

Walking and Working Surfaces, including Fall Protection

**OSHA 10-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 step ladder with the rungs facing towards the windows, and that he stood backwards on the step ladder.



NIOSH In-house FACE Report 2009-01

Introduction

Slips, trips, and falls:

- make up the majority of 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

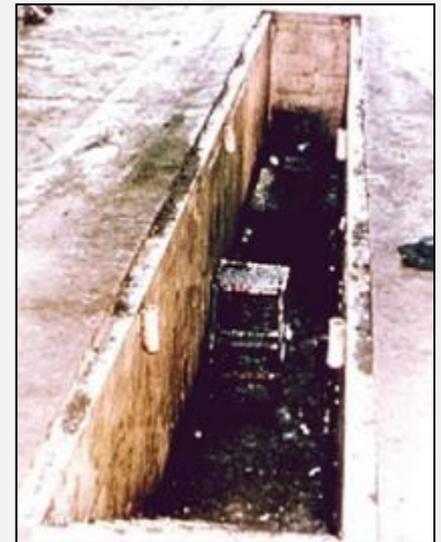
Controlling trip hazards:

- 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

Fall hazards:

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



Source of photos: OSHA

Hazards and Controls

- Structural collapse
 - structurally unsound surfaces, and/or
 - exceeding load limits.



Photo: example of a sidewalk grate system failure



Source of photos: OSHA

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



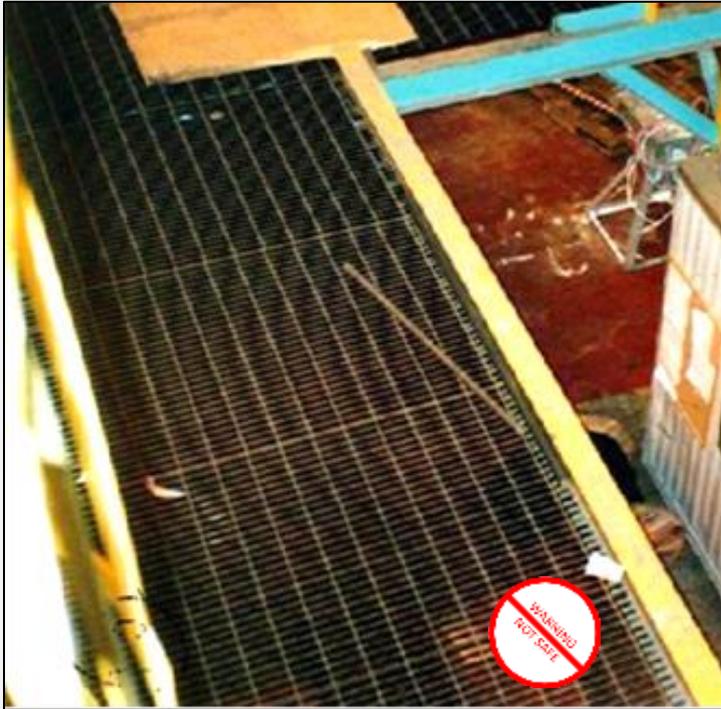
Source: Honeywell/Miller, used with permission.

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



Source: OSHA

- 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.

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:

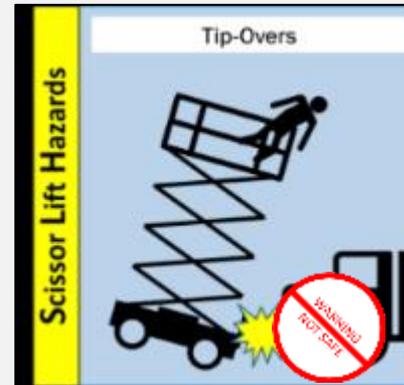
- Ladders
- Scaffolds and scissor lifts
- Stairways
- Floor and wall openings
- Other elevated surfaces



