



1926 Construction Stairways and Ladders

Introduction

- Lesson Overview
 - Basic types of ladders and stairways
 - Stairs and ladders hazards
 - Methods to prevent stairway and ladder hazards.
 - Employer requirements

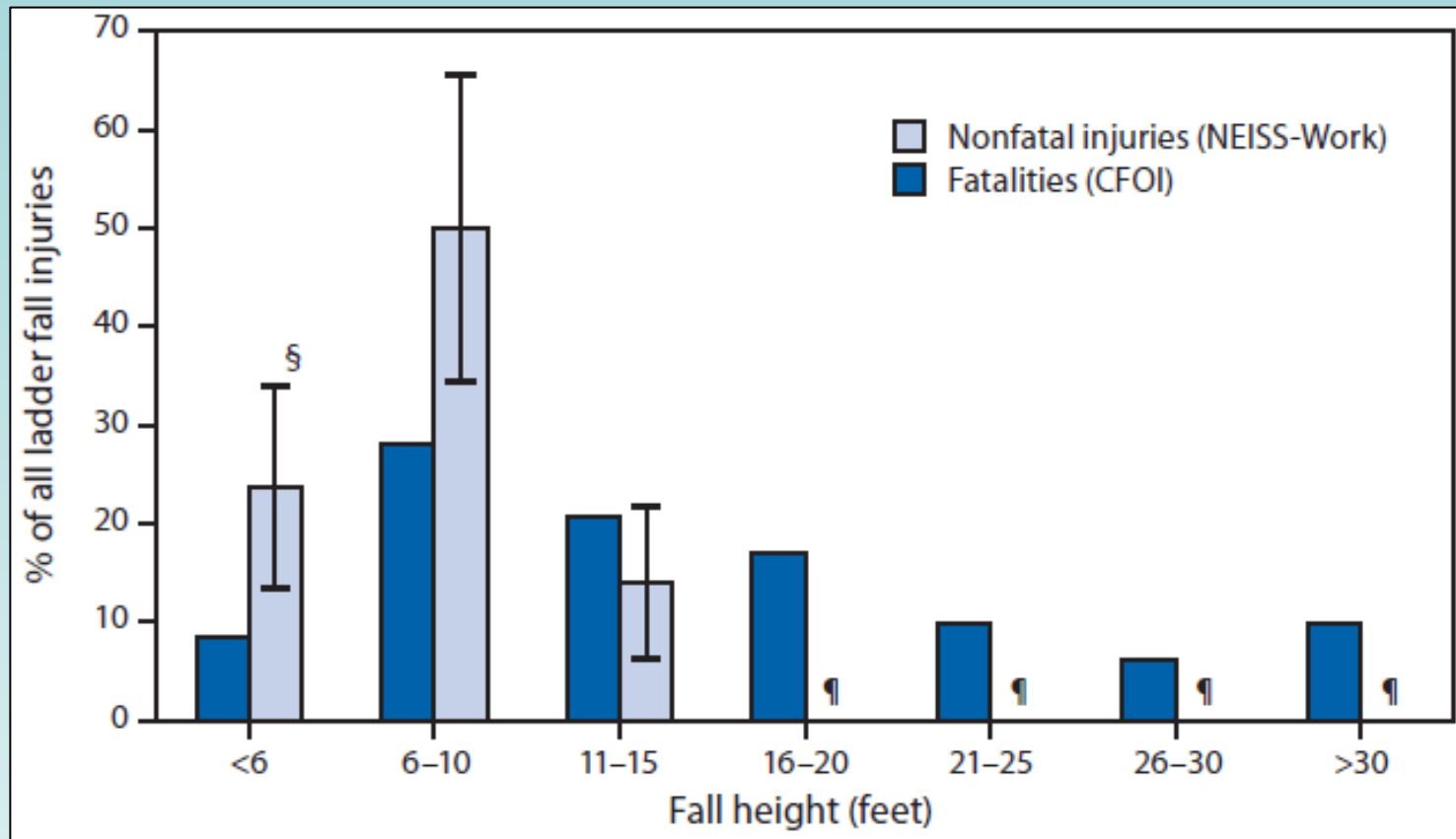
Introduction

- Falls are the leading cause of fatalities in constructions
- Falls from ladders make up about one-third of these fatalities
- Approximately 25,000 injuries per year due to falls from stairways and ladders
- Falls are preventable

