

4123:1-3-04 Floors, stairways, railing, overhead protection and guarding of open-sided floors, platforms and runways.

(A) Scope.

This rule shall apply to temporary conditions where there is danger of employees or material falling through floor, roof or wall openings or from stairways or runways.

(B) Definitions.

- (1) "Floor hole" means an opening measuring less than twelve inches but more than two inches in its least dimension in any walking or working surface six feet or more above the lower level.
- (2) "Floor opening" means an opening measuring twelve inches or more in its least dimension in any walking or working surface six feet or more above the lower level.
- (3) "Handrail" means a single bar or pipe supported on brackets from a wall or partition, as on a stairway or ramp.
- (4) "Nose (nosing)" means that portion of a tread projecting beyond the face of the riser immediately below.
- (5) "Platform" means a working space for employees elevated above the surrounding floor or ground.
- (6) "Rise (riser)" means the vertical distance from the top of a tread to the top of the next higher tread.
- (7) "Runway" means a passageway for employees, elevated above surrounding floor or ground level.
- (8) "Stair platform" means an extended step or landing breaking a continuous run of stairs.
- (9) "Stair railing" means a vertical barrier erected along exposed sides of a stairway.
- (10) "Stairs (stairway)" means a series of steps and landings having four or more risers leading from one level or floor to another, or leading to platforms.
- (11) "Standard guard railing" means a substantial barrier, constructed in accordance with paragraph (E) of this rule.

- (a) "Intermediate rail" means the intermediate lateral member or members of a standard guard railing, installed at intervals of no more than twenty-one inches.
- (b) "Top rail" means the top lateral member of a standard guard railing.
- (12) "Toeboard" means a vertical barrier at floor level, erected along exposed edges of a floor opening, platform, runway, or ramp to prevent falls of material.
- (13) "Tread width" means the horizontal distance from the front to back of tread, including nosing when used.
- (14) "Wall opening" means an opening no less than thirty inches in its vertical dimension and no less than eighteen inches in its horizontal dimension in any wall.

(C) Temporary floors.

(1) Strength and construction.

(a) Strength.

Temporary floors shall be provided in all structures for employees working on various floor levels and shall be substantially constructed to support employees and equipment safely.

(b) Construction.

The planks shall be placed as close together as possible, and shall not extend more than one foot beyond supports unless securely fastened to prevent slipping or tipping.

(2) Guarding of partial area.

(a) When employees are not required to work over the entire area of a floor, only such partial area on which employees are required to work shall be provided with the temporary working floors as required in paragraph (C)(1) of this rule.

(b) Standard guard railing and toeboards shall be provided around the unused portion of exposed sides of all openings in floors, roofs, platforms or shafts.

(3) Joists.

(a) Joists shall be securely fastened to prevent tipping before placing temporary floors.

- (b) Over joists upon which concrete floors are to be placed, expanded metal lath or wire mesh (no greater than one-half inch mesh) may be used where the joist spacing does not exceed twenty-four inches, provided that all laps and joints are securely fastened and that plank runways are provided for safe passage or working thereon by employees.

(4) Temporary floors below finished floor.

In buildings or structures where the upper floors are constructed before the lower floors, temporary floors of the strength required in paragraph (C)(1) of this rule shall be maintained no more than two floors below the floor being constructed.

(5) In structural steel frame buildings.

- (a) Structural steel frame buildings shall have temporary floors as provided in paragraph (C)(1) of this rule placed within two typical floors of the erectors and the riveters. Such floors shall cover the entire floor area beneath riveters or erectors except that no floors are required over hoistway or stairway openings.

(b) Exception.

The provisions of paragraph (C)(5)(a) of this rule shall not apply to what is generally known as mill buildings where no floors are contemplated, and where the operation of overhead cranes, etc., will not permit compliance.

(6) In reinforced concrete frame constructed buildings.

Reinforced concrete frame constructed buildings shall have floor or concrete forms constructed before the forms of the story above are started.

(7) Sectionally constructed buildings.

In sectionally constructed buildings each section constitutes a separate building operation in the application of the temporary floor requirements of this rule.

(D) Openings.

(1) Floor openings.

