to special or specific uses.

1910.21(e)

As used in 1910.27, unless the context requires otherwise, fixed ladder terms shall have the meanings ascribed in this paragraph.

1910.21(e)(1)

"Ladder." A ladder is an appliance usually consisting of two side rails joined at regular intervals by cross-pieces called steps, rungs, or cleats, on which a person may step in ascending or descending.

1910.21(e)(2)

"Fixed ladder." A fixed ladder is a ladder permanently attached to a structure, building, or equipment.

1910.21(e)(3)

"Individual-rung ladder." An individual-rung ladder is a fixed ladder each rung of which is individually attached to a structure, building, or equipment.

..1910.21(e)(4)

1910.21(e)(4)

"Rail ladder." A rail ladder is a fixed ladder consisting of side rails joined at regular intervals by rungs or cleats and fastened in full length or in sections to a building, structure, or equipment.

1910.21(e)(5)

"Railings." A railing is any one or a combination of those railings constructed in accordance with 1910.23. A standard railing is a vertical barrier erected along exposed edges of floor openings, wall openings, ramps, platforms, and runways to prevent falls of persons.

1910.21(e)(6)

"Pitch." Pitch is the included angle between the horizontal and the ladder, measured on the opposite side of the ladder from the climbing side.

1910.21(e)(7)

"Fastenings." A fastening is a device to attach a ladder to a structure, building, or equipment.

1910.21(e)(8)

"Rungs." Rungs are ladder cross-pieces of circular or oval cross-section on which a person may step in ascending or descending.

1910.21(e)(9)

"Cleats." Cleats are ladder cross-pieces of rectangular cross-section placed on edge on which a person may step in ascending or descending.

1910.21(e)(10)

"Steps." Steps are the flat cross-pieces of a ladder on which a person may step in ascending or descending.

..1910.21(e)(11)

1910.21(e)(11)

"Cage." A cage is a guard that may be referred to as a cage or basket guard which is an enclosure that is fastened to the side rails of the fixed ladder or to the structure to encircle the climbing space of the ladder for the safety of the person who must climb the ladder.

1910.21(e)(12)

"Well." A well is a permanent complete enclosure around a fixed ladder, which is attached to the walls of the well. Proper clearances for a well will give the person who must climb the ladder the same protection as a cage.

1910.21(e)(13)

"Ladder safety device." A ladder safety device is any device, other than a cage or well, designed to eliminate or reduce the possibility of accidental falls and which may incorporate such features as life belts, friction brakes, and sliding attachments.

1910.21(e)(14)

"Grab bars." Grab bars are individual handholds placed adjacent to or as an extension above ladders for the purpose of providing access beyond the limits of the ladder.

1910.21(e)(15)

"Through ladder." A through ladder is one from which a man getting off at the top must step through the ladder in order to reach the landing.

1910.21(e)(16)

"Side-step ladder." A side-step ladder is one from which a man getting off at the top must step sideways from the ladder in order to reach the landing.

..1910.21(f)**1910.21(f)**

As used in 1910.28, unless the context requires otherwise, scaffolding terms shall have the meaning ascribed in this paragraph.

1910.21(f)(1)

"Bearer." A horizontal member of a scaffold upon which the platform rests and which may be supported by ledgers.

1910.21(f)(2)

"Boatswain's chair." A seat supported by slings attached to a suspended rope, designed to accommodate one workman in a sitting position.

1910.21(f)(3)

"Brace." A tie that holds one scaffold member in a fixed position with respect to another member.

1910.21(f)(4)

"Bricklayers' square scaffold." A scaffold composed of framed wood squares which support a platform limited to light and medium duty.

1910.21(f)(5)

"Carpenters' bracket scaffold." A scaffold consisting of wood or metal brackets supporting a platform.

1910.21(f)(6)

"Coupler." A device for locking together the component parts of a tubular metal scaffold. The material used for the couplers shall be of a structural type, such as a drop-forged steel, malleable iron, or structural grade aluminum. The use of gray cast iron is prohibited.

..1910.21(f)(7)**1910.21(f)(7)**

"Crawling board or chicken ladder." A plank with cleats spaced and secured at equal intervals, for use by a worker on roofs, not designed to carry any material.

1910.21(f)(8)

"Double pole or independent pole scaffold." A scaffold supported from the base by a double row of uprights, independent of support from the walls and constructed of uprights, ledgers, horizontal platform bearers, and diagonal bracing.

1910.21(f)(9)

"Float or ship scaffold." A scaffold hung from overhead supports by means of ropes and consisting of a substantial platform having diagonal bracing underneath, resting upon and securely fastened to two parallel plank bearers at right angles to the span.

1910.21(f)(10)

"Guardrail." A rail secured to uprights and erected along the exposed sides and ends of platforms.

1910.21(f)(11)

"Heavy duty scaffold." A scaffold designed and constructed to carry a working load not to exceed 75 pounds per square foot.

1910.21(f)(12)

"Horse scaffold." A scaffold for light or medium duty, composed of horses supporting a work platform.

1910.21(f)(13)

"Interior hung scaffold." A scaffold suspended from the ceiling or roof structure.

..1910.21(f)(14)

1910.21(f)(14)

"Ladder jack scaffold." A light duty scaffold supported by brackets attached to ladders.

1910.21(f)(15)

"Ledger (stringer)." A horizontal scaffold member which extends from post to post and which supports the putlogs or bearer forming a tie between the posts.

1910.21(f)(16)

"Light duty scaffold." A scaffold designed and constructed to carry a working load not to exceed 25 pounds per square foot.

