

Stairways and Ladders

10-hour Construction Outreach

Introduction

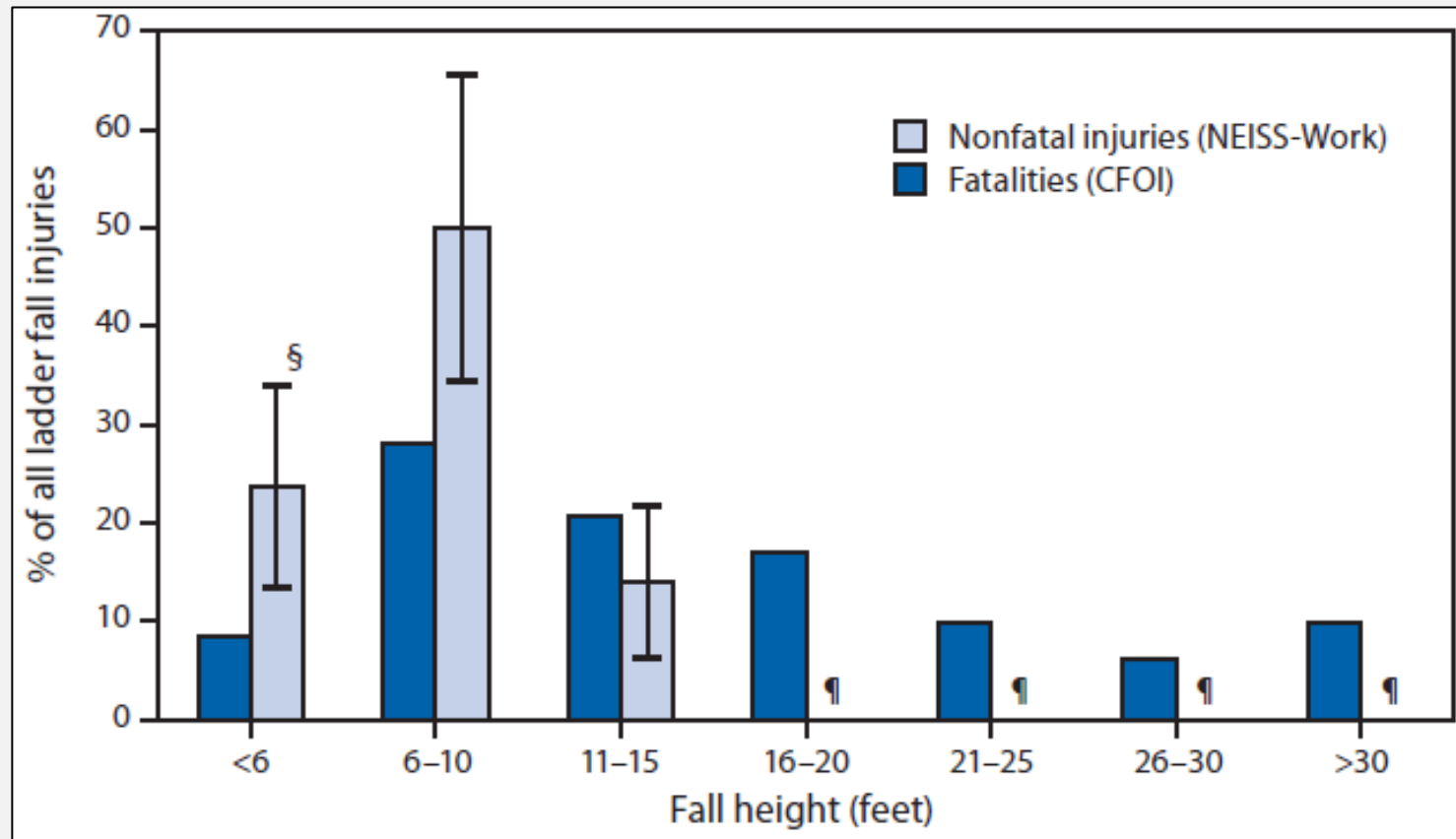
- Lesson Overview
 - Basic types of ladders and stairways
 - Stairs and ladders hazards
 - Methods to prevent stairway and ladder hazards.
 - Employer requirements

