alliance

An OSHA Cooperative Program

Elevator Industry Safety Partners

1910 General Industry
Walking and Working Surfaces

Walking and Working Surfaces, Including Fall Protection

OSHA 30-Hour Outreach Training

General Industry

Fatal Ladder Incident

A worker was cleaning windows when he fell onto a tiled floor and hit his head. It is believed that the worker had positioned the stepladder with the rungs facing towards the windows, and that he stood backwards on the stepladder.

NIOSH In-house FACE Report 2009-01

Introduction

Slips, trips, and falls:

- Make up most general industry accidents; and
- Cause 15% of all accidental deaths, second only to motor vehicle crashes.

Introduction

Lesson Objectives:

1. Identify hazards in the workplace associated with walking and working surfaces
2. Identify best practices for eliminating or controlling hazards associated with walking and working surfaces in the workplace
3. Recognize employer requirements to protect workers from walking and working surface hazards

Hazards and Controls

Slip hazards:

- Grease, oil, water, ice, snow, liquid spills, or polished floors
- Improper footwear

Source: Photos WVU Susan Harwood

Hazards and Controls

Controlling slip hazards:

- Keep walking/working surfaces as clean and dry as possible
- Make sure your footwear is as slip resistant as possible
- Require drainage for wet operations
- Clean up or mark and report spills
- Remove ice and snow frequently and regularly

Hazards and Controls

Trip hazards:

- Poor housekeeping
- Loose flooring, carpeting, or uneven surfaces

Source: Photos WVU Susan Harwood

Hazards and Controls

- Cords, hoses, open draws or other protruding items

Source: Photos WVU Susan Harwood

Hazards and Controls

Controlling trip hazards:

- Aisles and passageways should be well-lit, clean, and marked
- Material storage and work-related scraps shouldn't create trip hazards
- Trip hazards, such as loose flooring, carpeting, uneven surfaces, and protrusion hazards, should be repaired or reported
- Hoses and cables should be routed away from active work zones and walkways

Hazards and Controls

The employer must ensure that each employee on a walking-working surface with an unprotected side or edge that is 4 feet (1.2 m) or more above a lower level or less than 4 feet (1.2 m) above dangerous equipment, is protected from falling.

Fall hazards:

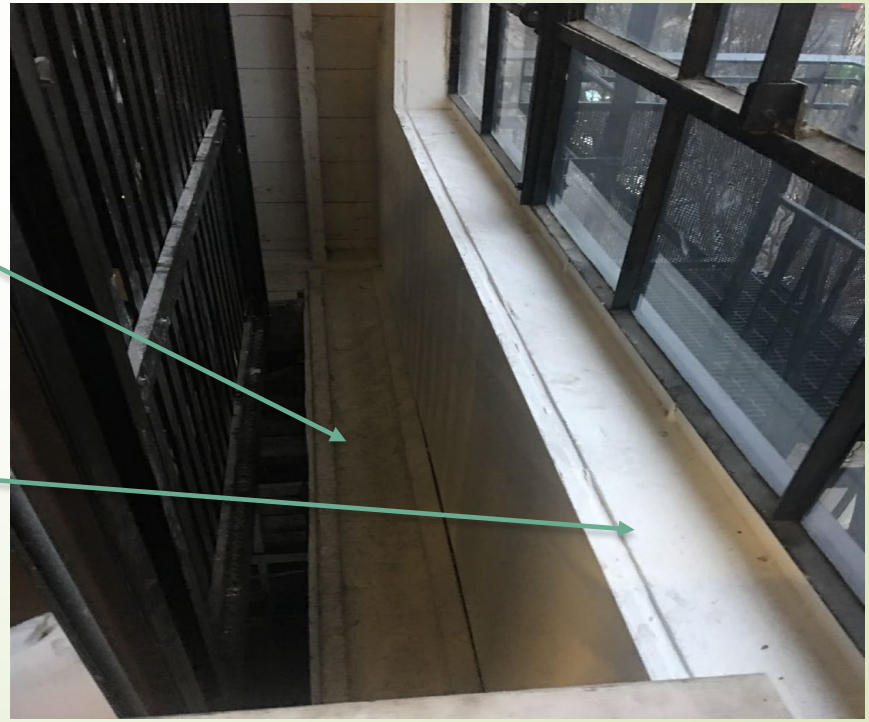
- Elevated surfaces – top of tanks, top of conveyance, towers, machines, platforms, runways, sheaves, channels, buffers, compensating sheaves, pits, or other elevated surfaces
- Lower-level surfaces – open pits, tanks, vats, or ditches

ACCIDENT

A repair crew was performing routine maintenance on a 2-stop corner post hydraulic elevator.
The crew wanted to leave the elevator as they found it; at the bottom landing with the hoistway door locked which accesses the street.

The probationary Apprentice entered the hoistway at the second floor with the elevator at the landing. He walked along a ledge inside the hoistway in order to reach the car calls at the back of the cab.

The probationary could not reach over the car gate so he climbed up onto a windowsill in order to place a first floor car call.



ACCIDENT

The Mechanic, with the second-floor hall gate raised, held in the gate lock while the elevator descended to the bottom street level landing.

The Probationary, now perched on the windowsill, attempted to maneuver down to the wider hoistway ledge to exit the shaft.

The Probationary lost his footing and fell down the hoistway 21 feet until his head and upper body struck the crosshead. The Probationary continued to fall another 10 feet to the platform onto his back.

The Probationary sustained serious injuries.

What could have been done differently?

Hazards and Controls

- Structural collapse
  - Structurally unsound surfaces, and/or
  - Exceeding load limits.

Source of photos: OSHA

Photo: Example of a sidewalk grate system failure

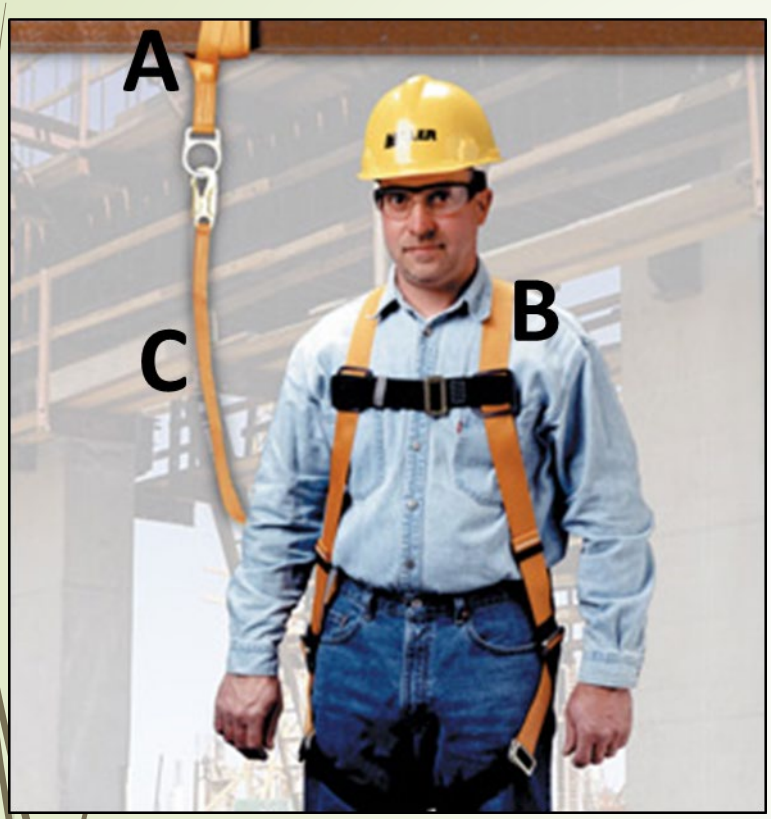
Hazards and Controls

Controlling fall hazards

- Tanks, towers, machines, and other elevated surfaces:
  - It is best to engineer out the need to go up in the first place.
  - Guardrails are often used, whether temporary or permanent.
  - As a last resort, use a Personal Fall Arrest System (PFAS).