1910.21(f)(17)

"Manually propelled mobile scaffold." A portable rolling scaffold supported by casters.

1910.21(f)(18)

"Masons' adjustable multiple-point suspension scaffold." A scaffold having a continuous platform supported by bearers suspended by wire rope from overhead supports, so arranged and operated as to permit the raising or lowering of the platform to desired working positions.

1910.21(f)(19)

"Maximum intended load." The total of all loads including the working load, the weight of the scaffold, and such other loads as may be reasonably anticipated.

1910.21(f)(20)

"Medium duty scaffold." A scaffold designed and constructed to carry a working load not to exceed 50 pounds per square foot.

..1910.21(f)(21)**1910.21(f)(21)**

"Mid-rail." A rail approximately midway between the guardrail and platform, used when required, and secured to the uprights erected along the exposed sides and ends of platforms.

1910.21(f)(22)

"Needle beam scaffold." A light duty scaffold consisting of needle beams supporting a platform.

1910.21(f)(23)

"Outrigger scaffold." A scaffold supported by outriggers or thrustouts projecting beyond the wall or face of the building or structure, the inboard ends of which are secured inside of such a building or structure.

1910.21(f)(24)

"Putlog." A scaffold member upon which the platform rests.

1910.21(f)(25)

"Roofing bracket." A bracket used in sloped roof construction, having provisions for fastening to the roof or supported by ropes fastened over the ridge and secured to some suitable object.

1910.21(f)(26)

"Runner." The lengthwise horizontal bracing or bearing members or both.

1910.21(f)(27)

"Scaffold." Any temporary elevated platform and its supporting structure used for supporting workmen or materials or both.

..1910.21(f)(28)**1910.21(f)(28)**

"Single-point adjustable suspension scaffold." A manually or power-operated unit designed for light duty use, supported by a single wire rope from an overhead support so arranged and operated as to permit the raising or lowering of the platform to desired working positions.

1910.21(f)(29)

"Single pole scaffold." Platforms resting on putlogs or crossbeams, 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.

1910.21(f)(30)

"Stone setters' adjustable multiple-point suspension scaffold." A swinging-type scaffold having a platform supported by hangers suspended at four points so as to permit the raising or lowering of the platform to the desired working position by the use of hoisting machines.

1910.21(f)(31)

"Toeboard." A barrier secured along the sides and ends of a platform, to guard against the falling of material.

1910.21(f)(32)

"Tube and coupler scaffold." An assembly consisting of tubing which serves as posts, bearers, braces, ties, and runners, a base supporting the posts, and special couplers which serve to connect the uprights and to join the various members.

..1910.21(f)(33)**1910.21(f)(33)**

"Tubular welded frame scaffold." A sectional, panel, or frame metal scaffold substantially built up of prefabricated welded sections which consist of posts and horizontal bearer with intermediate members. Panels or frames shall be braced with diagonal or cross braces.

1910.21(f)(34)

"Two-point suspension scaffold (swinging scaffold)." A scaffold, the platform of which is supported by hangers (stirrups) at two points, suspended from overhead supports so as to permit the raising or lowering of the platform to the desired working position by tackle or hoisting machines.

1910.21(f)(35)

"Window jack scaffold." A scaffold, the platform of which is supported by a bracket or jack which projects through a window opening.

1910.21(f)(36)

"Working load." Load imposed by men, materials, and equipment.

1910.21(g)

As used in 1910.29, unless the context requires otherwise, manually propelled mobile ladder stand and scaffold (tower) terms shall have the meaning ascribed in this paragraph.

1910.21(g)(1)

"Bearer." A horizontal member of a scaffold upon which the platform rests and which may be supported by ledgers.

1910.21(g)(2)

"Brace." A tie that holds one scaffold member in a fixed position with respect to another member.

..1910.21(g)(3)**1910.21(g)(3)**

"Climbing ladder." A separate ladder with equally spaced rungs usually attached to the scaffold structure for climbing and descending.

1910.21(g)(4)

"Coupler." A device for locking together the components of a tubular metal scaffold which shall be designed and used to safely support the maximum intended loads.

1910.21(g)(5)

"Design working load." The maximum intended load, being the total of all loads including the weight of the men, materials, equipment, and platform.

1910.21(g)(6)

"Equivalent." Alternative design or features, which will provide an equal degree or factor of safety.

1910.21(g)(7)

"Guardrail." A barrier secured to uprights and erected along the exposed sides and ends of platforms to prevent falls of persons.

1910.21(g)(8)

"Handrail." A rail connected to a ladder stand running parallel to the slope and/or top step.

1910.21(g)(9)

"Ladder stand." A mobile fixed size self-supporting ladder consisting of a wide flat tread ladder in the form of stairs. The assembly may include handrails.

..1910.21(g)(10)**1910.21(g)(10)**

"Ledger (stringer)." A horizontal scaffold member which extends from post to post and which supports the bearer forming a tie between the posts.

1910.21(g)(11)

"Mobile scaffold (tower)." A light, medium, or heavy duty scaffold mounted on casters or wheels.

1910.21(g)(12)

"Mobile." "Manually propelled."

1910.21(g)(13)

"Mobile work platform." Generally a fixed work level one frame high on casters or wheels, with bracing diagonally from platform to vertical frame.

1910.21(g)(14)

"Runner." The lengthwise horizontal bracing and/or bearing members.

1910.21(g)(15)

"Scaffold." Any temporary elevated platform and its necessary vertical, diagonal, and horizontal members used for supporting workmen and materials. (Also known as a scaffold tower.)

