

Fall Protection and Walking-Working Surfaces

FROM: OSHA OFFICE OF TRAINING AND EDUCATION

*OSHA 29 CFR PART 1910 SUBPART D; WALKING-WORKING SURFACES
(§1910.21 TO 1910.30)*

Introduction

- Slips, trips and falls cause:
 - the majority of general industry accidents
 - 15 percent of all accidental deaths
 - more fatalities than all other causes but motor vehicles
- Topics covered in this training module:
 - Housekeeping
 - Floor openings, holes, stairs, and guardrails
 - Ladders
 - Scaffolding
 - Fall protection



General Requirements

OSHA 29 CFR 1910.22(a)

Housekeeping

- Workplaces must be kept clean, orderly, and sanitary.
- Workroom floors must be maintained as clean and dry as possible.



General Requirements

OSHA 29 CFR 1910.22(b)

Aisles and Passageways

- Keep clear and move obstructions that could create a hazard.
- Mark permanent aisles and passageways.
- Aisles must be sufficiently wide where mechanical handling equipment is used.



General Requirements

OSHA 29 CFR 1910.22(c)

Covers and Guardrails

- Provide covers and/or guardrails to protect workers from the hazards of open pits, tanks, vats, ditches, and the like.
- Examples of when this applies?
 - Floor opening greater than 12" where work may be conducted.
 - Wall opening 18" wide and 30" high (or larger) where work may be conducted.
 - Skylight openings.
 - Equipment hatches/openings.
 - When in doubt, contact your Supervisor.



General Requirements

OSHA 29 CFR 1910.22(d)

Floor Loading Protection

- Load ratings must be marked on plates and be conspicuously posted.
- Do not exceed the load rating limit.



Guarding Floor Openings

OSHA 29 CFR 1910.21(a)(2)

Definitions

- **Standard railing:** Consists of top rail, mid rail, and posts. Height from the upper surface of top rail to floor level is 42 inches. Mid rail height is 21 inches.
- **Standard toeboard:** 4 inches high, with not more than ¼-inch clearance above the floor.



Stairway floor opening

Guardrail System Components

Standard guardrail:

Top Rail - 42" +/- 3"

Mid Rail - 1/2 distance from top rail

Toe Board - minimum of 3.5" high

Capable of withstanding 200 pound force in any outward or downward direction.

Contact your Supervisor if you must go into an area that should have a guardrail system and the system is deficient.



TIPS

- Do not go into an area that should have a guardrail system and the system is deficient.
- Contact your Supervisor to make necessary improvements.
- Contact your Supervisor to determine if a work permit system is necessary in this area.

Ladderway Floor Openings

OSHA 29 CFR 1910.23(a)(2)

- Guard with a standard railing with toeboard on all exposed sides (except entrance).
- Guard the passage through the railing with a swinging gate or offset it to prevent someone from walking into the opening.



Floor Hole

OSHA 29 CFR 1910.21(a)(1)

OSHA 29 CFR 1910.23(a)(8)

Definition:

An opening measuring less than 12 inches, but more than 1 inch in its least dimension, in a floor, platform, pavement or yard, through which materials but not persons may fall.

- Every floor hole into which persons cannot accidentally walk (because of fixed machinery, equipment, or walls) must be protected by a cover that leaves no openings more than 1 inch wide.
- The cover must be securely held in place to prevent tools or materials from falling through.
- While the cover is not in place, the floor hole must be constantly attended by someone or be protected by a standard railing with a standard toeboard.



Wall Openings

OSHA 29 CFR 1910.23(b)(1)

Definition:

Opening at least 30 in. high and 18 in. wide, in a wall or partition, through which persons may fall.

- Wall openings from which there is a drop of more than 4 feet must be guarded.
- Guard using one of the following: rail, roller, picket fence, half door, or equivalent barrier.
- Where there is exposure below to falling materials, a removable toe board or the equivalent must also be provided.