Source: OSHA

Hazards and Controls



Source: Honeywell/Miller, used with permission.

Know the ABCs of Personal Fall Arrest Systems

- **A**nchorages
- **B**ody harness
- **C**omponents (connectors like snaphooks or Dee-rings, connection points, lanyards, deceleration devices, lifelines, etc.)

Installed, used, and maintained according to the manufacturer.

Hazards and Controls
Suspension Trauma

- Hazard Orthostatic intolerance may be experienced by workers using fall arrest systems.
- Following a fall, a worker may remain suspended in a harness.
- The sustained immobility may lead to a state of unconsciousness.
- Depending on the length of time the suspended worker is unconscious/immobile and the level of venous pooling, the resulting orthostatic intolerance may lead to death.
- While not common, such fatalities often are referred to as “harness induced pathology” or “suspension trauma.”

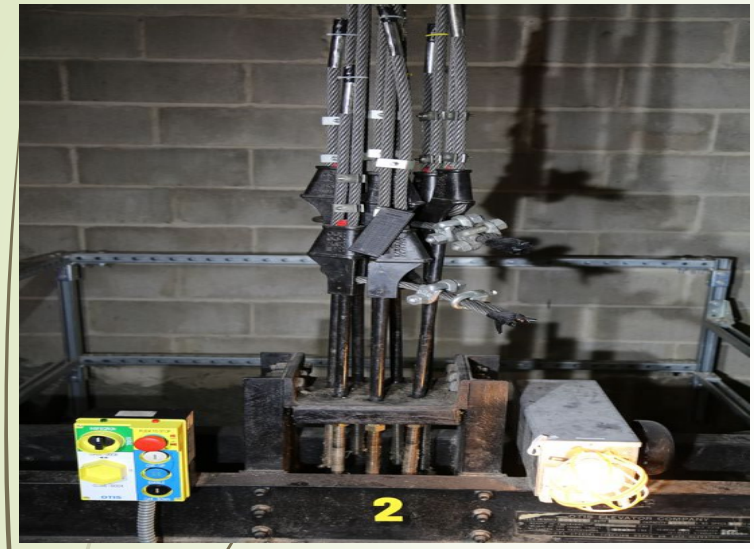
Hazards and Controls
Trauma Straps

Hazards and Controls

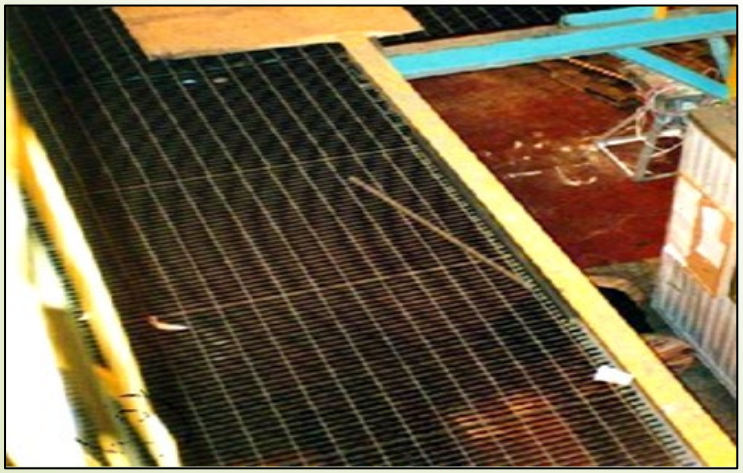
Suspension Trauma Tips

- Rescue suspended workers as quickly as possible.
- Be aware that suspended workers are at
- risk of orthostatic intolerance and suspension trauma.
- Be aware of signs and symptoms of orthostatic intolerance.
- Be aware that orthostatic intolerance is potentially life threatening. Suspended
- workers with head injuries or who are unconscious are particularly at risk.
- Be aware of factors that can increase the risk of suspension trauma.

Hazards and Controls



- Open-sided platforms and runways:
  - Use proper guardrail system at all times.
  - Platforms and runways next to dangerous operations require standard railings, regardless of height.



Source: OSHA

Hazards and Controls

- Structural collapse:
  - Ensure walking/working surfaces are structurally sound
  - Surfaces must be able to support intended/potential load, including people, equipment, and stored materials
  - Load limits must be posted

Source: OSHA

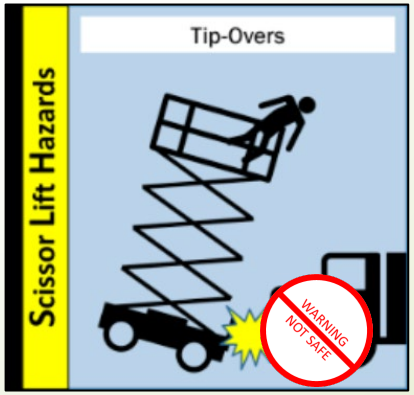
Hazards and Controls

Conditions leading to falls:

- Ladders
- Scaffolds and scissor lifts
- Stairways
- Floor and wall openings
- Other elevated surfaces

Source: WVU Susan Harwood

Source: www.elcosh/org



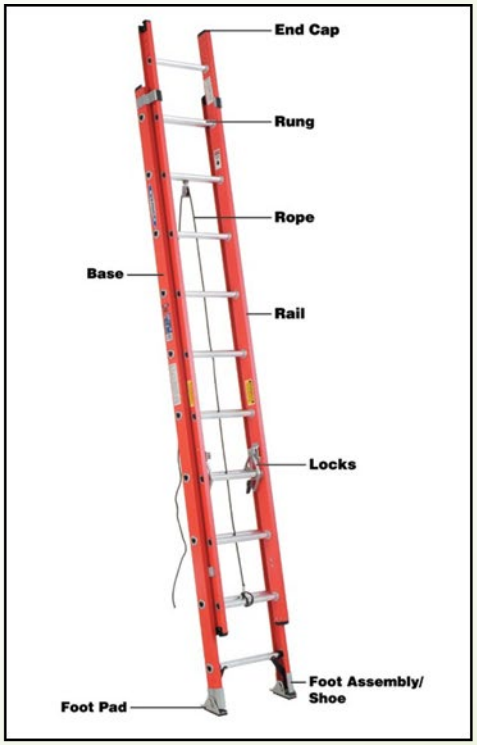
Source: OSHA

Source: OSHA

Hazards and Controls

Basic types of ladders:

Step Ladder



Extension Ladder

Fixed Ladder

Source of photos: OSHA

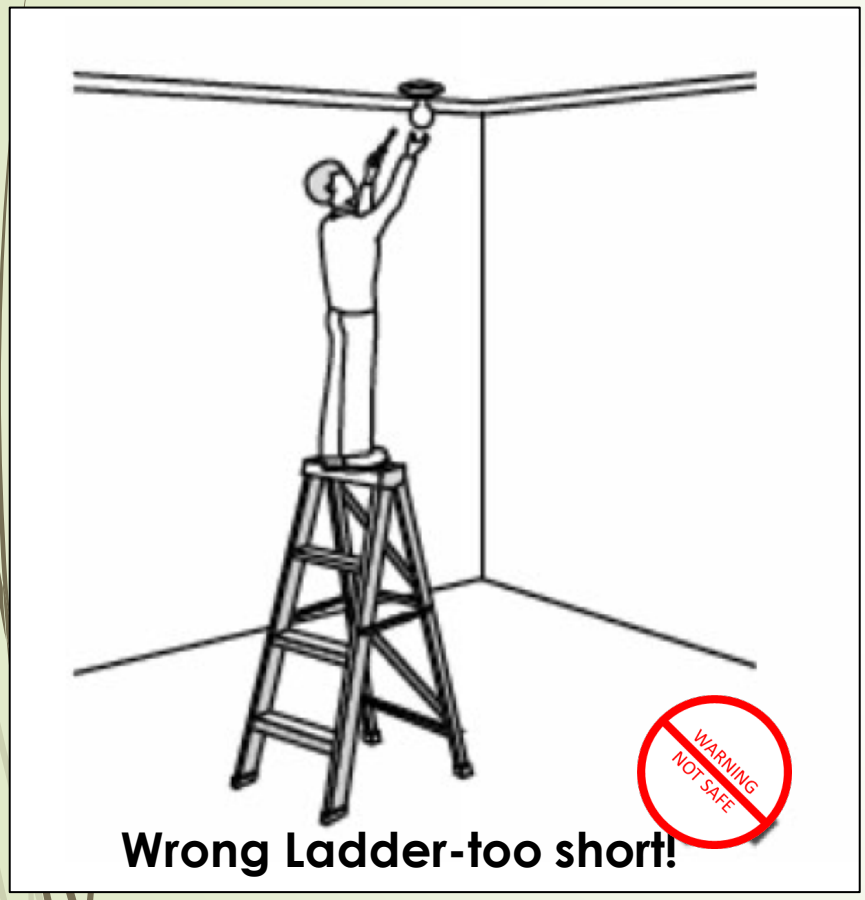
Hazards and Controls

Source: OSHA

Controlling fall hazards – ladders:

- One of the leading causes of fatalities and injuries
- Ladder safety
  - Use the right ladder
  - Use ladder that is free from defects
  - Use the ladder properly

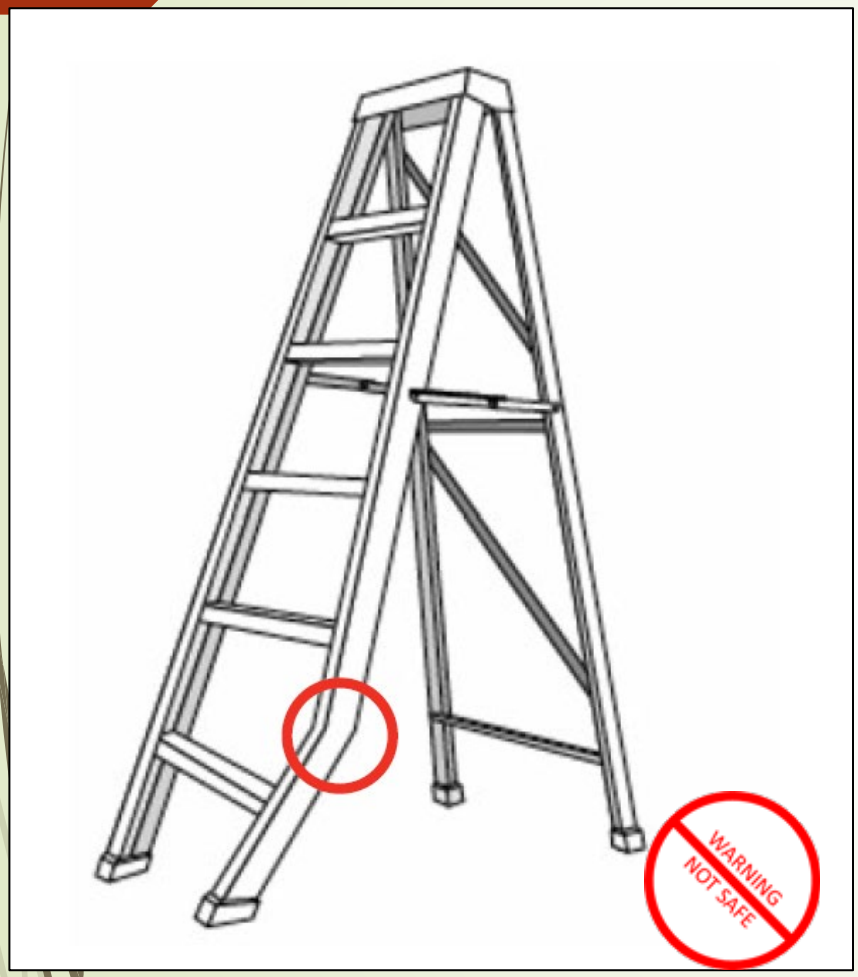
Hazards and Controls



Source: OSHA

- The right ladder:
  - Use the right type, length, and rating for the job
  - Never use the top two steps of a step ladder
  - Tell your supervisor if you need a longer ladder

Hazards and Controls



Source: OSHA

- Free from defects
  - Regardless of ladder type, inspect the ladder before use
  - Do not use the ladder if it is bent or there are missing parts
  - Tell your supervisor about the defective ladder