1910.21(g)(16)

"Toeboard." A barrier at platform level erected along the exposed sides and ends of a scaffold platform to prevent falls of materials.

..1910.21(g)(17)**1910.21(g)(17)**

"Tube and coupler scaffold." An assembly consisting of tubing which serves as posts, bearers, braces, ties, and runners, a base supporting the posts, and uprights, and serves to join the various members, usually used in fixed locations.

1910.21(g)(18)

"Tubular welded frame scaffold." A sectional, panel, or frame metal scaffold substantially built up of prefabricated welded sections, which consist of posts and bearers with intermediate connecting members and braced with diagonal or cross braces.

1910.21(g)(19)

"Tubular welded sectional folding scaffold." A sectional, folding metal scaffold either of ladder frame or inside stairway design, substantially built of prefabricated welded sections, which consist of end frames, platform frame, inside inclined stairway frame and braces, or hinged connected diagonal and horizontal braces, capable of being folded into a flat package when the scaffold is not in use.

1910.21(g)(20)

"Work level." The elevated platform, used for supporting workmen and their materials, comprising the necessary vertical, horizontal, and diagonal braces, guardrails, and ladder for access to the work platform.

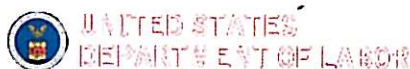
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• Subpart Title:	Walking-Working Surfaces
• Standard Number:	<u>1910.22</u>
• Title:	General requirements.

This section applies to all permanent places of employment, except where domestic, mining, or agricultural work only is performed. Measures for the control of toxic materials are considered to be outside the scope of this section.

1910.22(a)

"Housekeeping."

[1910.22\(a\)\(1\)](#)

All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition.

1910.22(a)(2)

The floor of every workroom shall be maintained in a clean and, so far as possible, a dry condition. Where wet processes are used, drainage shall be maintained, and false floors, platforms, mats, or other dry standing places should be provided where practicable.

1910.22(a)(3)

To facilitate cleaning, every floor, working place, and passageway shall be kept free from protruding nails, splinters, holes, or loose boards.

[1910.22\(b\)](#)

"Aisles and passageways."

1910.22(b)(1)

Where mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles, at loading docks, through doorways and wherever turns or passage must be made. Aisles and passageways shall be kept clear and in good repairs, with no obstruction across or in aisles that could create a hazard.

..1910.22(b)(2)[1910.22\(b\)\(2\)](#)

Permanent aisles and passageways shall be appropriately marked.

1910.22(c)

"Covers and guardrails." Covers and/or guardrails shall be provided to protect personnel from the hazards of open pits, tanks, vats, ditches, etc.

[1910.22\(d\)](#)

"Floor loading protection."

1910.22(d)(1)

In every building or other structure, or part thereof, used for mercantile, business, industrial, or storage purposes, the loads approved by the building official shall be marked on plates of approved design which shall be supplied and securely affixed by the owner of the building, or his duly authorized agent, in a conspicuous place in each space to which they relate. Such plates shall not be removed or defaced but, if lost, removed, or defaced, shall be replaced by the owner or his agent.

1910.22(d)(2)

It shall be unlawful to place, or cause, or permit to be placed, on any floor or roof of a building or other structure a load greater than that for which such floor or roof is approved by the building official.

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• Subpart:	D
• Subpart Title:	Walking-Working Surfaces
• Standard Number:	<u>1910.23</u>
• Title:	Guarding floor and wall openings and holes.

1910.23(a)

"Protection for floor openings."

[1910.23\(a\)\(1\)](#)

Every stairway floor opening shall be guarded by a standard railing constructed in accordance with paragraph (e) of this section. The railing shall be provided on all exposed sides (except at entrance to stairway). For infrequently used stairways where traffic across the opening prevents the use of fixed standard railing (as when located in aisle spaces, etc.), the guard shall consist of a hinged floor opening cover of standard strength and construction and removable standard railings on all exposed sides (except at entrance to stairway).

[1910.23\(a\)\(2\)](#)

Every ladderway floor opening or platform shall be guarded by a standard railing with standard toeboard on all exposed sides (except at entrance to opening), with the passage through the railing either provided with a swinging gate or so offset that a person cannot walk directly into the opening.

[1910.23\(a\)\(3\)](#)

Every hatchway and chute floor opening shall be guarded by one of the following:

..1910.23(a)(3)(i)

1910.23(a)(3)(i)

Hinged floor opening cover of standard strength and construction equipped with standard railings or permanently attached thereto so as to leave only one exposed side. When the opening is not in use, the cover shall be closed or the exposed side shall be guarded at both top and intermediate positions by removable standard railings.

1910.23(a)(3)(ii)

A removable railing with toeboard on not more than two sides of the opening and fixed standard railings with toeboards on all other exposed sides. The removable railings shall be kept in place when the opening is not in use.

Where operating conditions necessitate the feeding of material into any hatchway or chute opening, protection shall be provided to prevent a person from falling through the opening.

[1910.23\(a\)\(4\)](#)

Every skylight floor opening and hole shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides.

[1910.23\(a\)\(5\)](#)

Every pit and trapdoor floor opening, infrequently used, shall be guarded by a floor opening cover of standard strength and construction. While the cover is not in place, the pit or trap opening shall be constantly attended by someone or shall be protected on all exposed sides by removable standard railings.

[1910.23\(a\)\(6\)](#)

Every manhole floor opening shall be guarded by a standard manhole cover which need not be hinged in place. While the cover is not in place, the manhole opening shall be constantly attended by someone or shall be protected by removable standard railings.