Floor openings shall be guarded by a standard guard railing and toeboard or a cover with a safety factor of no less than two and so constructed that the cover cannot be accidentally displaced. A safety belt or harness with a lanyard may be provided in lieu of a standard guard railing and toeboard or cover.

(a) Ladderway floor openings or platforms.

Ladder floor opening or platforms shall be guarded by a standard guard railing and toeboard on all exposed sides except at the entrance to the opening, with the passage through the standard guard railing either provided with a swinging gate or so offset that an employee cannot walk directly into the opening.

(b) Floor holes.

Floor holes into which employees can accidentally walk, shall be provided with either a standard guard railing and toeboard on all exposed sides, or a floor hole cover which provides a factor of safety of no less than two and so constructed that the cover cannot be accidentally displaced. While the cover is not in place, the floor hole shall be guarded by a standard guard railing.

(c) Hatchways.

A removable standard guard railing and toeboard shall be provided on no more than two sides of the hatchway opening and fixed standard guard railing and toeboard shall be provided on all other exposed sides. The removable portion of the standard guard railings shall be kept in place when the opening is not in use and where practicable should be hinged or otherwise mounted so as to be conveniently replaceable.

(2) Wall openings.

(a) Guarding.

Where there is a danger of an employee falling six feet or more to a lower level through a wall opening, the opening shall be guarded by a standard guard railing and toeboard or a barricade. When the height and placement of the opening in relation to the working surface is such that either a standard guardrail or intermediate rail will effectively reduce the danger of falling, one or both shall be provided. One-fourth-inch wire rope, securely fastened in place, may be used in lieu of the top rail and intermediate rail. A safety belt or harness or a safety net system may be provided in lieu of the standard guard railing and toeboard or barricade.

(b) Spreaders.

If spreaders are used in window or door frames, such spreaders shall be substantially secured in place.

- (c) Where doors or gates open directly onto a stairway, a platform shall be provided and the swing of the door shall not reduce the effective width of the platform to less than twenty inches.

(3) Roof openings.

Wherever there is a danger of an employee falling six feet or more to a lower level through a roof opening, including skylights, a standard guard railing and toeboard shall be provided on all exposed sides, or a cover which provides a factor of safety of no less than two shall be provided. A safety belt or harness or a safety net system may be provided in lieu of the standard guard railing and toeboard or cover.

(E) Standard guard railing.

- (1) Standard guard railing shall be constructed as a substantial barrier, securely fastened in place and free from protruding objects such as nails, screws, and bolts, to protect openings or prevent accidental contact with some object. Which barrier shall consist of a top rail no less than thirty-nine inches or more than forty-five inches above the working level, and unless the space between the top rail and the working level is covered with substantial material, an intermediate rail. Minimum material requirements shall be:

(a) Metal

- (i) For pipe railings, the top rail, intermediate rail and uprights shall be no less than one and one half inches nominal diameter with uprights spaced no more than eight feet on centers.
- (ii) For structural steel railings, the top rail, intermediate rail and uprights shall be of two-inch by two-inch by three-eighths-inch angles or other metal shape of equivalent bending strength, with uprights spaced no more than eight feet on centers.
- (iii) For wire rope railings, the top and intermediate rail shall be at least one-quarter inch diameter of thickness.

(b) Wood.

For wood railings, the uprights shall be of no less than two-inch by four-inch (nominal) stock spaced not to exceed eight feet; the top rail shall be of no less than two-inch by four-inch (nominal) stock; the intermediate rail shall be of no less than one-inch by six-inch stock (nominal).

- (2) A standard toeboard shall be constructed of substantial material. It shall be three and one-half inches minimum in vertical height from its top edge to the level of

the floor, platform, runway or ramp. It shall be securely fastened in place, with a clearance of no more than one-fourth-inch above the floor, platform, runway or ramp.

(F) Stairways.

(1) Uniform dimensions.

- (a) The 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.
- (b) Temporary stairs shall have a landing no less than thirty inches in the direction of travel at every twelve feet of vertical rise.
- (c) Temporary spiral (winding) stairways are prohibited.

(2) Angle of stairways.