Stairways and Ladders

Introduction

Percentage of ladder fall fatalities* and nonfatal ladder fall injuries treated in emergency departments,† by fall height (when documented) — United States, 2011



Source: CDC

Types of Ladders & Stairways

- Fixed ladders



Source: OSHA

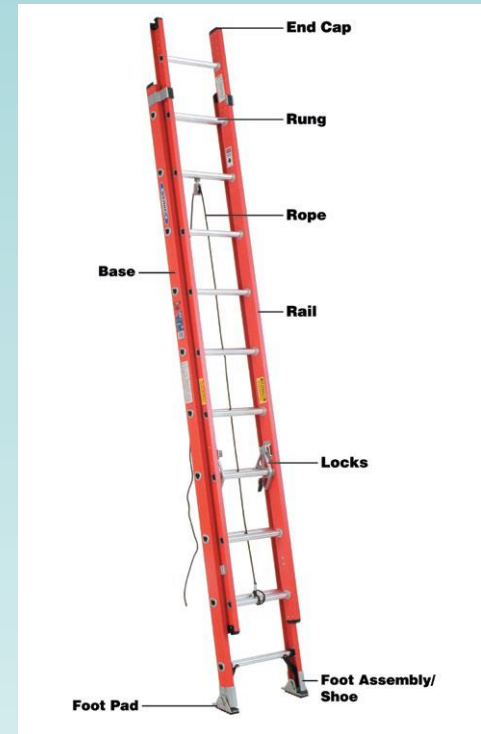


Source: TEEX Harwood

Stairways and Ladders

Types of Ladders & Stairways

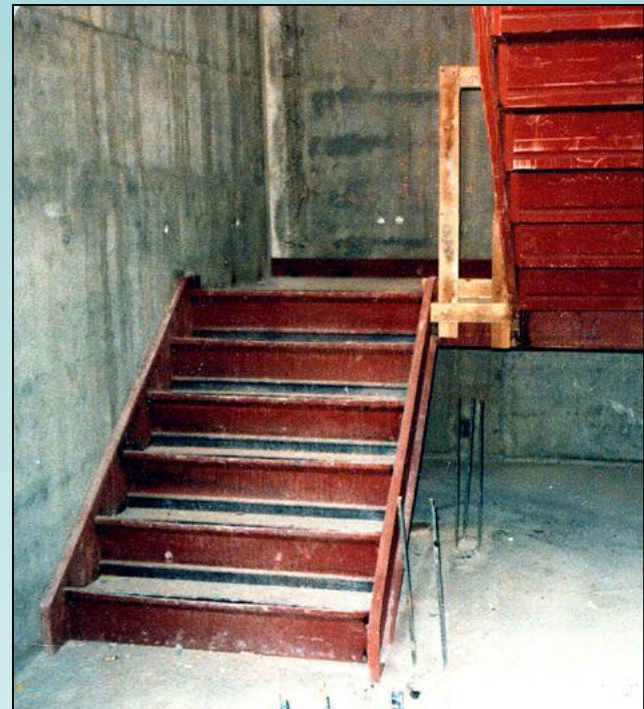
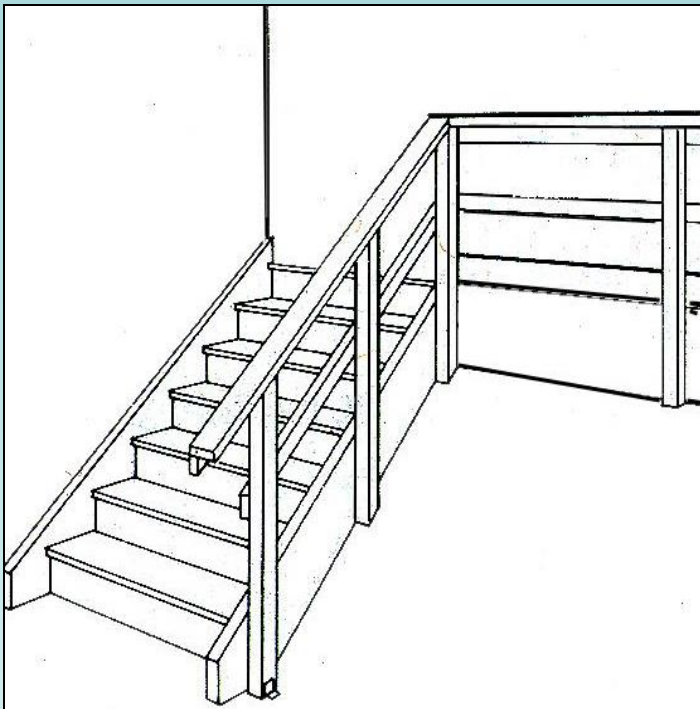
- Portable ladders