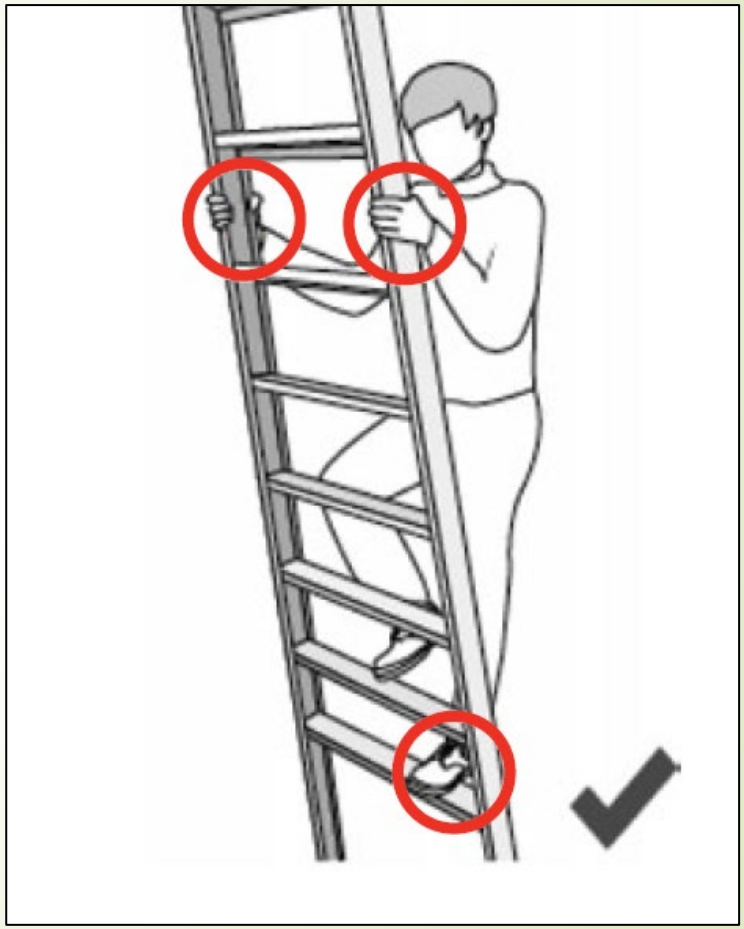
Hazards and Controls

Source: Wernerco shares page

- Proper use of ladders
  - Ladders must be used according to the manufacturer
  - Take the time to read the information
  - Read and follow all informational stickers and warning labels

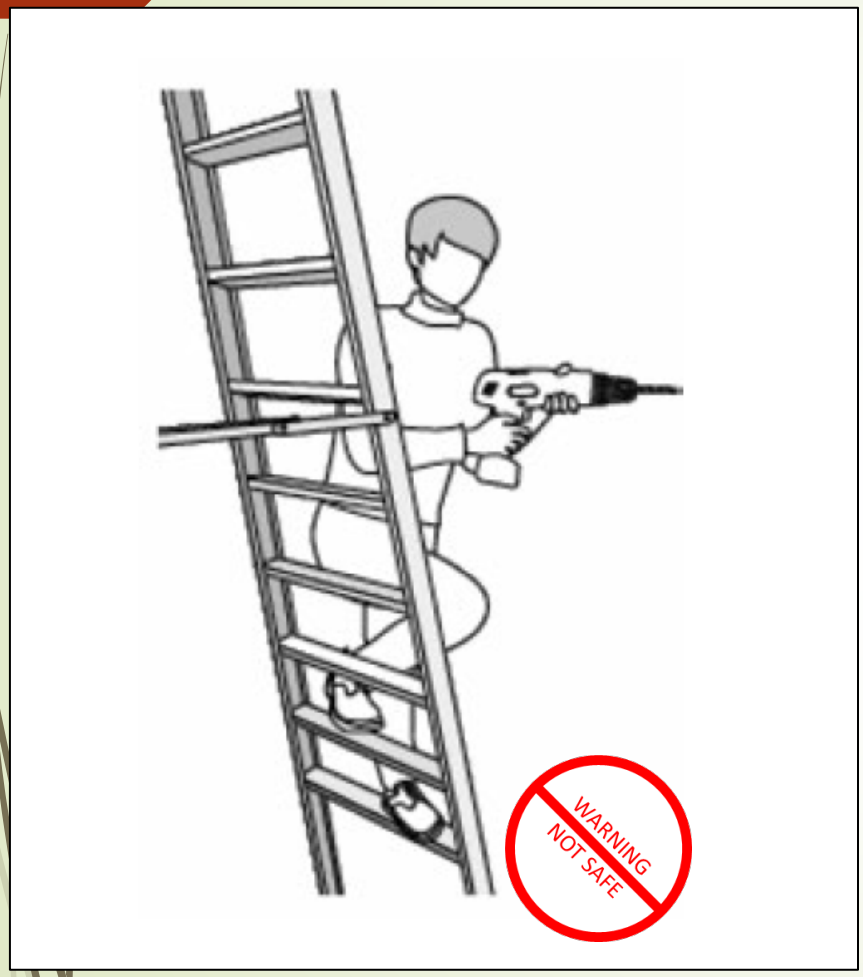
Hazards and Controls

- Maintain 3 points of contact



Source: OSHA

Hazards and Controls



Source: OSHA

- Maintain proper positioning
- Do not lean away from the ladder to carry out your task
- Always keep your weight centered between the side rails
- Move the ladder as necessary