Source: WVU Susan Harwood



Source: www.elcosh.org



Source: OSHA



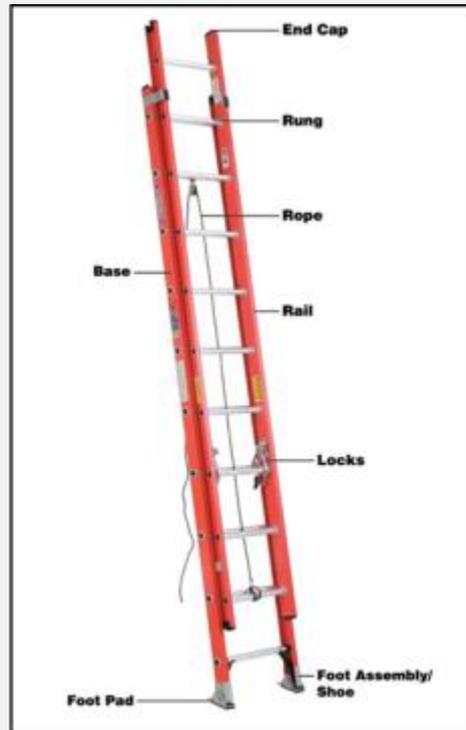
Source: OSHA

Hazards and Controls

Basic types of ladders:



Step Ladder



Extension Ladder



Fixed Ladder

Source of photos: OSHA

Hazards and Controls

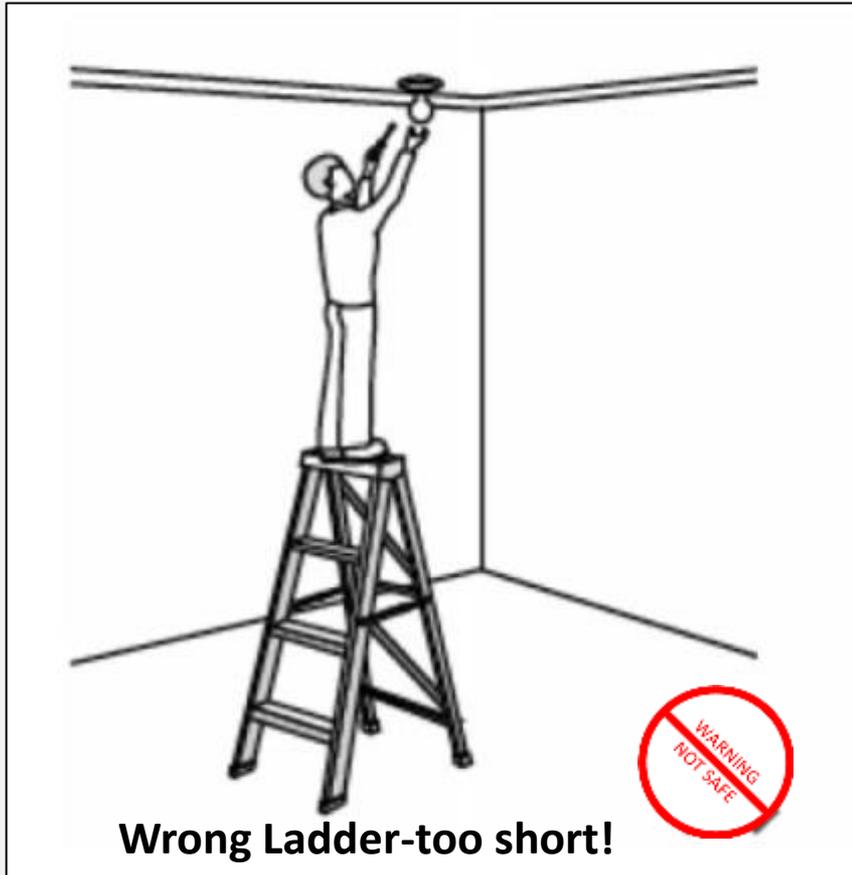


Source: OSHA

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.