Source of photos: OSHA

Types of Ladders & Stairways

- Stairways



Source of graphics: OSHA

Stairways and Ladders

Hazards Associated with Stairs and Ladders

- Slips
- Trips
- Falls



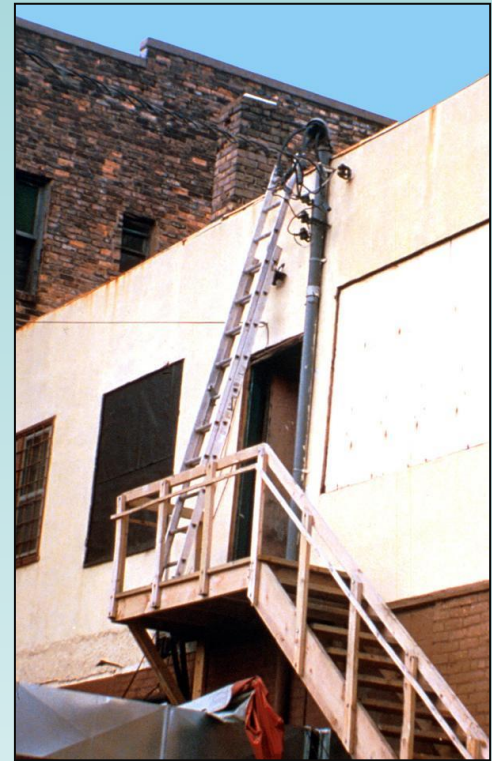
Source of photos: OSHA



Improper use of the top rung of a step ladder

Hazards Associated with Stairs and Ladders

- Electrical Hazards
- Falling Objects
- Protruding objects, sharp edges, or rough spots



This is an unsafe condition.

Reducing or Eliminating Hazards

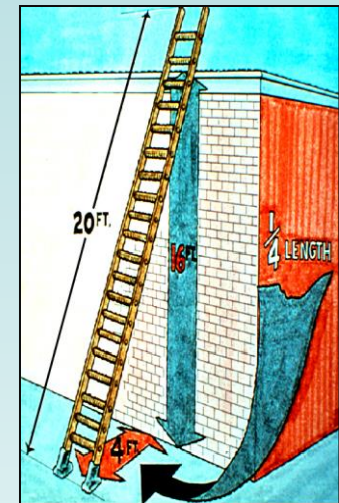
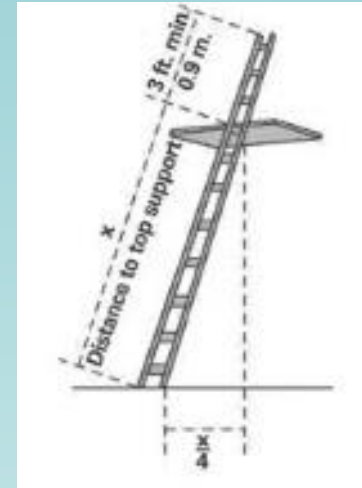
- Ladders
 - Safe practices
 - Ladder requirements
 - Structural defects