Hazards and Controls

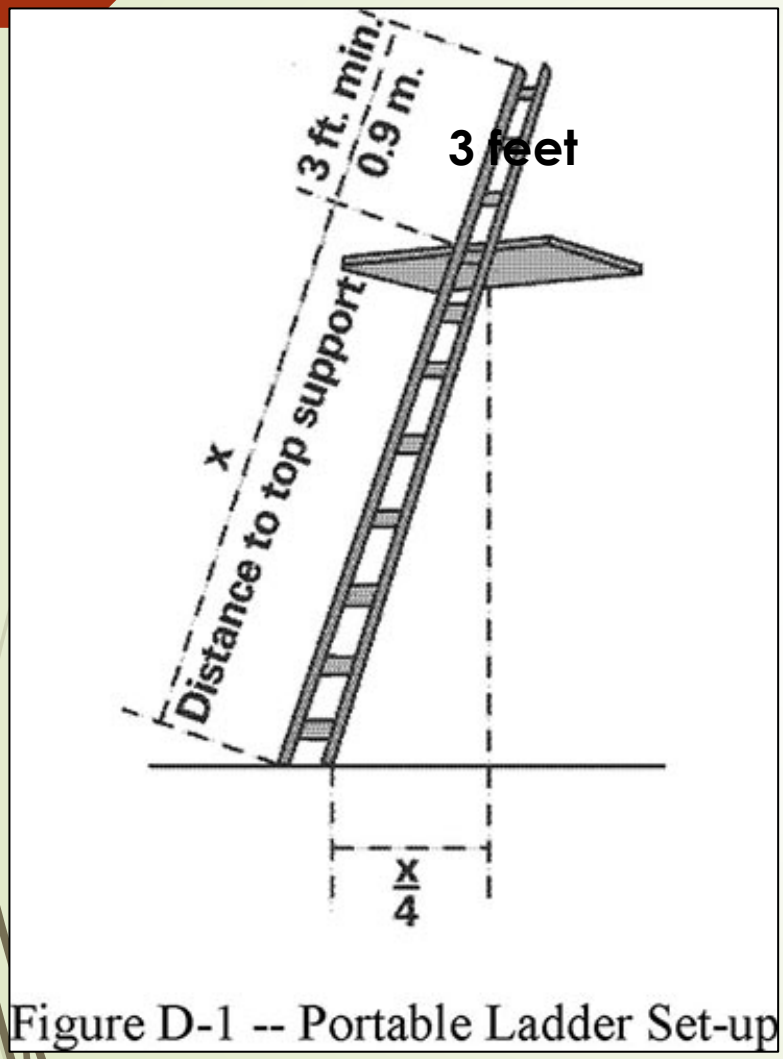


Figure D-1 -- Portable Ladder Set-up

Source: OSHA

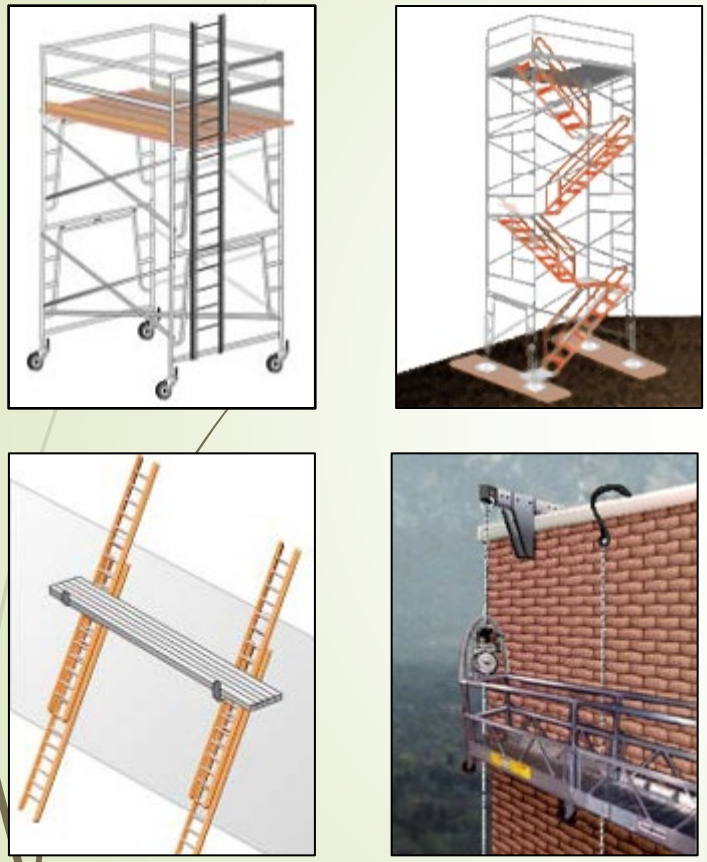
- When using ladders to access another level, secure and extend the ladder at least 3 feet above the landing point
- Angle ladder so the horizontal distance of bottom is ¼ the working length of the ladder

Hazards and Controls

Source: OSHA

- Fixed industrial ladders
  - Must be equipped with:
    - Personal fall arrest system, ladder safety system (if installed on/after 12/19/18)
    - Personal fall arrest system, ladder safety system, cage, or well (if installed before 12/19/18)
  - PFAS or ladder safety system must provide protection throughout entire vertical distance of ladder

Hazards and Controls



Source: OSHA

Controlling fall hazards – scaffolds:

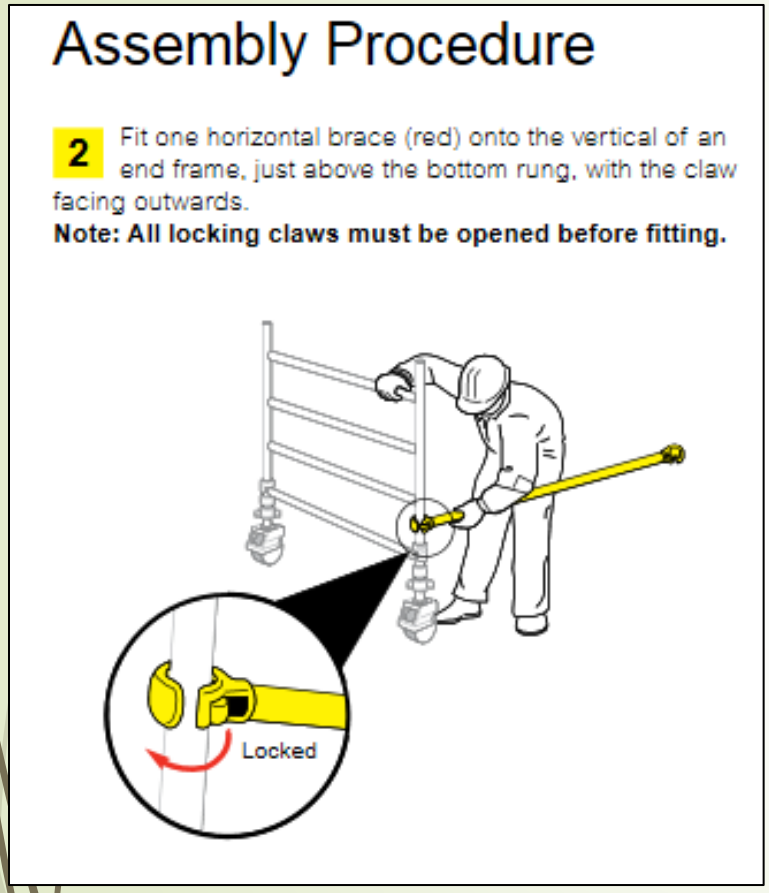
- Scaffold-related incidents can also lead to injury and death
- Scaffold safety
  - Free from defects
  - Properly set-up
  - Proper use

Scaffold Hazards and Controls

Source: OSHA

- Scaffold parts must be free from defects
  - Take the time to look the scaffold over before you use it
  - Report damage if you identify defective components
  - Damaged components must be replaced before use

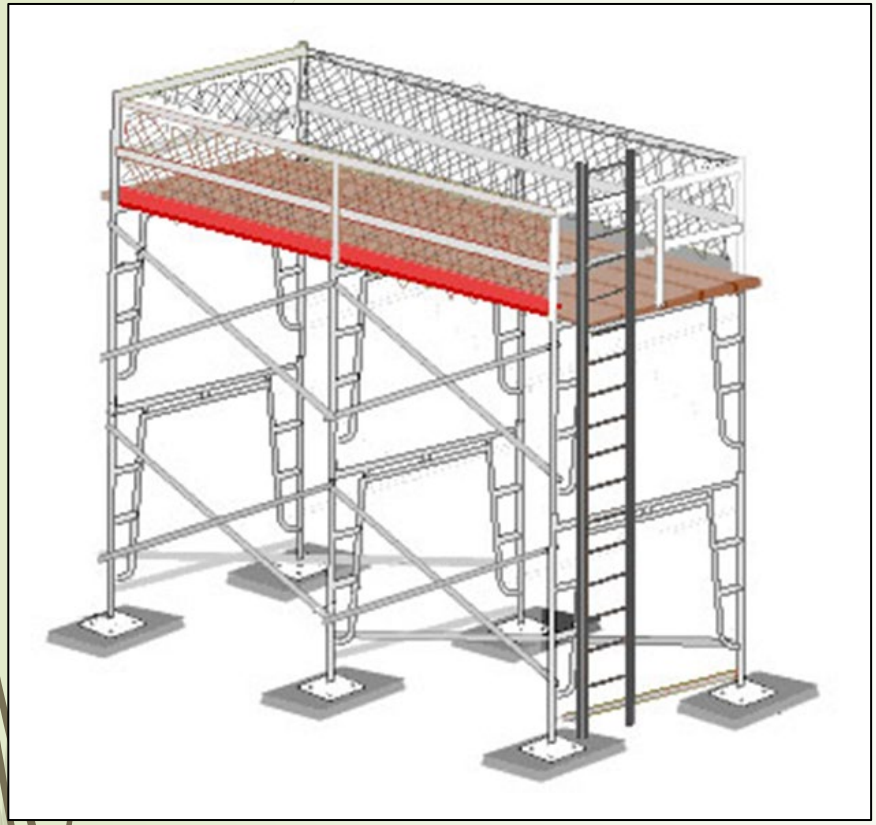
Scaffold Hazards and Controls



Source: Wernerco shares page

- Proper set-up
  - Scaffolds must be assembled and used according to the manufacturer
  - All components such as braces, and pins must be present
  - If you don't have a copy of instructions, most can be downloaded