Open-Sided Floors, Walkways, Platforms, and Runways

OSHA 29 CFR 1910.23(c)(1)

OSHA 29 CFR 1910.23(c)(3)

- Open-sided floors or platforms 4 feet or more above adjacent floor or ground level must be guarded by a standard railing (or equivalent) on all open sides, except where there is an entrance to a ramp, stairway, or fixed ladder.
- A toeboard is required when, beneath the open sides:
 - persons can pass,
 - there is moving machinery, or
 - there is equipment with which falling materials could create a hazard
- Regardless of height, a standard railing and toeboard must be used to guard above or adjacent to dangerous equipment.



Unguarded Platform

Stairways

OSHA 29 CFR 1910.23(d)(1)

OSHA 29 CFR 1910.23(e)(2)

- Flights of stairs with four or more risers must have standard stair railings or handrails.



Fixed Industrial Stairs

OSHA 29 CFR 1910.24

Fixed industrial stairs are required for access to and from places of work where operations necessitate regular travel between levels.

- Treads must be slip resistant with uniform rise height and tread width
- Must be able to carry 5 times expected load; minimum of 1000 pounds
- Minimum width of 22 inches
- Applies to interior and exterior stairs around machinery, tanks and other equipment, and stairs leading to or from floors, platforms or pits.
- Does not apply to stairs used for fire exit purposes, to construction operations, to private residences, or to articulated stairs, such as those on floating roof tanks.



Violation here – several steps bent and damaged

Portable Ladders

OSHA 29 CFR 1910.25

OSHA 29 CFR 1910.26

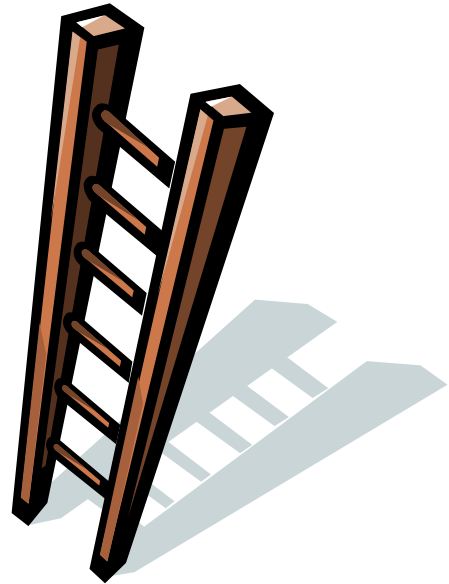
- Ladders used to gain access to a roof or other area must extend at least 3 feet above the point of support
 - Withdraw defective ladders from service and tag or mark "Dangerous, Do Not Use"
 - Never use ladders in a horizontal position as scaffolds or work platforms
 - Never use metal ladders near electrical equipment
 - Never splice together a short ladder to make a long ladder
 - Always face the ladder when climbing or descending.
 - Always place the ladder on secure footing and lock in place.
- Step Ladders
 - Maximum length:
 - 20 ft, single-rung ladders – 30 ft., two-section rung ladders – 60 ft.
 - Stepladders must be equipped with a metal spreader or locking device to securely hold the front and back sections in an open position.
 - Never use the top of a regular stepladder as a step.
 - Inspections
 - All ladders must be inspected periodically, kept in good condition at all times, and must be free from sharp edges, splinters, oil grease, or other defects which would affect their use.



Portable Ladders

Portable ladders have different ratings, depending on their use.

- 1A can support 300 lbs.
- 1 can support 250 lbs.
- 2 can support 225 lbs
- 3 can support 200 lbs.