Source: OSHA

Reducing or Eliminating Hazards

- Ladder-use practices
 - Extend side rails 3 feet above the upper landing surface
 - Don't exceed load/capacity
 - Use only as designed
 - Angle ladder so the horizontal distance of bottom is $\frac{1}{4}$ the working length of the ladder



Reducing or Eliminating Hazards

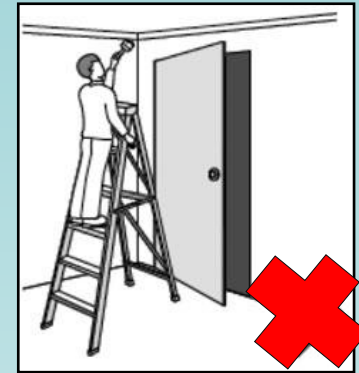
- Pitch fixed ladders no more than 90 degrees from the horizontal
- Avoid use of ladder on surfaces that are:
 - Unstable
 - Not level
 - Slippery
- Secure ladders to prevent movement



This ladder is not on a stable surface and is not properly positioned.

Reducing or Eliminating Hazards

- Prevent movement/displacement
 - Secure
 - Barricade
- Keep clear areas around top and bottom
- Equally support rails of non-self-supporting ladder at the top



Source of photos: OSHA



Reducing or Eliminating Hazards

- Ascending or descending ladder
 - Maintain 3-point contact
 - Face ladder
 - Stay inside side rails
 - Never carry tools/objects in hands
 - Be extra careful getting on or off



Source: OSHA



Source: OSHA

Reducing or Eliminating Hazards

- Don't move, shift, or extend while in use
- When exposed to energized electrical equipment, use nonconductive side rails
- Don't use the top two steps of a stepladder
- Don't climb the cross-bracing on the rear section of a stepladder



Stairways and Ladders

Reducing or Eliminating Hazards

- Don't use single-rail ladders
- Inspect (competent person)
 - Visible defects periodically, and after any incident that could affect their safe use



Source of photos: TEEX - Harwood

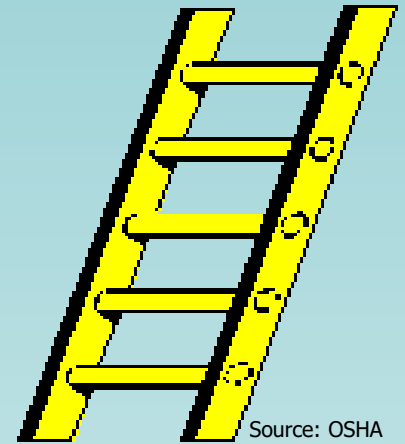
Reducing or Eliminating Hazards

- Ladder requirements:
 - Provide double-cleated ladder or two or more ladders:
 - When having 25 or more employees using as only means of access to work area;
 - When serving two-way traffic.



Reducing or Eliminating Hazards

- Rungs, cleats, and steps:
 - Parallel, level, and uniformly spaced
 - Spacing
 - Along portable or fixed ladder side rails – 10 to 14 inches apart
 - Between center lines on step stools – 8 to 12 inches apart
 - Between center lines on extension trestle ladders – 8 to 18 inches apart; extension section 6 to 12 inches



Source: OSHA

Reducing or Eliminating Hazards

- Don't tie or fasten together to create longer sections, unless design allows
- Side rail of spliced side rails must have strength equal to one-piece side rail
- Stepladder must have a metal spreader or locking device to hold in open position.