1910.23(a)(7)

Every temporary floor opening shall have standard railings, or shall be constantly attended by someone.

..1910.23(a)(8)

1910.23(a)(8)

Every floor hole into which persons can accidentally walk shall be guarded by either:

1910.23(a)(8)(i)

A standard railing with standard toeboard on all exposed sides, or

1910.23(a)(8)(ii)

A floor hole cover of standard strength and construction. While the cover is not in place, the floor hole shall be constantly attended by someone or shall be protected by a removable standard railing.

1910.23(a)(9)

Every floor hole into which persons cannot accidentally walk (on account of fixed machinery, equipment, or walls) shall be protected by a cover that leaves no openings more than 1 inch wide. The cover shall be securely held in place to prevent tools or materials from falling through.

1910.23(a)(10)

Where doors or gates open directly on a stairway, a platform shall be provided, and the swing of the door shall not reduce the effective width to less than 20 inches.

1910.23(b)

"Protection for wall openings and holes."

1910.23(b)(1)

Every wall opening from which there is a drop of more than 4 feet shall be guarded by one of the following:

..1910.23(b)(1)(i)

1910.23(b)(1)(i)

Rail, roller, picket fence, half door, or equivalent barrier. Where there is exposure below to falling materials, a removable toe board or the equivalent shall also be provided. When the opening is not in use for handling materials, the guard shall be kept in position regardless of a door on the opening. In addition, a grab handle shall be provided on each side of the opening with its center approximately 4 feet above floor level and of standard strength and mounting.

1910.23(b)(1)(ii)

Extension platform onto which materials can be hoisted for handling, and which shall have side rails or equivalent guards of standard specifications.

1910.23(b)(2)

Every chute wall opening from which there is a drop of more than 4 feet shall be guarded by one or more of the barriers specified in paragraph (b)(1) of this section or as required by the conditions.

1910.23(b)(3)

Every window wall opening at a stairway landing, floor, platform, or balcony, from which there is a drop of more than 4 feet, and where the bottom of the opening is less than 3 feet above the platform or landing, shall be guarded by standard slats, standard grill work (as specified in paragraph (e)(11) of this section), or standard railing.

Where the window opening is below the landing, or platform, a standard toe board shall be provided.

1910.23(b)(4)

Every temporary wall opening shall have adequate guards but these need not be of standard construction.

..1910.23(b)(5)

1910.23(b)(5)

Where there is a hazard of materials falling through a wall hole, and the lower edge of the near side of the hole is less than 4 inches above the floor, and the far side of the hole more than 5 feet above the next lower level, the hole shall be protected by a standard toeboard, or an enclosing screen either of solid construction, or as specified in paragraph (e)(11) of this section.

1910.23(c)

"Protection of open-sided floors, platforms, and runways."

1910.23(c)(1)

Every open-sided floor or platform 4 feet or more above adjacent floor or ground level shall be guarded by a standard railing (or the equivalent as specified in paragraph (e)(3) of this section) on all open sides except where there is entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a toeboard wherever, beneath the open sides,

1910.23(c)(1)(i)

Persons can pass,

1910.23(c)(1)(ii)

There is moving machinery, or

1910.23(c)(1)(iii)

There is equipment with which falling materials could create a hazard.

1910.23(c)(2)

Every runway shall be guarded by a standard railing (or the equivalent as specified in paragraph (e)(3) of this section) on all open sides 4 feet or more above floor or ground level. Wherever tools, machine parts, or materials are likely to be used on the runway, a toeboard shall also be provided on each exposed side.

Runways used exclusively for special purposes (such as oiling, shafting, or filling tank cars) may have the railing on one side omitted where operating conditions necessitate such omission, providing the falling hazard is minimized by using a runway of not less than 18 inches wide. Where persons entering upon runways become thereby exposed to machinery, electrical equipment, or other danger not a falling hazard, additional guarding than is here specified may be essential for protection.

..1910.23(c)(3)

1910.23(c)(3)

Regardless of height, open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, pickling or galvanizing tanks, degreasing units, and similar hazards shall be guarded with a standard railing and toe board.

1910.23(d)

"Stairway railings and guards."

1910.23(d)(1)

Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails as specified in paragraphs (d)(1)(i) through (v) of this section, the width of the stair to be measured clear of all obstructions except handrails:

1910.23(d)(1)(i)

On stairways less than 44 inches wide having both sides enclosed, at least one handrail, preferably on the right side descending.

1910.23(d)(1)(ii)

On stairways less than 44 inches wide having one side open, at least one stair railing on open side.

1910.23(d)(1)(iii)

On stairways less than 44 inches wide having both sides open, one stair railing on each side.

1910.23(d)(1)(iv)

On stairways more than 44 inches wide but less than 88 inches wide, one handrail on each enclosed side and one stair railing on each open side.

1910.23(d)(1)(v)

On stairways 88 or more inches wide, one handrail on each enclosed side, one stair railing on each open side, and one intermediate stair railing located approximately midway of the width.

..1910.23(d)(2)

1910.23(d)(2)

Winding stairs shall be equipped with a handrail offset to prevent walking on all portions of the treads having width less than 6 inches.

1910.23(e)

"Railing, toe boards, and cover specifications."

1910.23(e)(1)

A standard railing shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 42 inches nominal from upper surface of top rail to floor, platform, runway, or ramp level. The top rail shall be smooth-surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard.