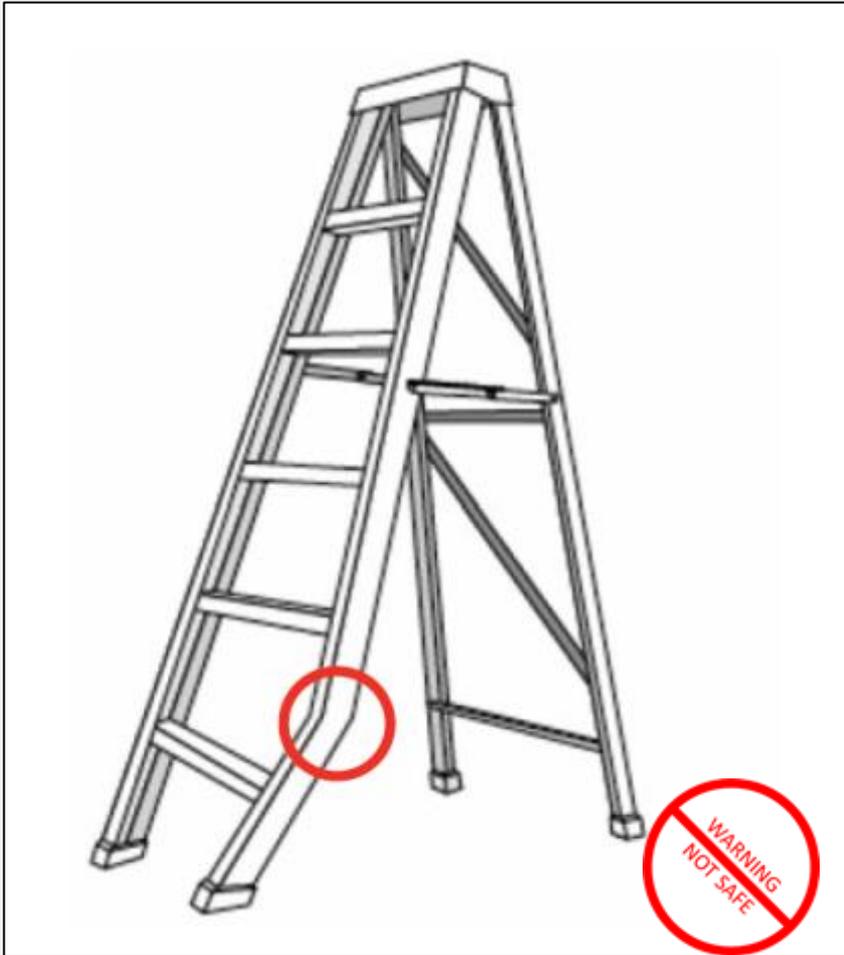
Hazards and Controls



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

- Proper use

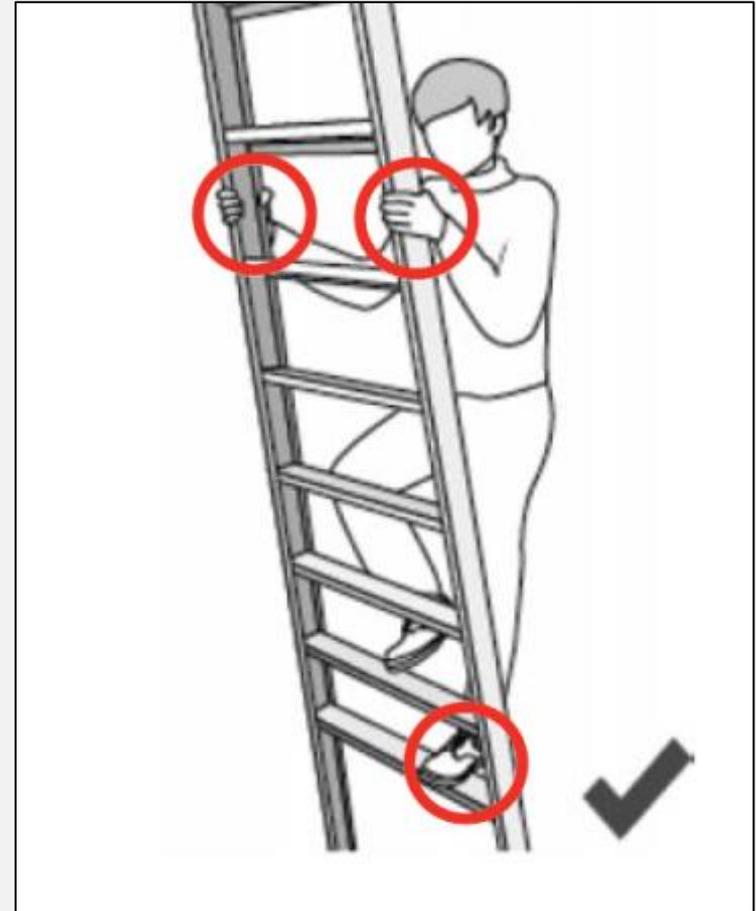
- Ladders must be used according to the manufacturer.
- Take the time to read the information.
- Read and follow all informational stickers and warning labels.