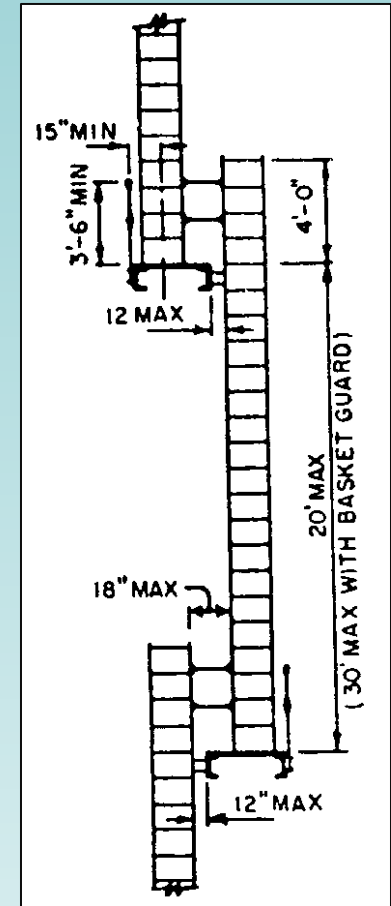
Source: OSHA



Source: OSHA

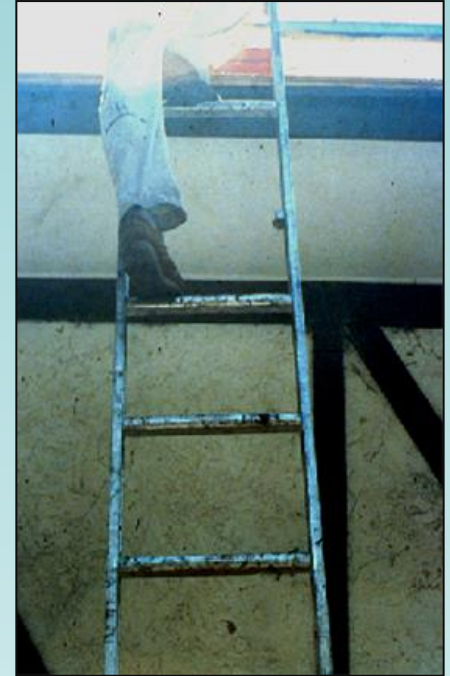
Reducing or Eliminating Hazards

- Platforms or landings - offset two or more separate ladders used to reach an elevated work area
- Ladder surface - free of projections, sharp edges, or abrasive materials that could puncture or cut user, or snag clothing
- Wood ladders - not coated with any opaque covering, except for identification or warning labels only on one face of a side rail



Reducing or Eliminating Hazards

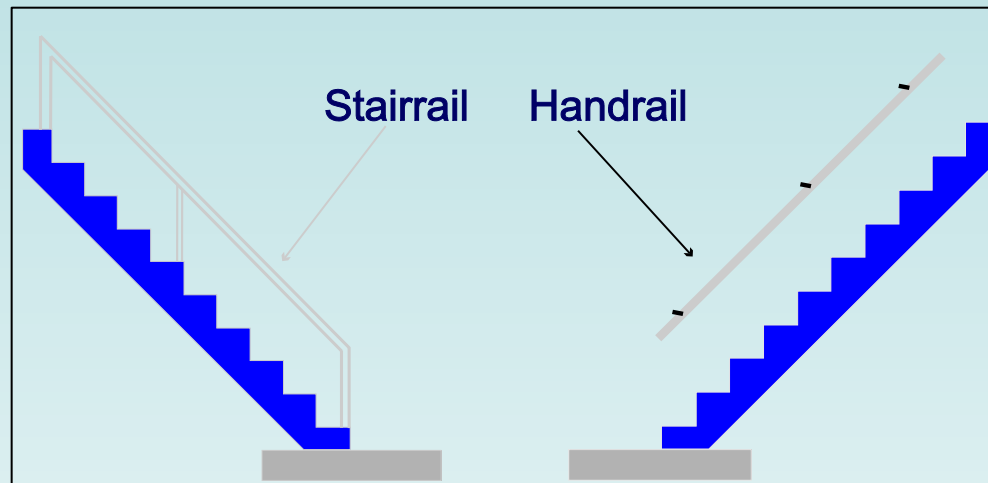
- Remove defective ladders from service
 - Broken or missing parts
 - Corrosion
 - Other faulty or defective components
- Mark defective or tag “Do Not Use”
- Repair to original design criteria