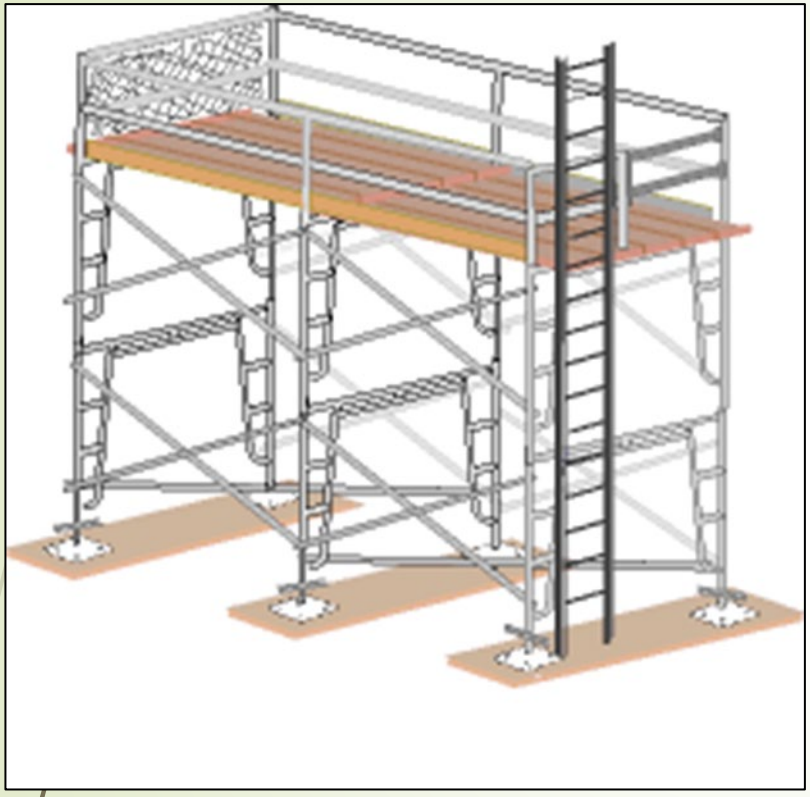
Hazards and Controls



Source: OSHA

- Each platform must be fully planked or decked between the front uprights and the guardrail supports
- You should not be exposed to a fall hazard due to partial decking

Scaffold Hazards and Controls



Source: OSHA

- Fall protection consists of either a guardrail system or a personal fall-arrest systems (PFAS)
- It must be provided on any scaffold 10 feet or more above a lower level

Scaffold Hazards and Controls

- Safe access
  - Preventing falls begins with safe access
  - You are most vulnerable to fall hazards when climbing on or off a scaffold
  - Your employer is required to provide safe scaffold access

Scaffold Hazards and Controls

- Proper use of Scaffolds
  - Make sure you are a properly trained scaffold user
  - Use scaffolds according to the manufacturer
  - Follow your company's scaffold safety policy
  - Report scaffold-related safety issues to your employer

Scaffold Hazards and Controls

- Never climb the bracing
- Never climb the frame unless designed to be a ladder
- Don't carry tools or materials while climbing
- Never use a ladder or other device to increase your reach from platform

Scaffold Hazards and Controls

Source: OSHA

- Make sure the scaffold system, your tools, and the materials you are working with stay at least 10 feet away from powerlines
- 3 feet from insulated lines

Hazards and Controls

Source: OSHA

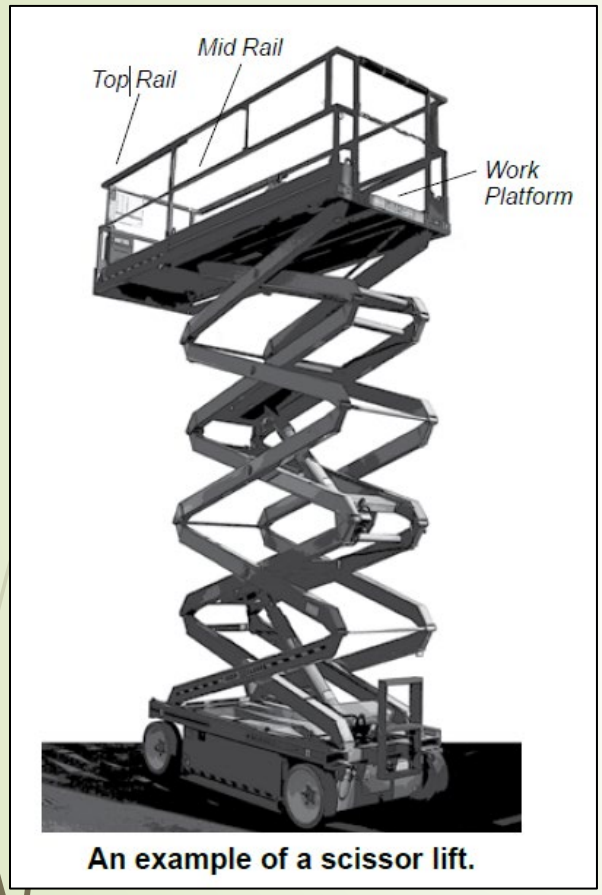
- Mobile scaffolds - additional concerns:
  - All casters must be locked when occupied
  - They can not be moved while occupied
  - All casters must have retainer pins

Hazards and Controls

Source: Wernerco shares page

- The height of the platform must never exceed 4 times the minimum base dimension
- Outriggers may be necessary to increase the minimum base dimension

Hazards and Controls



An example of a scissor lift.