Source: Wernerco shares page

Hazards and Controls

- Maintain 3 points of contact



Source: OSHA

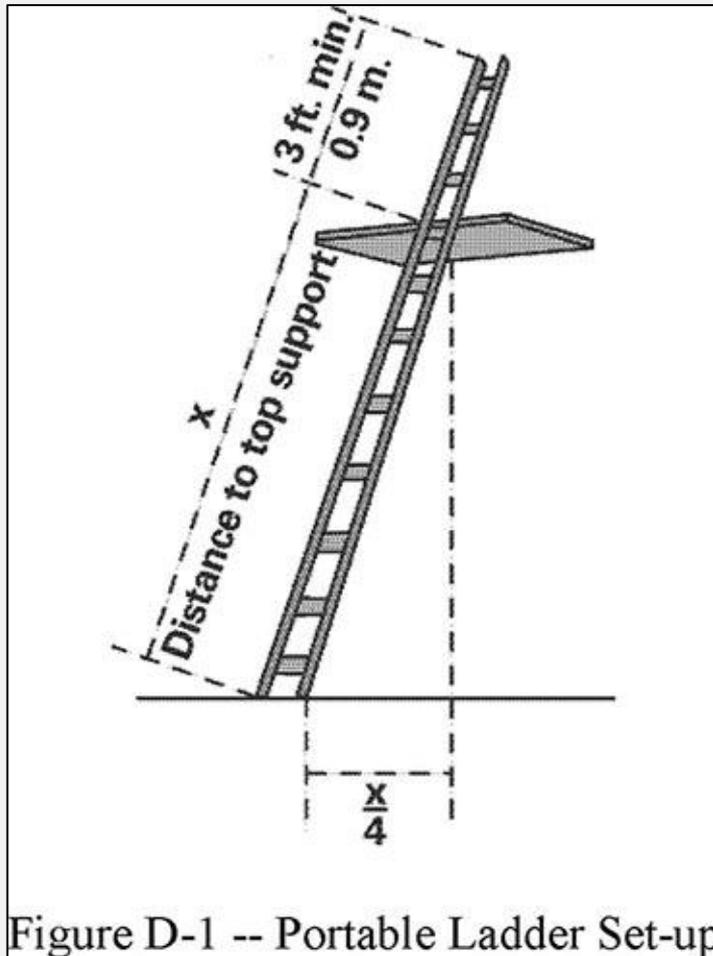
Hazards and Controls



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



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 $\frac{1}{4}$ the working length of the ladder.

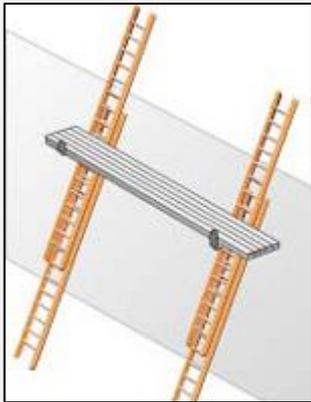
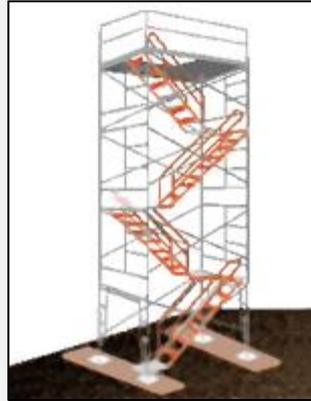
Hazards and Controls