Source: OSHA

Reducing or Eliminating Hazards

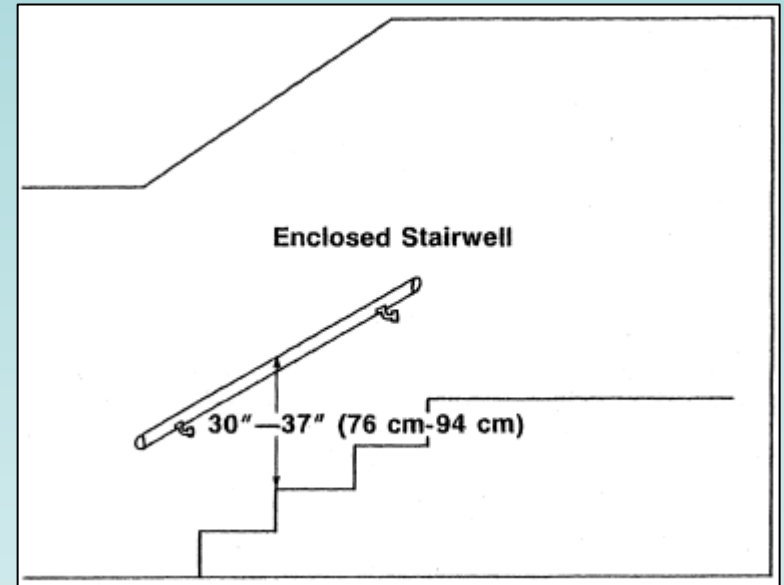
- Stairs
 - Handrails
 - Stair rail systems
 - Stair requirements
 - Temporary pan stairs



Source: OSHA

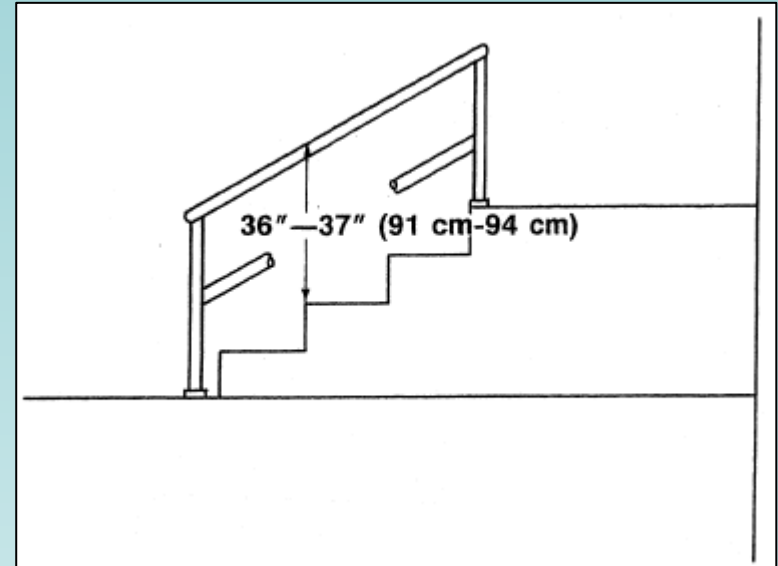
Reducing or Eliminating Hazards

- Install handrail on stairways
 - 4 or more risers
 - 30 inches of rise



Reducing or Eliminating Hazards

- Install stair rail system
 - Toprail, mid-rail, and sometimes a toeboard
 - Unprotected sides and edges of stairs with rise of 6 or more feet



