

17.1: Introduction to Stairways and Ladders

Introduction

Ladders are one of the most frequently used tools on the jobsite. Unfortunately, they are also one of the most abused and mistreated. Some of the most serious accidents that electrical workers have involve falls from six foot ladders. Accident studies show there are several factors that are common to most ladder accidents. Standing on the top step of a ladder, or standing above the maximum permitted height are frequently cited as factors in ladder accidents. Overreaching on the ladder is another commonly cited contributor to ladder accidents. Another common factor in ladder accidents is the use of the wrong ladder for the job. Using ladders with conductive side rails or using a step-ladder as a straight ladder are two good examples of ladder misapplication.

General Requirements

A stairway or ladder, for personnel access, shall be provided whenever there is a break in elevation of 19 inches or more. Stairways and ladders are not required where a ramp, sloped embankment, runway, or personnel hoist is provided.

Spiral stairways are not permitted for employees on construction sites unless they are part of the structure on which the construction work is being performed.

A double-cleated ladder or two or more separate ladders shall be provided when ladders are the only means of access or exit from a working area for 25 or more employees or when a ladder is used for simultaneous two-way traffic.

Each building or structure shall have at least one point of access between levels and that point shall be kept clear to permit free passage of employees.

Stairways

Installation Requirements

Temporary stairways shall be equipped with landings of not less than 30 inches in the direction of travel and extend at least 22 inches in width at every 12 feet, or less, of vertical rise.

Stairways shall be installed between 30 degrees and 50 degrees from horizontal. Riser height and tread depth shall be within 1/4" of uniform heights and depths in any stairway system.

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

Pan stairs

Stairways with pan stairs, where the treads and/or landings are not filled, shall not be used for foot traffic unless the treads and/or landings are temporarily fitted with wood or other material to the top edge of each pan.

Requirements for stairways rising more than 30 inches

Stairways having four or more risers or rising more than 30 inches shall be equipped with the following:

1. At least one handrail.
2. One vertical barrier along the unprotected sides to prevent employees from falling to lower levels.

Construction requirements

Construction of stairways shall also meet the following requirements:

1. The height of the stairrails shall not be less than 36 inches from the upper surface of the stairrail system to the surface of the tread, in line with the face of the riser at the forward edge of the tread.
2. Midrails, when used, shall be installed midway between the top edge of the stairrail and the stairway steps.
3. If Midrails are not used then screens, mesh or intermediate vertical members shall be provided between the top of the stairrail and the stairway steps.
4. When screens or mesh are used, they shall extend from the top rail of the stairway to the stairway step.
5. When intermediate vertical members are used they shall not be more than 19 inches apart.

6. Handrails and the top rails of stairrails shall be capable of withstanding, without failure, a force of at least 200 pounds, applied within two inches of any point along the top edge.
7. The height of handrails shall not be more than 37 inches nor less than 30 inches from the upper surface of the handrail to the surface or the tread.
8. Stairrail systems and handrails shall not be constructed with surfaces that can cause lacerations or puncture, nor shall their ends constitute a projection hazard.
9. Handrails, not part of the permanent structure, shall have a minimum clearance of three inches between the handrail and the walls or other objects.

Ladders

Ladders shall be constructed in accordance with the following requirements:

1. Self-supporting and portable ladders shall be designed to handle four times the maximum intended load. Fixed ladders shall be capable of handling at least two loads of 250 pounds each, concentrated between any two consecutive attachments, plus any anticipated loads. Steps or rungs shall be capable of handling at least 250 pounds, applied in the middle of the step or rung.
2. Rungs, cleats and steps of portable and fixed ladders shall be spaced at not less 10 inches and not more than 14 inches apart.
3. The rungs and steps of fixed metal ladders shall be corrugated, knurled, dimpled, coated with skid resistant material or otherwise treated to minimize slippage.
4. In general, when two or more separate ladders are used to reach an elevated work area, the ladders shall be offset with a platform or landings between ladders.
5. Except for use in elevator pits, the minimum perpendicular clearance between fixed ladder rungs or steps and any objects behind the ladder, shall be seven inches.
6. Where the total length of the climb is equal to or greater than 24 feet, the ladder shall be equipped with one of the following:
 - Ladder safety device.
 - Self-retracting lifelines with rest platforms at intervals not exceeding 150 feet.
 - A cage or well, and multiple ladder sections, each section of which is offset from adjacent sections, with landing platforms at intervals not exceeding 50 feet.

Ladder Use

All ladders, including job-made ladders, shall be used in accordance with the following requirements:

1. If portable ladders are used to gain access to upper floors, the ladder siderails shall extend at least three feet above the upper landing surface. If the ladders length does not permit such an extension, then the ladder must be secured at the top to a rigid support and a grabrail or other grasping device shall be provided.
2. Ladders shall not be loaded beyond the maximum load and shall not be used for other than the purpose for which they were designed.
3. Non-self-supporting ladders shall be used at an angle such that the horizontal distance from the top of the support to the foot of the ladder is approximately one quarter of the working length of the ladder.
4. Ladders shall only be used on stable and level surfaces unless secured to prevent accidental displacement.
5. Ladders shall be so located that they are protected from displacement by workplace activities. If ladders are placed in such locations, like stairways and doorways, they shall be secured to prevent accidental displacement or a barricade shall be erected.
6. The areas around the top and bottom of ladders shall be kept clear.
7. Ladders, shall not be moved, shifted or extended while occupied. "Walking" ladders to a different location is not permitted.
8. Ladders used where the worker could be exposed to energized electrical equipment, shall be equipped with nonconductive siderails.
9. The top or top step of a step ladder shall not be used as a step.

Training

Employer responsibilities

The employer shall provide a training program for each employee to learn proper usage of ladders and stairways, as necessary. The program shall enable each employee to recognize hazards related to ladders and stairways, and the employer shall conduct training that includes the procedures to be followed to minimize these hazards.

Employee training

The employer shall ensure that each employee has been trained by a competent person in the following areas, as applicable:

- The nature of the fall hazards in the work area.
- The correct procedure for erecting, maintaining, and disassembling the fall protection systems to be used.
- The proper construction, use, placement, and care in handling of all stairways and ladders.
- The maximum intended load-carrying capacities of the ladders used.
- The standards contained in Subpart X.

Retraining

Retraining shall be provided for each employee as necessary so that the employee maintains the understanding and knowledge acquired through compliance with this section.

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