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

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 and Stairways

- Basic types of ladders



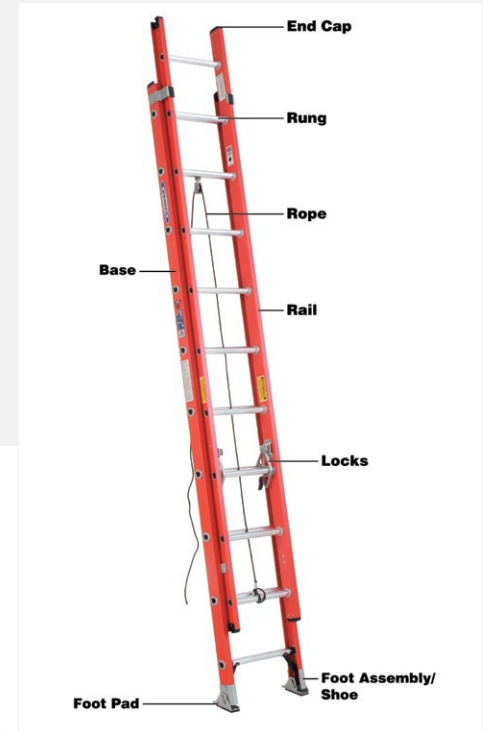
Source: OSHA



Source: TEEX Harwood

Types of Ladders and Stairways

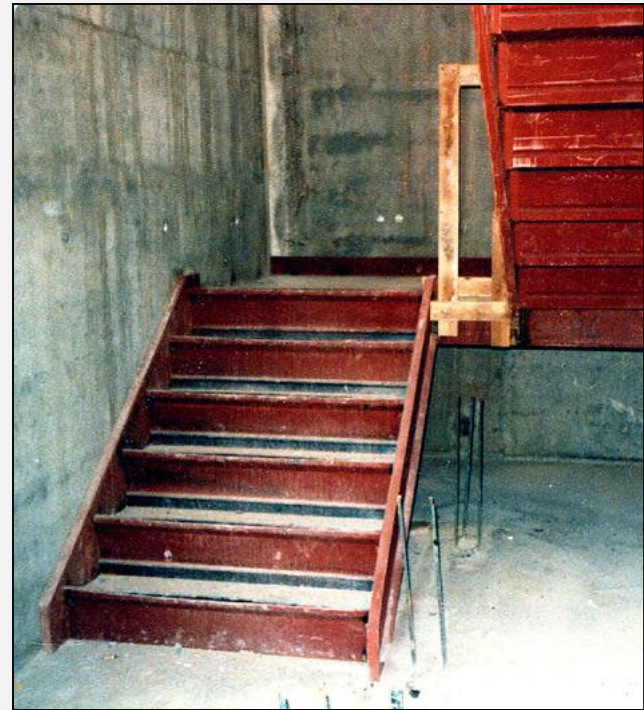
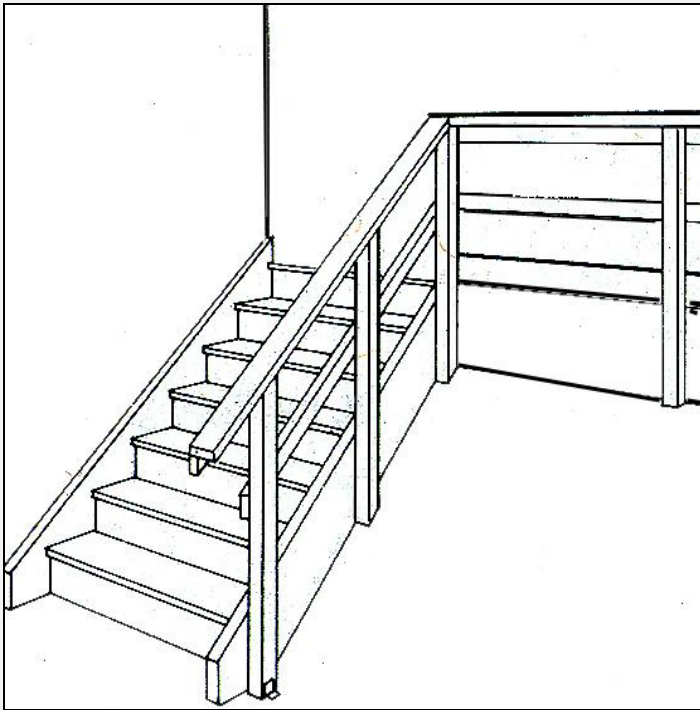
- Basic types of ladders



Source of photos: OSHA

Types of Ladders and Stairways

- Basic types of stairways



Source of graphics: OSHA

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.