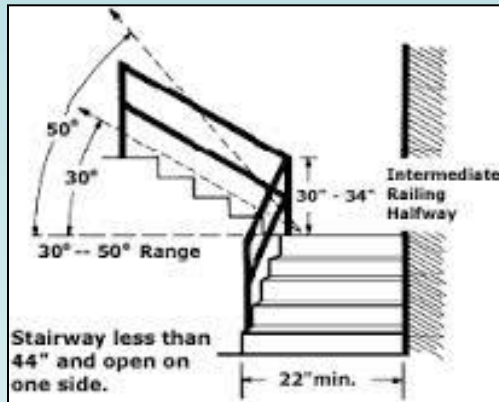
Source: OSHA

Reducing or Eliminating Hazards

- Build/maintain stairs that meet OSHA requirements
 - Uniform riser height and tread depth
 - 30 to 50 degrees angle
 - Landings every 12 feet
 - Remove projections
 - Correct slippery conditions



Source: OSHA



Uniform - 30 & 50 deg. angle

No more than 1/4 inch
variation in any stairway system

Source: OSHA

Reducing or Eliminating Hazards

- Temporary pan stairs
 - Secure in place before filling
 - Fill to top edge
 - Replace worn treads and landings



Source: OSHA

Employer requirements

- Comply with OSHA standards related to stairs and ladders
 - Training
 - Inspection
- Comply with manufacturers' requirements and recommendations for all ladders.

Hazard Recognition - Ladders

- Identify ladders hazards and solutions

Step
ladder set
up wrong.
Not self
supporting



Source: TEEX – Harwood

Ladder
rails don't
extend 3'
above the
landing



Source: OSHA

Hazard Recognition - Stairs

- Identify stair hazards and solutions

Cooler and bucket inhibit access



Source: Luis Diaz

Stairs require handrails



Source: OSHA

Summary

- Key components for ladder safety:
 - A competent person must inspect
 - Use the correct ladder for the job
 - Use the correct angle, supports, treads, cross braces, and rails
 - Don't overload
 - Your employer must train you in proper use of a ladder

Summary

- Key components for stairway safety
 - Treads
 - Rails
 - Handrails
 - Stair rails
 - Guardrails
 - Landings and Platforms

Knowledge Check

1. When portable ladders are used for access to an upper landing surface, how many feet above the upper landing must the side rails extend?
 - a. 2 feet
 - b. 3 feet
 - c. 4 feet
 - d. 5 feet

b. 3 feet

Knowledge Check

2. You can use metal ladder around power lines or exposed energized electrical equipment.
 - a. True – but only if there isn't any other option to get the work done.
 - b. False – you should never use a metal ladder in this circumstance.
- b. False – never use a metal ladder in this circumstance**

Knowledge Check

3. Handrails must be able to withstand, without failure, how many pounds of weight applied within 2 inches of the top edge in any downward or outward direction?
- a. 300 pounds
 - b. 250 pounds
 - c. 200 pounds
 - d. 175 pounds

c. 200 pounds

Knowledge Check

4. Stairways that have four or more risers **MUST** have a stair rail.
 - a. True
 - b. False

a. True

Knowledge Check

5. A non-self-supporting ladder should be set up at ____ (horizontal distance/working length of ladder).
- a. 90-degree angle
 - b. 30-degree angle
 - c. 1:2 angle
 - d. 1:4 angle

d. 1:4 angle

Stairways and Ladders

Through the Alliance between OSHA's 10 Regional Offices and the Elevator Contractors of America (ECA), Elevator Industry Work Preservation Fund (EIWPF), International Union of Elevator Constructors (IUEC), National Association of Elevator Contractors (NAEC), National Elevator Industry Educational Program (NEIEP), and National Elevator Industry Inc. (NEII), collectively known as The Elevator Industry Safety Partners, developed this Stairways and Ladders Industry Specific Training for informational purposes only. It does not necessarily reflect the official views of OSHA or the U.S. Department of Labor. May 2021

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Any Questions

Stairways and Ladders