Stepladders

- Stand by themselves
- Flat steps
- Safety Rules
 - Ladder must be fully open and spreaders locked
 - Do not climb, sit or stand on top 2 rungs

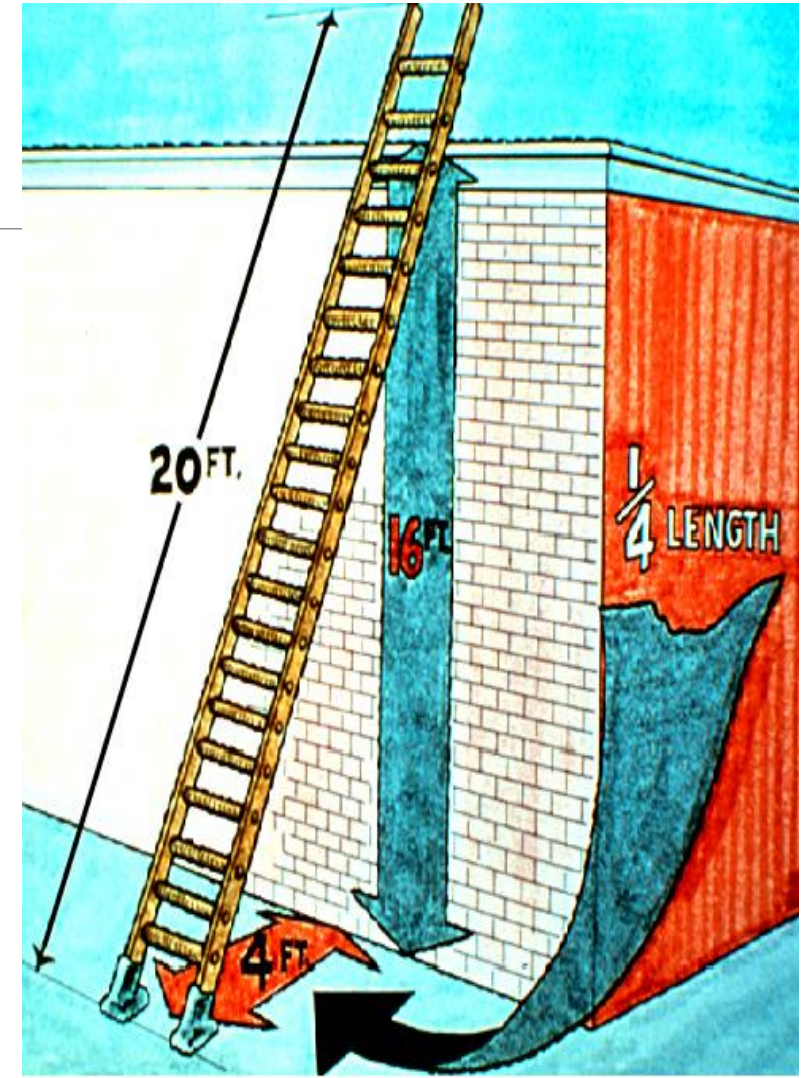
Extension Ladders

- Lightweight
- Adjustable in length
- Rules - must have overlap
 - 32 feet, 3-foot overlap
 - 32 – 36 feet, 4-foot overlap
 - 36 – 48 feet, 5-foot overlap
 - Over 48 feet, 6-foot overlap

Ladder Angle

Portable Rung and Cleat Ladders
OSHA 29 CFR 1910.25

- Use at angle where the horizontal distance from the top support to the foot of the ladder is $\frac{1}{4}$ the working length of the ladder (length along ladder between the foot and top support).