Source: OSHA

Reducing or Eliminating Hazards

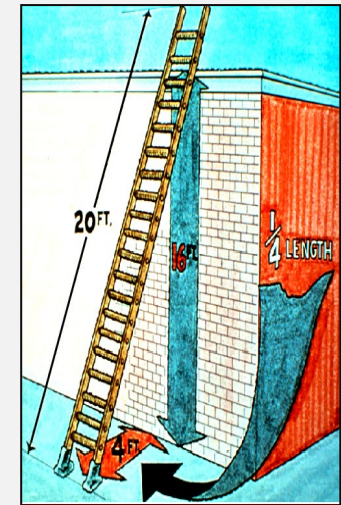
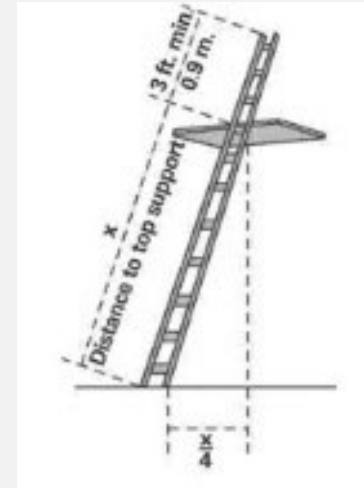
- Ladders
 - Safe practices
 - Ladder requirements
 - Structural defects



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



Source of graphics: OSHA

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

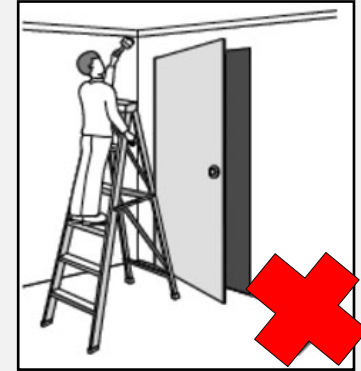


This ladder is not on a stable surface and is not properly positioned.

Source of photos: OSHA

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

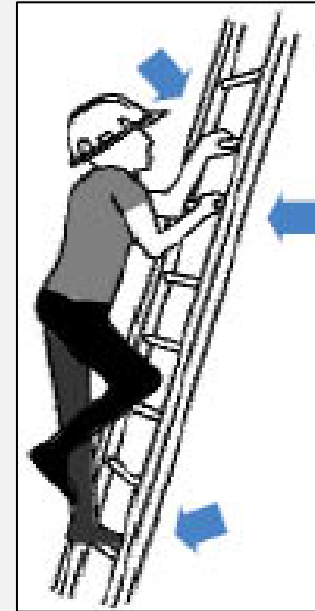


Reducing or Eliminating Hazards

- 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 step of a stepladder.
- Don't climb the cross-bracing on the rear section of a stepladder.



Source: TEEX – Harwood

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

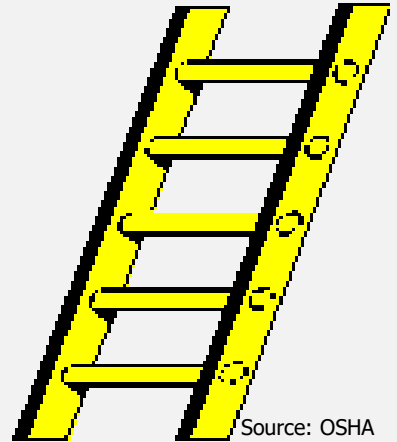
- Ladder requirements:
 - Provide double-cleated ladder or two or more ladders:
 - when having 25 or more employees using as only means of access to work area;
 - when serves two-way traffic.



Source: OSHA

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



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.



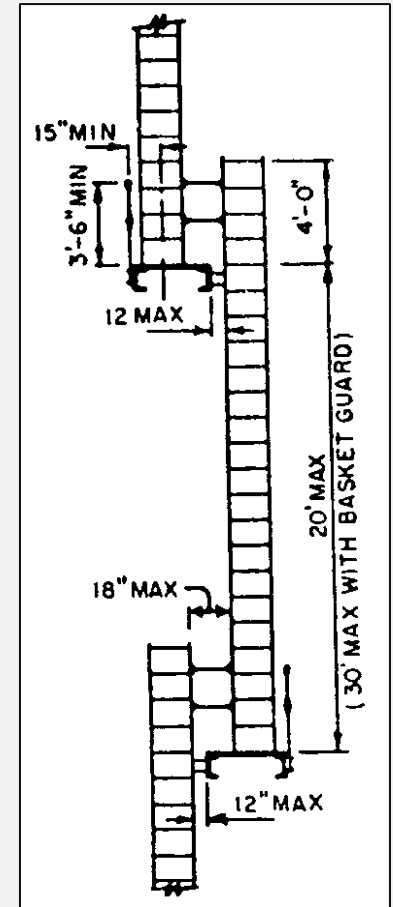
Source: OSHA



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.