Source: OSHA

- Fixed industrial ladders
 - Must be equipped with a
 - 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
 - proper set-up
 - proper use

Hazards and Controls



Source: OSHA

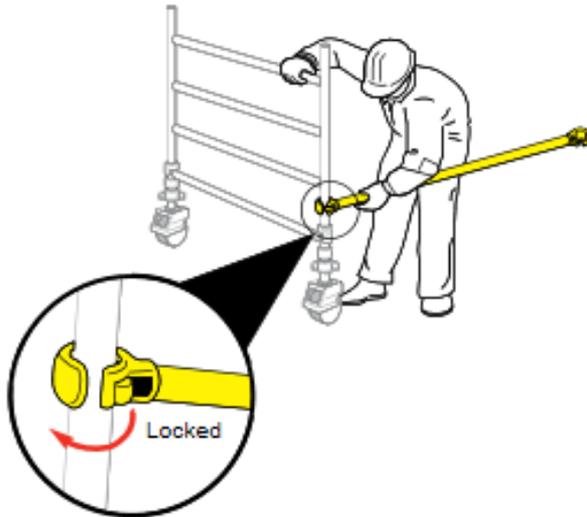
- Free from defects
 - Take the time to look the scaffold over before you use it.
 - Report damage if you identify defective components.
 - Damaged components must be replaced before use.

Hazards and Controls

Assembly Procedure

2 Fit one horizontal brace (red) onto the vertical of an end frame, just above the bottom rung, with the claw facing outwards.

Note: All locking claws must be opened before fitting.



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.

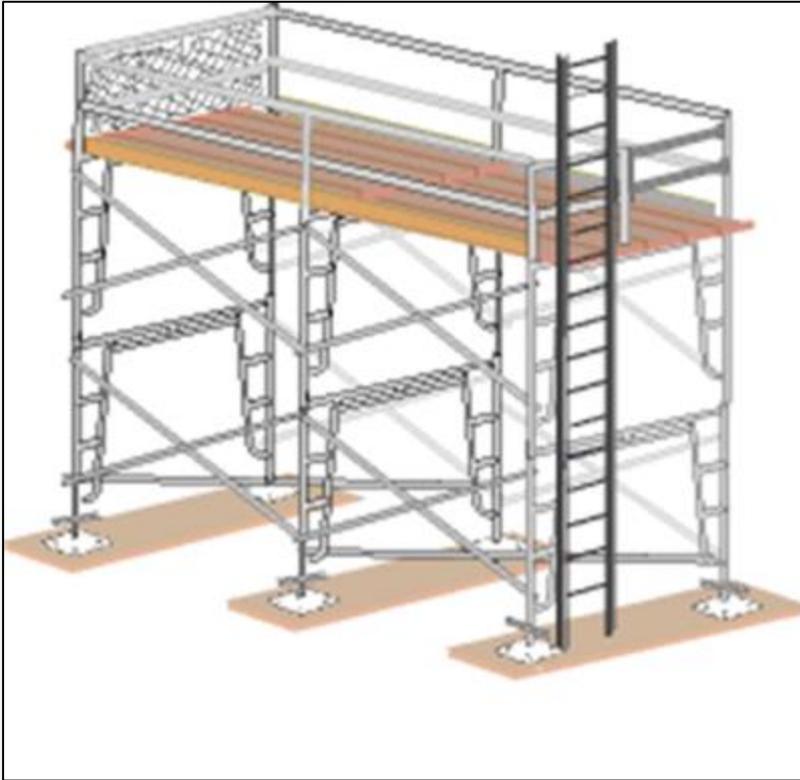
Hazards and Controls



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.

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.

Hazards and Controls



Source: OSHA

- 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.

Hazards and Controls

- Proper use
 - 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.

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.

