

CONSTRUCTION SAFETY DESIGN SOLUTION #2 DESIGN CATEGORY: INTERIOR HAZARD: FALLS FROM FLOOR



This design solution reduces the risk of serious falls from floor openings during the construction and maintenance activities during the life of a building. Falls from floor openings can result in death or serious injury – about 31 fatalities per year [BLS, 2006] are reported.

A 20-year-old male drywall mechanic (the victim) died after falling about 10 feet from an open-sided second floor landing and striking his head on a concrete floor. The victim was working alone sanding a ceiling constructed of sheetrock. The victim was operating a sander and apparently unaware of his position in relation to the open-sided floor. The victim fell about 10-feet, hitting the concrete floor face first. A temporary or permanent guardrail system along the open-sides of the floor would have prevented this tragedy.

SOLUTION

Designers should specify guardrail systems around floor openings except at the entrance to stairways. Designers should work with contractors to install permanent guardrails as soon as possible in the construction process so that workers will not be exposed to fall hazards. Cast-in sockets can be specified around floor openings. The sockets make it easy for contractors to install temporary guardrails during the construction phase. The sockets can then be used for permanent railings or filled in.



This photo shows cast sockets along the open side of a stairway, The sockets make it convenient to install temporary or permanent guardrails.



This photo shows guardrails installed along an opening. Installing guardrails early on in the construction process can eliminate the risk of a fall through an opening.

BACKGROUND INFORMATION

Applicable US Safety Regulations

OSHA Construction standards

1926.501(b)(1) Unprotected sides and edge. Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 6 feet or more above a lower level shall

be protected from falling by the use of guardrails systems, safety net systems, or personal fall arrest systems.

1926.502(b)(1) Top edge height of top rails, or equivalent guardrail system members shall be 42 inches plus or minus 3 inches above the walking/working level.

1926.502(b)(2) Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members shall be installed between the top edge of the guardrail system and the walking/working surface when there is no wall or parapet wall at least 21 inches high.

1926.502(b)(3) Guardrail systems shall be capable of withstanding, without failure, a force of 200 pounds applied within 2 inches of the top edge, in any outward or downward direction, at any point along the top edge.

OSHA General Industry standards

1910.23 (a) Protection for floor openings. (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 the entrance to stairway). For infrequently used stairways where traffic across the openings prevent 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 the entrance to stairway).

OTHER CONSIDERATIONS

-Consider specifying perimeter beams around floor openings. The beams would provide a convenient tie off point for workers during construction

-Consider adding drawing notes to plans specifying that floor openings and holes should be protected with either a secured cover or guardrail

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