1910.23(e)(2)

A stair railing shall be of construction similar to a standard railing but the vertical height shall be not more than 34 inches nor less than 30 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.

1910.23(e)(3)

[Reserved]

1910.23(e)(3)(i)

For wood railings, the posts shall be of at least 2-inch by 4-inch stock spaced not to exceed 6 feet; the top and intermediate rails shall be of at least 2-inch by 4-inch stock. If top rail is made of two right-angle pieces of 1-inch by 4-inch stock, posts may be spaced on 8-foot centers, with 2-inch by 4-inch intermediate rail.

..1910.23(e)(3)(ii)

1910.23(e)(3)(ii)

For pipe railings, posts and top and intermediate railings shall be at least 1 1/2 inches nominal diameter with posts spaced not more than 8 feet on centers.

1910.23(e)(3)(iii)

For structural steel railings, posts and top and intermediate rails shall be of 2-inch by 2-inch by 3/8-inch angles or other metal shapes of equivalent bending strength with posts spaced not more than 8 feet on centers.

1910.23(e)(3)(iv)

The anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least 200 pounds applied in any direction at any point on the top rail.

1910.23(e)(3)(v)

Other types, sizes, and arrangements of railing construction are acceptable provided they meet the following conditions:

1910.23(e)(3)(v)(a)

A smooth-surfaced top rail at a height above floor, platform, runway, or ramp level of 42 inches nominal;

1910.23(e)(3)(v)(b)

A strength to withstand at least the minimum requirement of 200 pounds top rail pressure;

1910.23(e)(3)(v)(c)

Protection between top rail and floor, platform, runway, ramp, or stair treads, equivalent at least to that afforded by a standard intermediate rail;

..1910.23(e)(4)

1910.23(e)(4)

A standard toeboard shall be 4 inches nominal in vertical height from its top edge to the level of the floor, platform, runway, or ramp. It shall be securely fastened in place and with not more than 1/4-inch clearance above floor level. It may be made of any substantial material either solid or with openings not over 1 inch in greatest dimension.

Where material is piled to such height that a standard toeboard does not provide protection, paneling from floor to intermediate rail, or to top rail shall be provided.

1910.23(e)(5)

1910.23(e)(5)(i)

A handrail shall consist of a lengthwise member mounted directly on a wall or partition by means of brackets attached to the lower side of the handrail so as to offer no obstruction to a smooth surface along the top and both sides of the handrail. The handrail shall be of rounded or other section that will furnish an adequate handhold for anyone grasping it to avoid falling. The ends of the handrail should be turned in to the supporting wall or otherwise arranged so as not to constitute a projection hazard.

1910.23(e)(5)(ii)

The height of handrails shall be not more than 34 inches nor less than 30 inches from upper surface of handrail to surface of tread in line

with face of riser or to surface of ramp.

1910.23(e)(5)(iii)

The size of handrails shall be: When of hardwood, at least 2 inches in diameter; when of metal pipe, at least 1 1/2 inches in diameter. The length of brackets shall be such as will give a clearance between handrail and wall or any projection thereon of at least 3 inches. The spacing of brackets shall not exceed 8 feet.

..1910.23(e)(5)(iv)

1910.23(e)(5)(iv)

The mounting of handrails shall be such that the completed structure is capable of withstanding a load of at least 200 pounds applied in any direction at any point on the rail.

1910.23(e)(6)

All handrails and railings shall be provided with a clearance of not less than 3 inches between the handrail or railing and any other object.

1910.23(e)(7)

Floor opening covers may be of any material that meets the following strength requirements:

1910.23(e)(7)(i)

Trench or conduit covers and their supports, when located in plant roadways, shall be designed to carry a truck rear-axle load of at least 20,000 pounds.

1910.23(e)(7)(ii)

Manhole covers and their supports, when located in plant roadways, shall comply with local standard highway requirements if any; otherwise, they shall be designed to carry a truck rear-axle load of at least 20,000 pounds.

1910.23(e)(7)(iii)

The construction of floor opening covers may be of any material that meets the strength requirements. Covers projecting not more than 1 inch above the floor level may be used providing all edges are chamfered to an angle with the horizontal of not over 30 degrees. All hinges, handles, bolts, or other parts shall set flush with the floor or cover surface.

..1910.23(e)(8)

1910.23(e)(8)

Skylight screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied perpendicularly at any one area on the screen. They shall also be of such construction and mounting that under ordinary loads or impacts, they will not deflect downward sufficiently to break the glass below them. The construction shall be of grillwork with openings not more than 4 inches long or of slatwork with openings not more than 2 inches wide with length unrestricted.

1910.23(e)(9)

Wall opening barriers (rails, rollers, picket fences, and half doors) shall be of such construction and mounting that, when in place at the opening, the barrier is capable of withstanding a load of at least 200 pounds applied in any direction (except upward) at any point on the top rail or corresponding member.

1910.23(e)(10)

Wall opening grab handles shall be not less than 12 inches in length and shall be so mounted as to give 3 inches clearance from the side framing of the wall opening. The size, material, and anchoring of the grab handle shall be such that the completed structure is capable of withstanding a load of at least 200 pounds applied in any direction at any point of the handle.

1910.23(e)(11)

Wall opening screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied horizontally at any point on the near side of the screen. They may be of solid construction, of grillwork with openings not more than 8 inches long, or of slatwork with openings not more than 4 inches wide with length unrestricted.