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



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



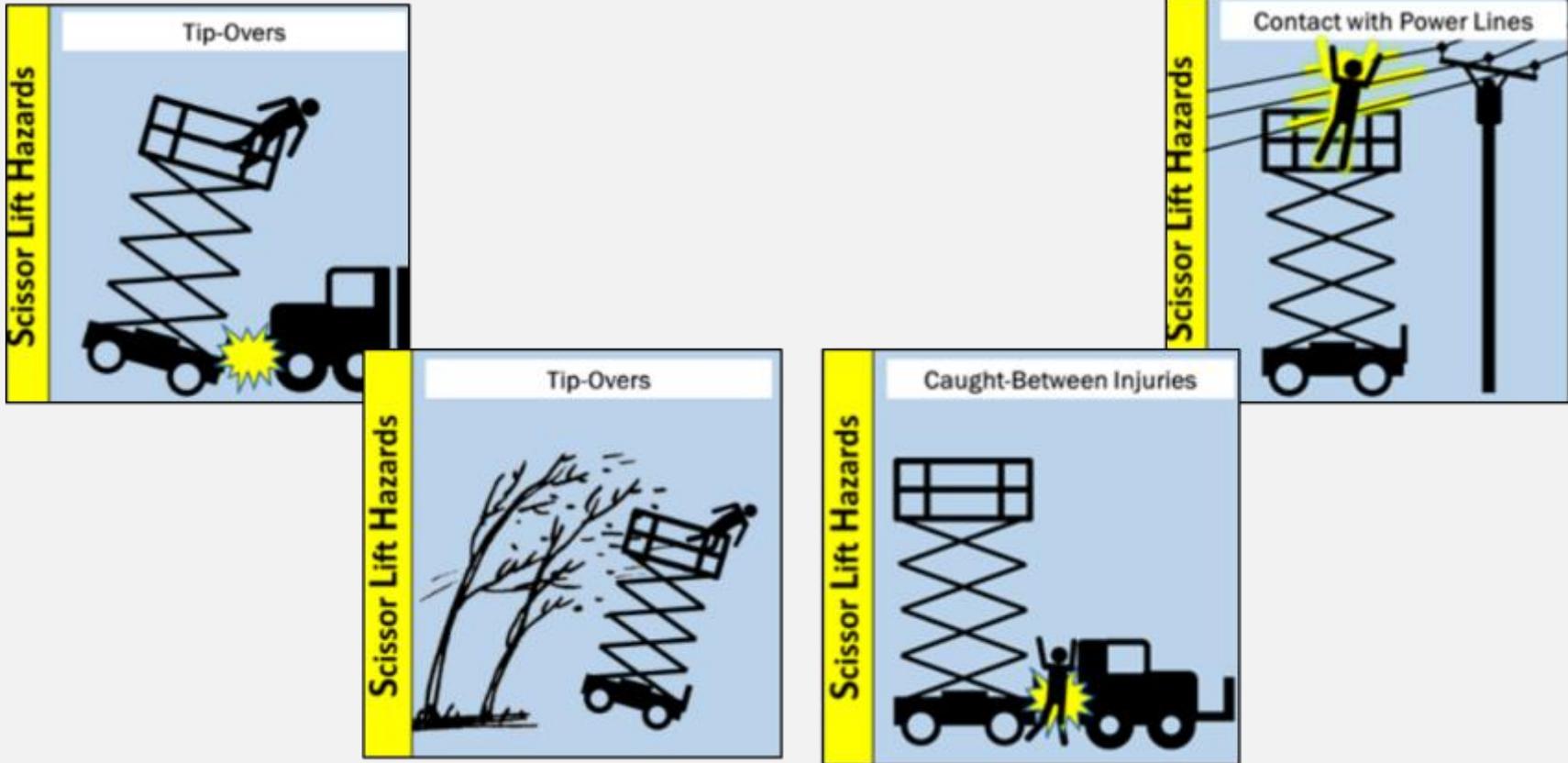
Source: OSHA

- 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



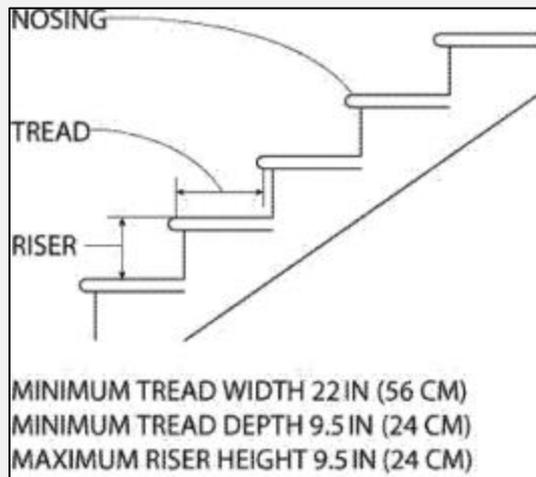
Source: WVU Susan Harwood

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; and
 - no more than 1/4 inch variation.

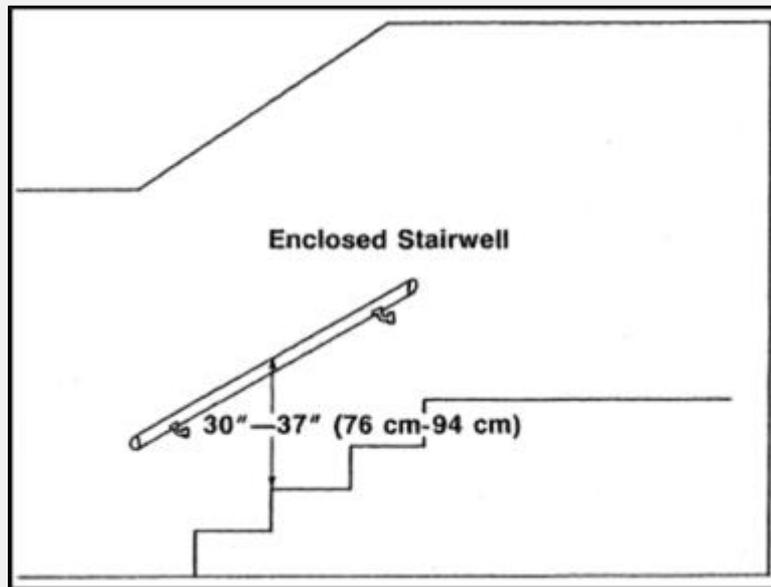


Source: OSHA



Source: WVU Susan Harwood

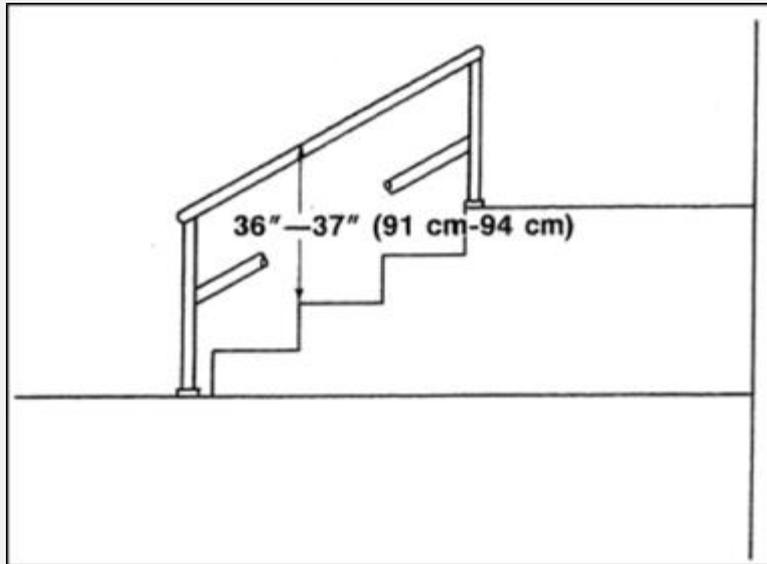
Hazards and Controls



Source: OSHA

- 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.

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 1/4" 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 a guardrail and toeboard 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 guardrails and toeboards.
- Other means of fall protection that may be required on certain jobs include safety harness and line, safety nets, stair railings and handrails.

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

Identify hazards and what should be done to control them.



Source : WVU



Source: WVU



Source: OSHA

Hazard Recognition

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Source: OSHA



Source: OSHA



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 step ladder 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