Fixed Ladders

OSHA 29 CFR 1910.27

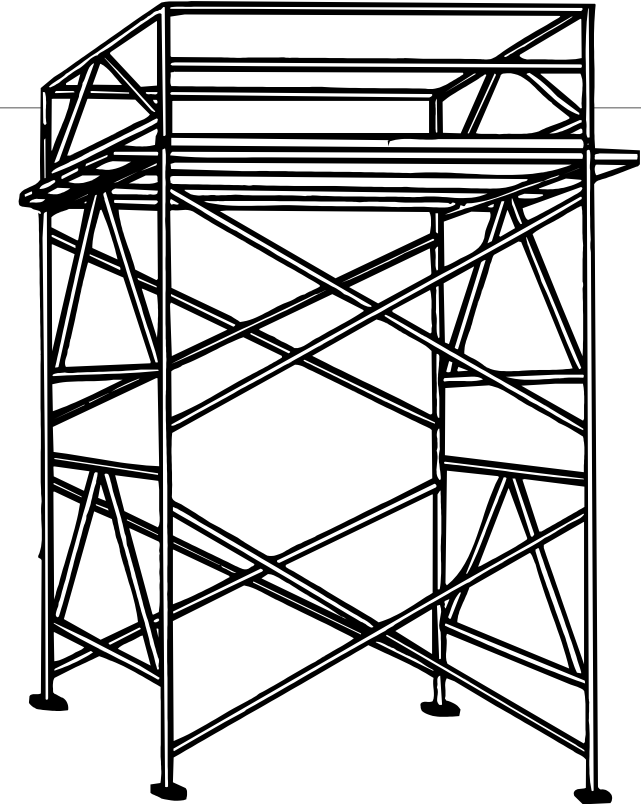
- Permanently attached to a structure, building or equipment.
- Cages or wells required if longer than 20 ft. to a maximum unbroken length of 30 ft.
- Ladder safety devices may be used on tower, water tank and chimney ladders over 20 ft. in unbroken length instead of cage protection.
- All fixed ladders must be inspected regularly and be maintained in a safe condition.
- Preferred pitch in range of 75 to 90 degrees with horizontal.



Scaffolding

OSHA 29 CFR 1910.28 General Requirements

- Must be capable of supporting four times the maximum intended load.
- Do not alter or move while in use.
- Protect workers on scaffolds from overhead hazards.
- If higher than 10 ft., use guardrails, midrails and toeboards
- Use wire mesh between the toeboard and guardrail if people work or pass underneath.
- Must be equipped with access ladder or equivalent.
- Damaged or weakened scaffolds must not be used.
- A safe means must be provided to gain access to the working platform level through use of a ladder, ramp, etc.
- Never work on scaffolds during storms, high winds, ice, or snow.
- Always be aware of the hazards of overhead power lines when working on scaffolds.



Fall Protection

Use Fall Protection when...

Over trigger height – (4, 6, 10)

Man lifts (scissor lift, bucket truck, forklift platform/cage)

Confined spaces

Equipment maintenance

Ladders

Unprotected floor or wall openings

Ask your Supervisor!

Personal Fall Arrest/Restraint Systems

- Arrests a fall.
- Limits free fall distance to 6 feet.
- All components must be rated for 5000 lbs. per person.
- Limits the maximum force on the employee's body of 1800 lbs, if falls.
- Use full body harness, NO BODY BELTS
- Lanyard - If shock absorbing can add 3-4 feet!
- Connectors - D-rings and double locking snaphooks

Fall Protection Systems

What is available?

- Personal Fall Arrest System (PFAS)
- Personal Fall Restraint System
- Guardrail System



Full body harness

Full Body Harness

Vest-type harness with back D-ring and non-sparking hardware (coated):

Limitations:

combined weight of equipment and person must not exceed 310 lbs.

Free fall is limited to 5-6 feet.

Make sure there is good fall clearance

Use:

Inspect before each use

- Know how it will be used. Plan anchorage points
- Avoid sharp edges.
- If a fall happens, what is the plan after the fall?
- What about rescue?



Fall Protection Equipment Inspection

Always inspect before each use! If damaged, do not use and remove from service.

Harness

- ✓ Inspect for frayed edges, broken fibers, pulled stitches, chemical damage
- ✓ Inspect for loose, distorted or broken grommets
- ✓ Check for distortion of tongue buckle