[39 FR 23502, June 27, 1974, as amended at 43 FR 49744, Oct. 24, 1978; 49 FR 5321, Feb. 10, 1984]

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- Subpart: D
- Subpart Title: Walking-Working Surfaces
- Standard Number: 1910.24
- Title: Fixed Industrial stairs.

1910.24(a)

"Application of requirements." This section contains specifications for the safe design and construction of fixed general industrial stairs. This classification includes interior and exterior stairs around machinery, tanks, and other equipment, and stairs leading to or from floors, platforms, or pits. This section does not apply to stairs used for fire exit purposes, to construction operations to private residences, or to articulated stairs, such as may be installed on floating roof tanks or on dock facilities, the angle of which changes with the rise and fall of the base support.

..1910.24(b)

1910.24(b)

"Where fixed stairs are required." Fixed stairs shall be provided for access from one structure level to another where operations necessitate regular travel between levels, and for access to operating platforms at any equipment which requires attention routinely during operations. Fixed stairs shall also be provided where access to elevations is daily or at each shift for such purposes as gauging, inspection, regular maintenance, etc., where such work may expose employees to acids, caustics, gases, or other harmful substances, or for which purposes the carrying of tools or equipment by hand is normally required. (It is not the intent of this section to preclude the use of fixed ladders for access to elevated tanks, towers, and similar structures, overhead traveling cranes, etc., where the use of fixed ladders is common practice.) Spiral stairways shall not be permitted except for special limited usage and secondary access situations where it is not practical to provide a conventional stairway. Winding stairways may be installed on tanks and similar round structures where the diameter of the structure is not less than five (5) feet.

1910.24(c)

"Stair strength." Fixed stairways shall be designed and constructed to carry a load of five times the normal live load anticipated but never of less strength than to carry safely a moving concentrated load of 1,000 pounds.

1910.24(d)

"Stair width." Fixed stairways shall have a minimum width of 22 inches.

1910.24(e)

"Angle of stairway rise." Fixed stairs shall be installed at angles to the horizontal of between 30 deg. and 50 deg. Any uniform combination of rise/tread dimensions may be used that will result in a stairway at an angle to the horizontal within the permissible range. Table D-1 gives rise/tread dimensions which will produce a stairway within the permissible range, stating the angle to the horizontal produced by each combination. However, the rise/tread combinations are not limited to those given in Table D-1.

Table D-1

Angle to horizontal	Rise (in inches)	Tread run (in inches)
30 deg. 35'	6 1/2	11
32 deg. 08'	6 3/4	10 3/4
33 deg. 41'	7	10 1/2
35 deg. 16'	7 1/4	10 1/4
36 deg. 52'	7 1/2	10
38 deg. 29'	7 3/4	9 3/4
40 deg. 08'	8	9 1/2
41 deg. 44'	8 1/4	9 1/4
43 deg. 22'	8 1/2	9
45 deg. 00'	8 3/4	8 3/4
46 deg. 38'	9	8 1/2
48 deg. 16'	9 1/4	8 1/4
49 deg. 54'	9 1/2	8

..1910.24(f)

1910.24(f)

"Stair treads." All treads shall be reasonably slip-resistant and the nosings shall be of nonslip finish. Welded bar grating treads without nosings are acceptable providing the leading edge can be readily identified by personnel descending the stairway and provided the tread is serrated or is of definite nonslip design. Rise height and tread width shall be uniform throughout any flight of stairs including any foundation structure used as one or more treads of the stairs.

1910.24(g)

"Stairway platforms." Stairway platforms shall be no less than the width of a stairway and a minimum of 30 inches in length measured in the direction of travel.

1910.24(h)

"Railings and handrails." Standard railings shall be provided on the open sides of all exposed stairways and stair platforms. Handrails shall be provided on at least one side of closed stairways preferably on the right side descending. Stair railings and handrails shall be installed in accordance with the provisions of 1910.23.

1910.24(i)

"Vertical clearance." Vertical clearance above any stair tread to an overhead obstruction shall be at least 7 feet measured from the leading edge of the tread.

[39 FR 23502, June 27, 1974, as amended at 43 FR 49744, Oct. 24, 1978; 49 FR 5321, Feb. 10, 1984]

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• Subpart:	D
• Subpart Title:	Walking-Working Surfaces
• Standard Number:	<u>1910.27</u>
• Title:	Fixed ladders.

1910.27(a)

"Design requirements" -

1910.27(a)(1)

Design considerations. All ladders, appurtenances, and fastenings shall be designed to meet the following load requirements:

1910.27(a)(1)(i)

The minimum design live load shall be a single concentrated load of 200 pounds.

1910.27(a)(1)(ii)

The number and position of additional concentrated live-load units of 200 pounds each as determined from anticipated usage of the ladder shall be considered in the design.

1910.27(a)(1)(iii)

The live loads imposed by persons occupying the ladder shall be considered to be concentrated at such points as will cause the maximum stress in the structural member being considered.

1910.27(a)(1)(iv)

The weight of the ladder and attached appurtenances together with the live load shall be considered in the design of rails and fastenings.

1910.27(a)(2)

"Design stresses." Design stresses for wood components of ladders shall not exceed those specified in 1910.25. All wood parts of fixed ladders shall meet the requirements of 1910.25(b).

For fixed ladders consisting of wood side rails and wood rungs or cleats, used at a pitch in the range 75 degrees to 90 degrees, and intended for use by no more than one person per section, single ladders as described in 1910.25(c)(3)(ii) are acceptable.

1910.27(b)

"Specific features" -

[1910.27\(b\)\(1\)](#)

"Rungs and cleats."

