ABE127

UF UNIVERSITY of FLORIDA IFAS Extension

Guarding Floor and Wall Openings and Holes — OSHA Standard 1910.23 [1]

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The Impact of Safety on Florida Agriculture

Florida agriculture, including forestry and fishing, made an annual economic impact of $98 billion in 2004. More than 390,000 workers are directly employed in these industries in Florida, and another 380,000 people are employed in activities related to agriculture (Hodges 2006). The state's agricultural enterprises range from large citrus, vegetable and cattle operations to small family-operated farms.

In spite of the popular images of agriculture, it is a highly mechanized, industrial profession with one of the highest injury and death rates among U.S. industries. The last study of death rates in Florida agriculture (Liller 2000) found 240 deaths from 1989 to 1998. In 2005, the Bureau of Labor Statistics (BLS 2005a), reported that death due to injury in agriculture was 31.4 deaths per 100,000 full-time workers, which was the highest rate among all major occupational groups and an increase of 14% over 2004. Also in 2005, the Bureau of Labor Statistics reported 6,100 injuries per 100,000 full-time workers (BLS 2005b).

Safety in Florida agriculture is challenging because:

- the state's agricultural enterprises are diverse,
- safety knowledge among workers varies,
- manual labor is used extensively,
- the climate creates year-round heat stress.

Therefore, it is vital to assist the public in learning about OSHA documents related to agriculture. More information about the OSHA Standards and agricultural safety is available at the following Web sites:

- Florida AgSafe: http://www.flagsafe.ufl.edu
- OSHA Regulations: http://www.osha.gov/comp-links.html
- National Agricultural Safety Database: http://www.cdc.gov/nasd

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Overview

This is a condensation of Standard 1910.23 of the Occupational Safety and Health Act. This document is not intended to be totally inclusive but rather to highlight the information and requirements in the complete OSHA standard that all owners and managers of agricultural businesses should understand.

Definitions

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.

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 standard.

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.

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.

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

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

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

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

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.

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.

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.

Protection for Floor Openings
Stairway Floor Openings

Every stairway floor opening must be guarded by a standard railing (see the section Railing, Toeboard and Cover Specifications). The railing must be provided on all exposed sides (except that of the stairway entrance). 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 must consist of a hinged floor opening cover (of standard strength and construction) and removable standard railings on all exposed sides (again, excepting that of the stairway entrance).

Doors or Gates on Stairways

Where doors or gates open directly on a stairway, a platform must be provided large enough that the swing of the door does not reduce its effective width to less than 20 inches.

Ladderway Floor Openings

Every ladderway floor opening or platform must be guarded by a standard railing with standard toeboard on all exposed sides (except at the entrance to the 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.

Hatchway and Chute Floor Openings

Every hatchway and chute floor opening must be guarded by either:

- A hinged floor opening cover of standard strength and construction equipped with standard railings or permanently attached so as to leave only one exposed side. (When the opening is not in use, the cover must be closed or the exposed side guarded at both top and intermediate positions by removable standard railings.) OR
- 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 must 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 must be provided to prevent a person from falling through the opening.

Skylight Floor Openings and Holes

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

Pit and Trapdoor Floor Openings

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

Manhole Floor Openings

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

Temporary Floor Openings

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

Floor Holes

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

- a standard railing with standard toeboard on all exposed sides, or
- a floor hole cover of standard strength and construction. (While the cover is not in place, the floor hole must be constantly attended by someone or must be protected by a removable standard railing.)

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

Protection for Wall Openings and Holes

General

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

- A rail, roller, picket fence, half door or equivalent barrier. (Where there is exposure below to falling materials, a removable toe board or the equivalent must also be provided. When the opening is not in use for handling materials, the guard must be kept in position regardless of a door on the opening. In addition, a grab handle must be provided on each side of the opening with its center approximately four feet above floor level and of standard strength and mounting.) OR
- An extension platform onto which materials can be hoisted for handling. Such a platform must have side rails or equivalent guards of standard specifications.

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 four inches above the floor and the far side of the hole more than five feet above the next lower level, the hole must be protected by a standard toeboard or an enclosing screen (either of solid construction) or as specified in the section Wall Opening Screens.

Chute Wall Openings

Every chute wall opening from which there is a drop of more than four feet must be guarded by one or more of the general barriers (see the section General), as required by conditions.

Window Wall Openings

Every window wall opening at a stairway landing, floor, platform or balcony, from which there is a drop of more than four feet, and where the bottom of the opening is less than three feet above the platform or landing, must be guarded by standard slats, standard grill work (see the section Wall Opening Screens) or standard railing. Where the window opening is below the landing, or platform, a standard toe board must be provided.