Source: OSHA

Controlling fall hazards – scissor lifts:

- OSHA's investigations found that most injuries and fatalities involving scissor lifts were the result of employers not addressing:
  - Fall protection
  - Stabilization
  - Positioning

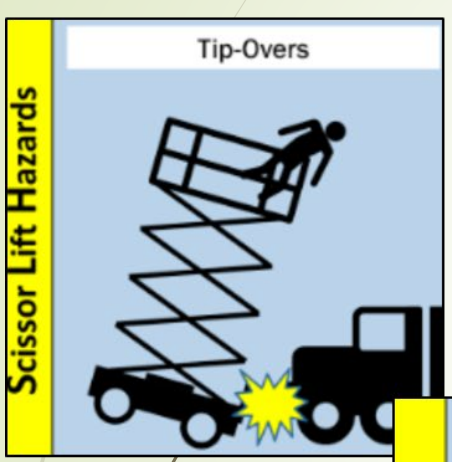
Hazards and Controls

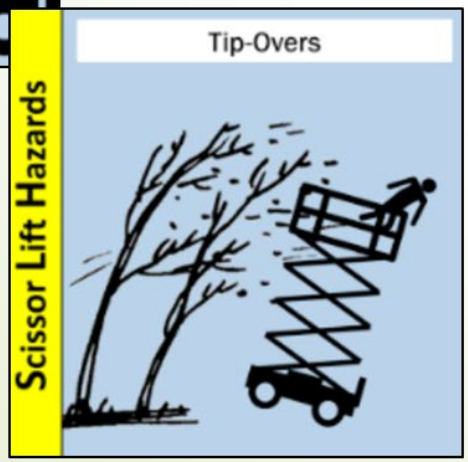
- Fall protection
  - Check to see that a guardrail system is in place before working on the scissor lift
  - Only stand on the work platform; never stand on the guardrails
  - Keep work within easy reach to avoid leaning away from the scissor lift

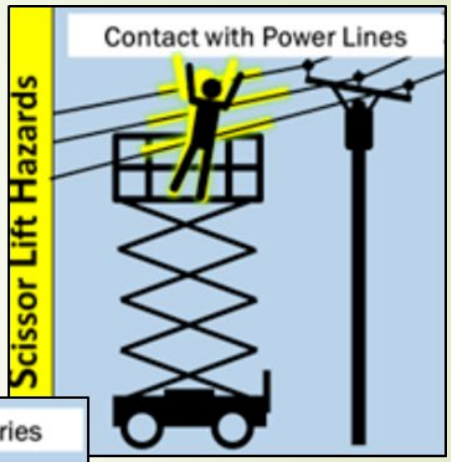
Note: Some manufacturers require a PFAS in addition to the unit's guardrails.

Hazards and Controls

- Stabilization and positioning







Source: OSHA

Hazards and Controls

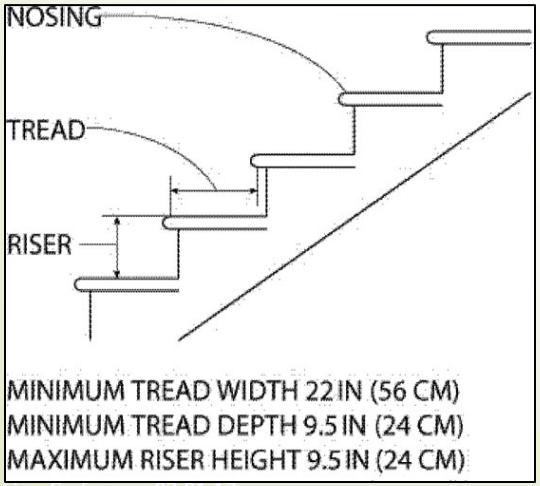
Source: WVU Susan Harwood

Controlling fall hazards – stairs:

- Often stair-related hazards can be overlooked
- Stair safety comes down to proper
  - Design & construction
  - Condition
  - Use

Hazards and Controls

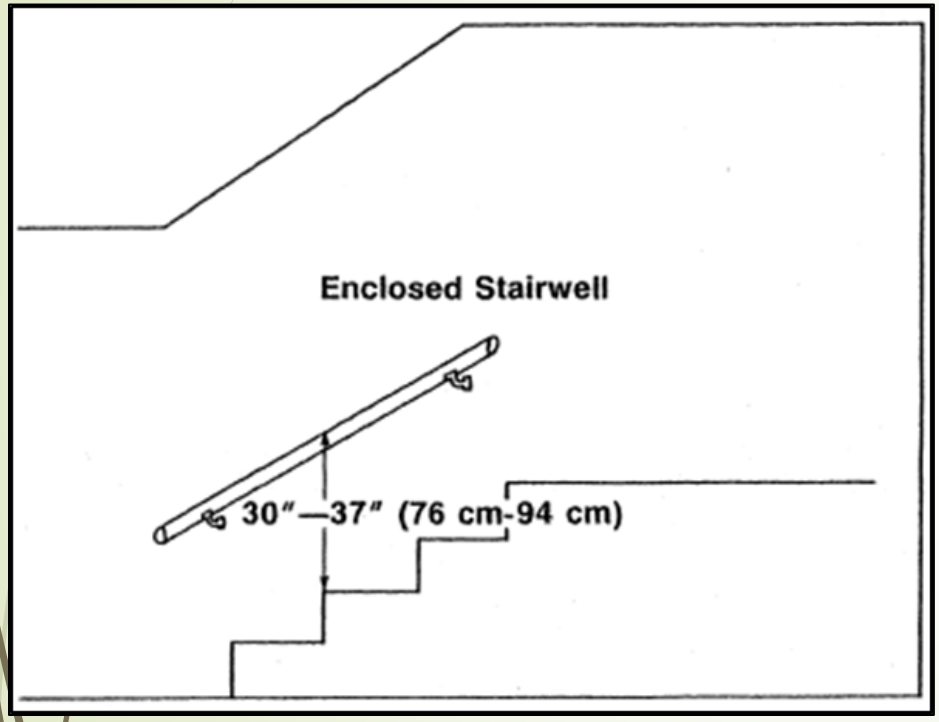
- Proper design/construction
  - Fixed industrial stairs must be:
    - Strong enough to handle a minimum 1,000 lb. live load
    - At least 22 inches wide
    - Installed at angles between 30-50 degrees
    - No more than ¼ inch variation



Source: OSHA

Source: WVU Susan Harwood

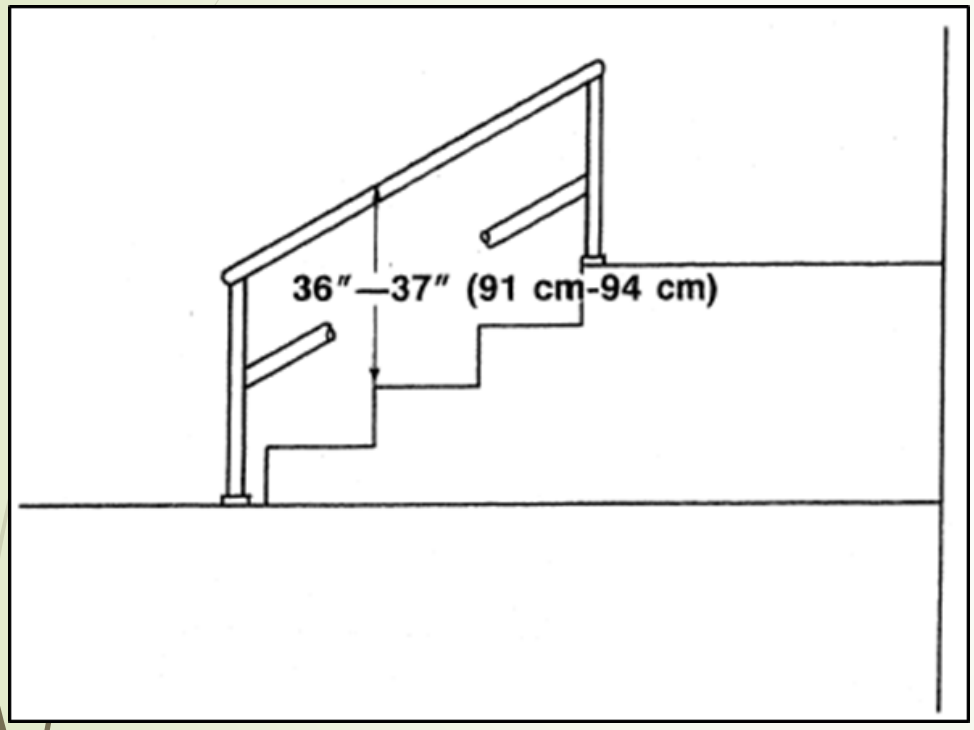
Hazards and Controls



- Handrails are required when there is 4 or more risers
- Mainly to be used on the right side as you descend
- Allows you to maintain three points of contact