1910.27(b)(1)(i)

All rungs shall have a minimum diameter of three-fourths inch for metal ladders, except as covered in paragraph (b)(7)(i) of this section and a minimum diameter of 1 1/8 inches for wood ladders.

[1910.27\(b\)\(1\)\(ii\)](#)

The distance between rungs, cleats, and steps shall not exceed 12 inches and shall be uniform throughout the length of the ladder.

[1910.27\(b\)\(1\)\(iii\)](#)

The minimum clear length of rungs or cleats shall be 16 inches.

1910.27(b)(1)(iv)

Rungs, cleats, and steps shall be free of splinters, sharp edges, burrs, or projections which may be a hazard.

1910.27(b)(1)(v)

The rungs of an individual-rung ladder shall be so designed that the foot cannot slide off the end. A suggested design is shown in figure D-1.

FIGURE D-1. - Suggested design for rungs on individual-rung ladders. (For Figure D-1, [Click Here](#))

1910.27(b)(2)

"Side rails." Side rails which might be used as a climbing aid shall be of such cross sections as to afford adequate gripping surface without sharp edges, splinters, or burrs.

1910.27(b)(3)

"Fastenings." Fastenings shall be an integral part of fixed ladder design.

1910.27(b)(4)

"Splices." All splices made by whatever means shall meet design requirements as noted in paragraph (a) of this section. All splices and connections shall have smooth transition with original members and with no sharp or extensive projections.

1910.27(b)(5)

"Electrolytic action." Adequate means shall be employed to protect dissimilar metals from electrolytic action when such metals are joined.

1910.27(b)(6)

"Welding." All welding shall be in accordance with the "Code for Welding in Building Construction" (AWS D1.0-1966).

1910.27(b)(7)

"Protection from deterioration."

1910.27(b)(7)(i)

Metal ladders and appurtenances shall be painted or otherwise treated to resist corrosion and rusting when location demands. Ladders formed by individual metal rungs imbedded in concrete, which serve as access to pits and to other areas under floors, are frequently located in an atmosphere that causes corrosion and rusting. To increase rung life in such atmosphere, individual metal rungs shall have a minimum diameter of 1 inch or shall be painted or otherwise treated to resist corrosion and rusting.

1910.27(b)(7)(ii)

Wood ladders, when used under conditions where decay may occur, shall be treated with a nonirritating preservative, and the details shall be such as to prevent or minimize the accumulation of water on wood parts.

1910.27(b)(7)(iii)

When different types of materials are used in the construction of a ladder, the materials used shall be so treated as to have no deleterious effect one upon the other.

FIGURE D-2. - Rail Ladder With Bar Steel Rails and Round Steel Rungs (For Figure D-2, [Click Here](#))

1910.27(c)

"Clearance" -

1910.27(c)(1)

"Climbing side." On fixed ladders, the perpendicular distance from the centerline of the rungs to the nearest permanent object on the climbing side of the ladder shall be 36 inches for a pitch of 76 degrees, and 30 inches for a pitch of 90 degrees (fig. D-2 of this section), with minimum clearances for intermediate pitches varying between these two limits in proportion to the slope, except as provided in subparagraphs (3) and (5) of this paragraph.

1910.27(c)(2)

"Ladders without cages or wells." A clear width of at least 15 inches shall be provided each way from the centerline of the ladder in the climbing space, except when cages or wells are necessary.

1910.27(c)(3)

"Ladders with cages or baskets." Ladders equipped with cage or basket are excepted from the provisions of subparagraphs (1) and (2) of this paragraph, but shall conform to the provisions of paragraph (d)(1)(v) of this section. Fixed ladders in smooth-walled wells are excepted from the provisions of subparagraph (1) of this paragraph, but shall conform to the provisions of paragraph (d)(1)(vi) of this section.

1910.27(c)(4)

"Clearance in back of ladder." The distance from the centerline of rungs, cleats, or steps to the nearest permanent object in

back of the ladder shall be not less than 7 inches, except that when unavoidable obstructions are encountered, minimum clearances as shown in figure D-3 shall be provided.

Minimum Ladder Clearances

FIGURE D-3. - Clearance for Unavoidable Obstruction at Rear of Fixed Ladder
(For Figure D-3, [Click Here](#))

1910.27(c)(5)

"Clearance in back of grab bar." The distance from the centerline of the grab bar to the nearest permanent object in back of the grab bars shall be not less than 4 inches. Grab bars shall not protrude on the climbing side beyond the rungs of the ladder which they serve.

1910.27(c)(6)

"Step-across distance." The step-across distance from the nearest edge of ladder to the nearest edge of equipment or structure shall be not more than 12 inches, or less than 2 1/2 inches (fig. D-4).

FIGURE D-4. - Ladder Far from Wall (For Figure D-4, [Click Here](#))

1910.27(c)(7)

"Hatch cover." Counterweighted hatch covers shall open a minimum of 60 degrees from the horizontal. The distance from the centerline of rungs or cleats to the edge of the hatch opening on the climbing side shall be not less than 24 inches for offset wells or 30 inches for straight wells. There shall be no protruding potential hazards within 24 inches of the centerline of rungs or cleats; any such hazards within 30 inches of the centerline of the rungs or cleats shall be fitted with deflector plates placed at an angle of 60 degrees from the horizontal as indicated in figure D-5. The relationship of a fixed ladder to an acceptable counterweighted hatch cover is illustrated in figure D-6.

1910.27(d)

"Special requirements" -

1910.27(d)(1)

"Cages or wells."