- (a) Buildings or other structures in which permanent stairways are not installed for construction use, shall be provided with no less than one temporary stairway of substantial construction between floors, fitted with no less than two-inch by eight-inch treads, securely fastened in place. The flights of stairs shall be installed at angles to the horizontal of between thirty and fifty degrees to the floors or other horizontal parts to which they connect or land.
- (b) Where it is not possible to provide temporary stairways due to the absence of floors in the structure, a ladder shall be provided.

(3) Stairways with pan-type treads.

Permanent steel or other metal stairways with hollow pan-type treads that are to be filled with concrete or other materials, when used during construction, shall be filled to the level of the nosing with solid material. This requirement shall apply as each flight of stairs is completed.

(4) Treads, landings, gratings.

Stairways used for construction purposes shall be fitted with substantial treads, securely fastened and shall have tightly floored landings or gratings.

(5) Illumination.

Stairways, ramps, runways and platforms shall be lighted to no less than the minimum illumination intensity of five foot-candles.

(6) Stair railings and handrails.

- (a) Every flight of stairs having four or more risers or rising thirty inches, whichever is less, shall be equipped with stair railings or handrails as specified in paragraphs (F)(6)(a)(i) to (F)(6)(a)(i)(v) of this rule, the width of the stair to be measured clear of all obstructions except handrails:
- (i) On stairways less than forty-four inches wide having both sides enclosed, at least one handrail, preferably on the right side descending;
 - (ii) On stairways less than forty-four inches wide having one side open, at least one stair railing on the open side;
 - (iii) On stairways less than forty-four inches wide having both sides open, one stair railing on each side;
 - (iv) On stairways more than forty-four inches wide but less than eighty-eight inches wide, one handrail on each enclosed side and one stair railing on each open side;
 - (v) On stairways eighty-eight 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;
 - (vi) On the open sides of stairways and stair landings, except where such stairways and landings are protected by studding and other permanent construction, a stair railing shall be provided.

(b) Construction.

(i) Stair railing.

A stair railing shall be of construction similar to a standard guard railing, except that the vertical height shall be no less than thirty-six inches from the upper surface of the top rail to the surface of the tread in line with the face of the riser at the forward edge of the tread.

(ii) Handrail.

(a) A handrail shall be of construction similar to a standard guard railing except that it is mounted to a wall or partition, and does not include an intermediate rail. It shall have a smooth surface along the top and both sides of the handrail. Ends of the handrail shall be constructed so as not to constitute a projection hazard.

(b) The height of handrails shall be no more than thirty-seven inches and no less than thirty inches from the upper surface of the handrail to the surface of the tread, in line with the face of the riser or to the surface of the ramp.

(c) Handrails and railings shall be provided with a clearance of approximately three inches between the handrail or railing and any other object.

(G) Overhead protection.

Overhead protection shall be provided where employees are working below other employees on floor levels with open floor above.

(H) Guarding of open-sided floors, platforms and runways.

(1) Open-sided floors or platforms.

(a) Standard guard railing and toeboards shall be provided on every open-sided floor or platform six feet or more above adjacent floor or ground level, except where there is entrance to a ramp, stairway or fixed ladder.

(b) One-quarter-inch wire rope and toeboard, substantially secured in place, may be used in lieu of standard guard railing.

(2) Runways.

(a) Standard guard railings and toeboards shall be provided on all open sides of runways six feet or more above floor or ground level.

(b) Runways used exclusively for special purposes may have the railing on one side omitted where operating conditions necessitate such omission, providing the falling hazard is minimized by using a runway no less than eighteen inches wide.

(3) Working above dangerous equipment.

(a) Each employee working less than six feet above dangerous equipment, such as machinery in operation, open vats, hoppers, or tanks, railroad tracks with moving equipment below the work, live electrical conductors unless deenergized and effectively grounded, or similar sources of danger, shall be protected from falling into or onto the dangerous equipment by a standard guard railing and toeboard, or the equipment shall be guarded.

(b) Each employee working six feet or more above dangerous equipment, such as machinery in operation, open vats, hoppers, or tanks, railroad tracks with

moving equipment below the work, live electrical conductors unless deenergized and effectively grounded, or similar sources of danger, shall be protected from falling into or onto the dangerous equipment by a standard guard railing and toeboard, or safety belt or harness, or a safety net system.

(4) Bridge decks.

The height of the standard guard railing on bridge decks may be adjusted to provide clearance for the operation of paving machinery.

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