Source: OSHA

Reducing or Eliminating Hazards

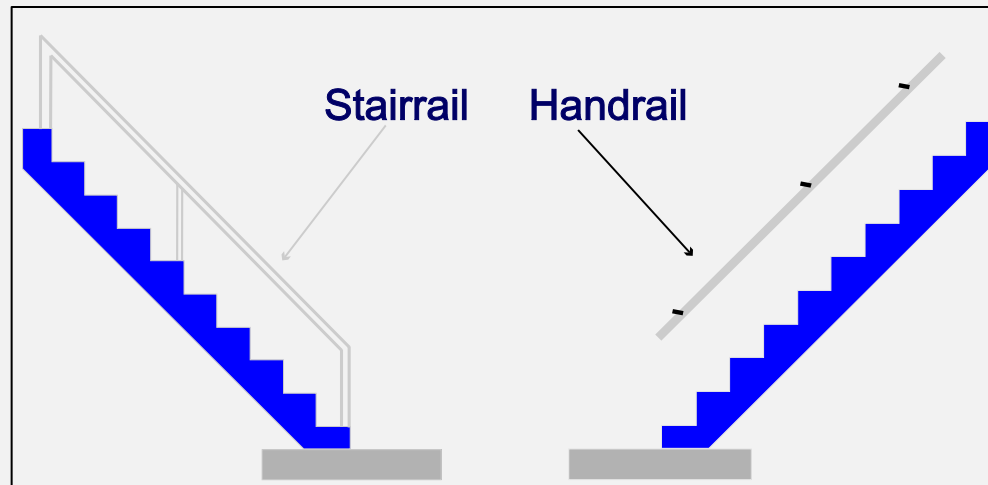
- Remove defective ladders from service
 - Broken or missing parts
 - Corrosion
 - Other faulty or defective components
- “Do Not Use”
- Repair to original design criteria



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

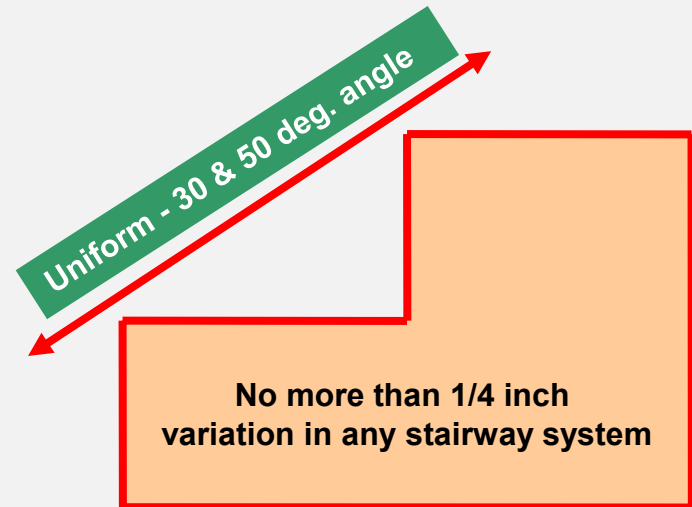
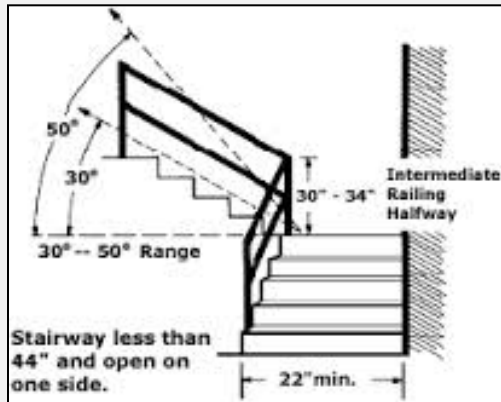
- Install stair rail system
 - Toprail, mid-rail, and sometimes a toeboard
 - Unprotected sides and edges of stairs with rise of 6 or more feet

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



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



Source: TEEX – Harwood



Source: OSHA

Hazard Recognition - Stairs

- Identify stairs hazards and solutions



Source: Luis Diaz



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