Source: OSHA

Hazards and Controls



Source: OSHA

- Stair rails prevent falls from open sides
- Stair rail system must be present on the unprotected sides and edges (open stairs)
- Stair rails are required when there is 4 or more risers

Hazards and Controls

Source: OSHA

- Condition
  - Fixed industrial stairs must be maintained in good shape
  - These stairs are uneven and unpredictable.
  - Report stair-related defects
  - What else is wrong?

Hazards and Controls

Source: WVU Susan Harwood

- Proper use
  - Maintain at least three (3) points of contact
  - Do not run up or down stairs
  - Do not carry heavy objects, only light loads
  - Do not jump the last few steps

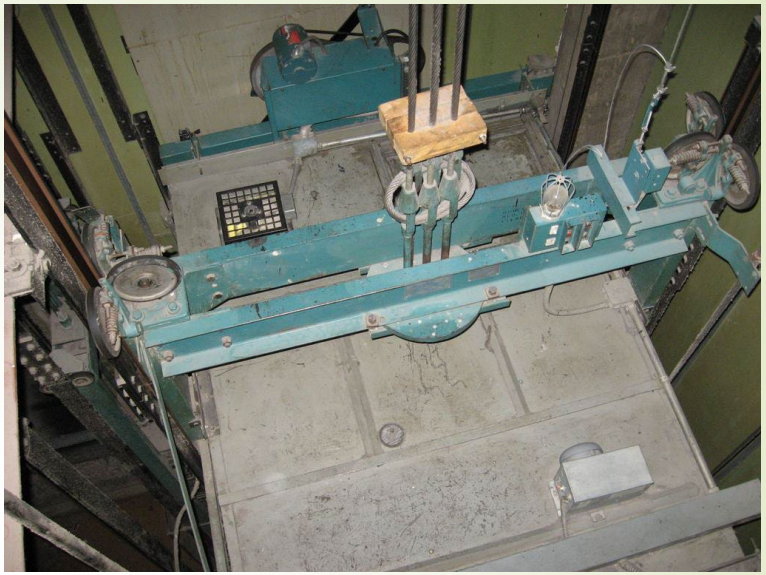
Hazards and Controls

Source: OSHA

- Items should never be placed or stored on stairs
- Stairs should be inspected on a regular basis
- Remove items to ensure no one gets hurt

Hazards and Controls

- Common fall hazards:
- Floor and wall openings
- Open-sided platforms and runways



Source of photos: OSHA

Hazards and Controls

Source: OSHA

Controlling fall hazards – floor openings:

- Unguarded openings like this must never exist
- They require a proper cover or guardrail system at all times
- Posting a "guard" to monitor an opening like this for temporary access is permitted

Hazards and Controls

Source: OSHA

Controlling fall hazards – wall openings

- Wall openings from which there is a drop of more than 4 feet must be guarded
- They require a proper guardrail system, like this one, at all times

Hazards and Controls

Source: OSHA

Guardrail systems:

- **Standard railing**: consists of top rail, mid-rail, and posts. Height from the upper surface of top rail to floor level is 42" (+/− 3"). Mid-rail height is 21 inches.
- **Standard toeboard**: 3.5" high, with not more than ¼" clearance above the floor.

Employer Requirements

To prevent employees from being injured from falls, employers must:

- Guard every floor hole into which a worker can accidentally walk
- Provide fall protection around every open-sided platform, floor, or runway that is 4 feet or higher off the ground or next level

Employer Requirements

- Regardless of height, if a worker can fall into or onto dangerous machines or equipment, employers must provide fall protection.
- Means of fall protection include guardrail systems, safety net systems, travel restraint systems, personal fall arrest systems.

Employer Requirements

- Provide working conditions that are free of known dangers
- Keep floors in work areas in a clean and sanitary condition
- Select and provide required personal protective equipment at no cost to workers
- Train workers about job hazards in a language that they can understand

Hazard Recognition

Identify hazards and what should be done to control them

Source of photos: WVU

Hazard Recognition

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Source: OSHA

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Source: WVU

Hazard Recognition

Identify hazards and what should be done to control them

Source of photos: OSHA

Knowledge Check

1. Slips, trips, and falls make up what percent of all accidental deaths?

   a. 2%

   b. 15%

   c. 36%

   d. 50%

Answer: b. 15%

Knowledge Check

2. What is the easiest and most accurate way to use a portable ladder according to the manufacturer?

   a. Contact the manufacturer via cell phone
   b. Download the material from the internet.
   c. Read and follow all warning labels and stickers.
   d. Ask a fellow worker.

Answer: c. Read and follow all warning labels and stickers.

Knowledge Check

3. When using a portable ladder to access another level, which statement is true?

   a. A stepladder may be used if long enough.
   b. Portable ladders may never be used.
   c. The ladder should be secured and extend 3 feet above the level you are accessing.
   d. Carrying tools and materials is permitted.

Answer: c. The ladder should be secured and extend 3 feet above the level you are accessing

Knowledge Check

4. The maximum work level height of a free-standing scaffold's platform should never exceed ___ times the minimum base dimension.

a. 2

b. 3

c. 4

d. 5

Answer: c. 4

Knowledge Check

5. Which best describes a safe scaffold?

a. Placed on a firm foundation and is plumb and level

b. Has proper access and is fully decked

c. Has proper guardrail system

d. All of the above

Answer: d. All of the above

Knowledge Check

6. Scissor lifts rated for outdoor use are generally limited to wind speeds below __.

a. 28 MPH

b. 50 MPH

c. 60 MPH

d. 75 MPH

Answer: a. 28 MPH

Knowledge Check

7. The height of a proper guardrail system is __ (+/− 3") from the walking/working surface.

a. 30 inches

b. 42 inches

c. 60 inches

d. None of the above

Answer: b. 42 inches

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 Walking Working Surfaces Hazard 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

Under the Occupational Safety and Health Act, employers are responsible (http://www.osha.gov/as/opa/worker/employer-responsibility.html) for providing a safe and healthy workplace and workers have rights (https://www.osha.gov/workers). OSHA can help answer questions or concerns from employers and workers. OSHA's On-Site Consultation Program (https://www.osha.gov/consultation) offers free and confidential advice to small and medium-sized businesses, with priority given to high-hazard worksites. For more information, contact your regional or area OSHA office (https://www.osha.gov/contactus/bystate), call 1-800-321-OSHA (6742), or visit https://www.osha.gov/.


Any questions?