Temporary Wall Openings

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

Protection of Open-Sided Floors, Platforms and Runway

Every open-sided floor or platform four feet or more above adjacent floor or ground level (e.g., a raised packinghouse sorting table) must be guarded by a standard railing (or the equivalent as indicated in the section Specifications for Various Railing Materials) on all open sides except where there is entrance to a ramp, stairway or fixed ladder. The railing must be provided with a toeboard wherever, beneath the open sides:

- persons can pass,
- there is moving machinery, or
- there is equipment with which falling materials could create a hazard.

Every runway must be guarded by a standard railing (or the equivalent as indicated in the section Specifications for Various Railing Materials) on all open sides four feet or more above floor or ground level. Wherever tools, machine parts or materials are likely to be used on the runway, a toeboard must also be provided on each exposed side.

Runways used exclusively for special purposes, such as servicing machinery, may have the railing on one side omitted where necessary due to operating conditions, providing the falling hazard is minimized by using a runway of not less than 18 inches wide. Where persons entering runways become exposed to machinery, electrical equipment or dangers other than falling hazards, additional guarding may be essential for protection.

Regardless of height, open-sided floors, walkways, platforms or runways above or adjacent to dangerous equipment must be guarded with a standard railing and toeboard.

Stairway Railings and Guards

Every flight of stairs having four or more risers must be equipped with standard stair railings or standard handrails as follows. (The width of the stair must be measured clear of all obstructions except handrails.) Stairways:

- less than 44 inches wide having both sides enclosed must be equipped with at least one handrail, preferably on the right side descending.
- less than 44 inches wide having one side open must be equipped with at least one stair railing on open side.
- less than 44 inches wide having both sides open, must be equipped with one stair railing on each side.
- more than 44 inches wide but less than 88 inches wide must be equipped with one handrail on each side.
- 88 or more inches wide must be equipped with one handrail on each side, and one center stair railing located approximately midway of the total width.
- Winding stairs must be equipped with a handrail offset to prevent walking on all portions of the treads having width less than 6 inches.

Railing, Toeboard and Cover Specifications

Railings

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

Stair Railings or Handrails

A stair railing or handrail must be of construction similar to a standard railing, but the vertical height must be 30 to 34 inches from the upper surface of the top rail to the face of the riser at the forward edge of the tread.

A handrail must 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 must 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.

The size of handrails must 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 must be such as will give a clearance between the handrail and wall or any projection on the wall of at least 3 inches; the spacing of brackets must not exceed 8 feet).

The **mounting** of handrails must 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.

All **handrails** must be provided with a clearance of at least 3 inches between the handrail or railing and any other object.

Specifications for Various Railing Materials

For **wood railings** the posts must be of at least 2" x 4" stock spaced at 6 feet or less; the top and intermediate rails must be of at least 2" x 4" stock. If the top rail is made of two right-angle pieces of 1" x 4" stock, posts may be spaced on 8-foot centers, with a 2" x 4" intermediate rail.

For **pipe railings** , posts and top and intermediate railings must be at least 1 1/2" diameter with posts spaced 8 feet or less on centers.

For **structural steel railings** , posts and top and intermediate rails must be of 2" x 2" x 3/8" angle iron or other metal shapes of equivalent bending strength with posts spaced 8 feet or less on centers.

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

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

- a smooth-surfaced top rail at a height above floor, platform, runway or ramp level of 42 inches,
- a strength to withstand at least the minimum requirement of 200 pounds top rail pressure, and
- protection between the top rail and floor, platform, runway, ramp or stair treads, equivalent at least to that afforded by a standard intermediate rail.

Toeboards

A standard toeboard must be 4 inches in height from its top edge to the level of the floor, platform, runway or ramp. It must be securely fastened in place and with a clearance = or < 1/4" above floor level. It may be made of any substantial material either solid or with openings = or < 1 inch in greatest dimension.

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

Covers

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

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

Floor opening covers may be constructed of any material that meets the strength requirements. Covers projecting 1 inch or less above the floor level may be used providing all edges are chamfered to a horizontal angle = or < 30 degrees. All hinges, handles, bolts or other parts must sit flush with the floor or cover surface.

Skylight Screens

Skylight screens must 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 must 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 must be of grillwork with openings = or < 4 inches long, or of slatwork with openings = or < 2 inches wide with length unrestricted.

Wall Opening Barriers

Wall opening barriers (rails, rollers, picket fences, and half doors) must 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.

Wall Opening Grab Handles

Wall opening grab handles must be at least 12 inches in length and must be mounted so as to give 3 inches clearance from the side framing of the wall opening. The size, material, and anchoring of the grab handle must 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.

Wall Opening Screens

Wall opening screens must 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 = or < 8 inches long, or of slatwork with openings = or < 4 inches wide with length unrestricted.

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