1910.27(d)(1)(I)

Cages or wells (except on chimney ladders) shall be built, as shown on the applicable drawings, covered in detail in figures D-7, D-8, and D-9, or of equivalent construction.

1910.27(d)(1)(II)

Cages or wells (except as provided in subparagraph (5) of this paragraph) conforming to the dimensions shown in figures D-7, D-8, and D-9 shall be provided on ladders of more than 20 feet to a maximum unbroken length of 30 feet.

FIGURE D-5. - Deflector Plates for Head Hazard (For Figure D-5, [Click Here](#))

FIGURE D-6. - Relationship of Fixed Ladder to a Safe Access Hatch (For Figure D-6, [Click Here](#))

1910.27(d)(1)(iii)

Cages shall extend a minimum of 42 inches above the top of landing, unless other acceptable protection is provided.

1910.27(d)(1)(iv)

Cages shall extend down the ladder to a point not less than 7 feet nor more than 8 feet above the base of the ladder, with bottom flared not less than 4 inches, or portion of cage opposite ladder shall be carried to the base.

1910.27(d)(1)(v)

Cages shall not extend less than 27 nor more than 28 inches from the centerline of the rungs of the ladder. Cage shall not be less than 27 inches in width. The inside shall be clear of projections. Vertical bars shall be located at a maximum spacing of 40 degrees around the circumference of the cage; this will give a maximum spacing of approximately 9 1/2 inches, center to center.

1910.27(d)(1)(vi)

Ladder wells shall have a clear width of at least 15 inches measured each way from the centerline of the ladder. Smooth-walled wells shall be a minimum of 27 inches from the centerline of rungs to the well wall on the climbing side of the ladder. Where other obstructions on the climbing side of the ladder exist, there shall be a minimum of 30 inches from the centerline of the rungs.

FIGURE D-7. - Cages for Ladders More Than 20 Feet High (For Figure D-7, [Click Here](#))

FIGURE D-8. - Clearance Diagram for Fixed Ladder in Well (For Figure D-8, [Click Here](#))

FIGURE D-9. - Cages-Special applications. (For Figure D-9, [Click Here](#))

1910.27(d)(2)

"Landing platforms." When ladders are used to ascend to heights exceeding 20 feet (except on chimneys), landing platforms shall be provided for each 30 feet of height or fraction thereof, except that, where no cage, well, or ladder safety device is provided, landing platforms shall be provided for each 20 feet of height or fraction thereof. Each ladder section shall be offset from adjacent sections. Where installation conditions (even for a short, unbroken length) require that adjacent sections be offset, landing platforms shall be provided at each offset.

1910.27(d)(2)(i)

Where a man has to step a distance greater than 12 inches from the centerline of the rung of a ladder to the nearest edge of structure or equipment, a landing platform shall be provided. The minimum step-across distance shall be 2 1/2 inches.

1910.27(d)(2)(ii)

All landing platforms shall be equipped with standard railings and toeboards, so arranged as to give safe access to the ladder. Platforms shall be not less than 24 inches in width and 30 inches in length.

1910.27(d)(2)(iii)

One rung of any section of ladder shall be located at the level of the landing laterally served by the ladder. Where access to the landing is through the ladder, the same rung spacing as used on the ladder shall be used from the landing platform to the first rung below the landing.

[1910.27\(d\)\(3\)](#)

"Ladder extensions." The side rails of through or side-step ladder extensions shall extend 3 1/2 feet above parapets and landings. For through ladder extensions, the rungs shall be omitted from the extension and shall have not less than 18 nor more than 24 inches clearance between rails. For side-step or offset fixed ladder sections, at landings, the side rails and rungs shall be carried to the next regular rung beyond or above the 3 1/2 feet minimum (fig. D-10).

FIGURE D-10. - Offset Fixed Ladder Sections (For Figure D-10, [Click Here](#))

[1910.27\(d\)\(4\)](#)

"Grab bars." Grab bars shall be spaced by a continuation of the rung spacing when they are located in the horizontal position. Vertical grab bars shall have the same spacing as the ladder side rails. Grab-bar diameters shall be the equivalent of the round-rung diameters.

[1910.27\(d\)\(5\)](#)

"Ladder safety devices." Ladder safety devices may be used on tower, water tank, and chimney ladders over 20 feet in unbroken length in lieu of cage protection. No landing platform is required in these cases. All ladder safety devices such as those that incorporate lifebelts, friction brakes, and sliding attachments shall meet the design requirements of the ladders which they serve.

1910.27(e)

"Pitch" -

1910.27(e)(1)

"Preferred pitch." The preferred pitch of fixed ladders shall be considered to come in the range of 75 degrees and 90 degrees with the horizontal (fig. D-11).

FIGURE D-11. - Pitch of Fixed Ladders (For Figure D-11, [Click Here](#))

1910.27(e)(2)

"Substandard pitch." Fixed ladders shall be considered as substandard if they are installed within the substandard pitch range of 60 and 75 degrees with the horizontal. Substandard fixed ladders are permitted only where it is found necessary to meet conditions of installation. This substandard pitch range shall be considered as a critical range to be avoided, if possible.

1910.27(e)(3)

"Scope of coverage in this section." This section covers only fixed ladders within the pitch range of 60 degrees and 90 degrees with the horizontal.

1910.27(e)(4)

"Pitch greater than 90 degrees." Ladders having a pitch in excess of 90 degrees with the horizontal are prohibited.

1910.27(f)

"Maintenance." All ladders shall be maintained in a safe condition. All ladders shall be inspected regularly, with the intervals between inspections being determined by use and exposure.

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