D-ring

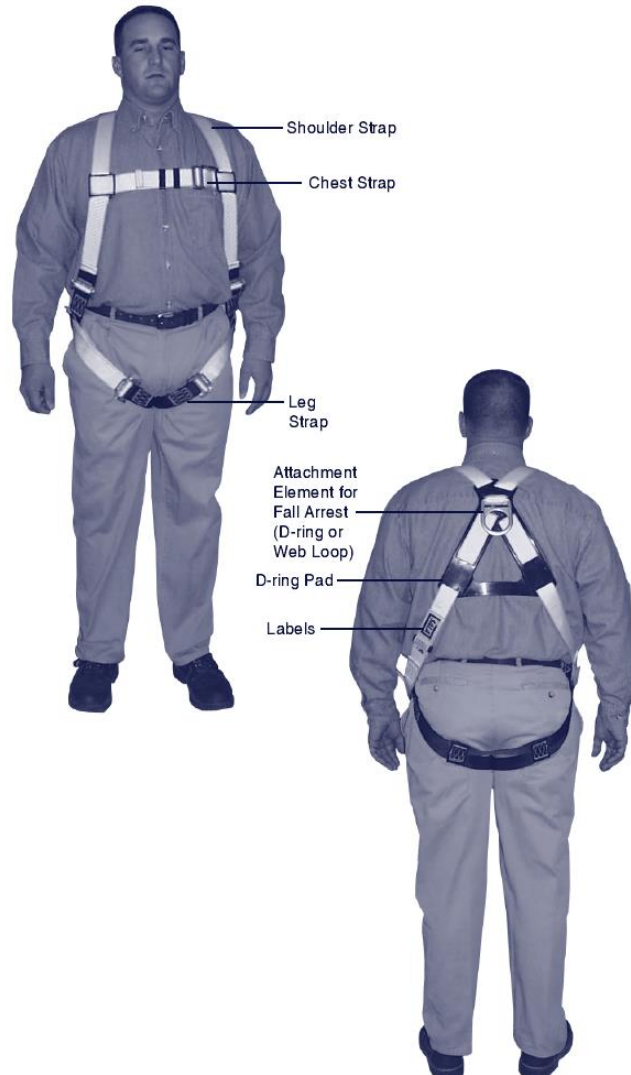
- ✓ Check for distortion, cracks, breaks and rough or sharp edges

Lanyard

- ✓ Safety tab
- ✓ Shock absorbing mechanism
- ✓ Inspect lanyard for discoloration, cracks, and charring from heat or chemical damage
- ✓ Inspect hardware for distortion, cracks, corrosion or pitted surfaces
- ✓ Inspect latch and keeper spring/lock



Putting on the Full-Body Harness



- Lift harness by D-ring and untangle straps. Leg straps should dangle free
- Don vest like a jacket.
- Reach between legs and grasp leg straps and connect.
- Connect chest strap.
- Adjust shoulder straps to a snug fit. Readjust all straps to snug and symmetrical fit.

Lanyard

Example: Shock Wave II lanyard with large locking snap on and standard hook on other end



Capacity:

310 lbs.

connectors support 5000 lbs.

Use:

Inspect before each use

- Know how it will be used. Plan anchorage points
- Avoid sharp edges.
- If a fall happens, what is the plan after the fall?
- What about rescue?
- inspect before each use.

After fall - remove from service

Connecting to anchorage:

Always connect the energy absorber end of lanyard to body support (harness).

Do not wrap lanyards around guard rails.

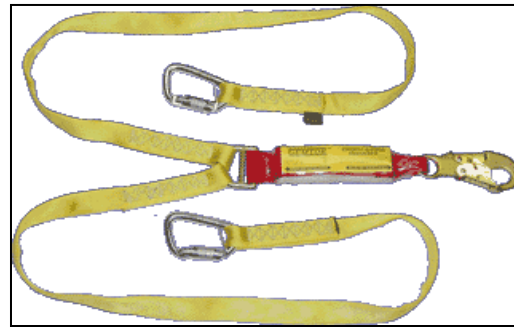
Do not anchor to anything in which you are unsure of the force rating.

Lanyard Limitations

- Use cross arm strap when appropriate.
- Do not wrap lanyards around guard rails.
- Do not anchor to anything in which you are unsure of the force rating.
- Be aware of additional length of shock absorbing lanyards.
- Do not use retractable lanyards/lifelines in horizontal position unless approved by manufacturer.
- Do not use equipment rated for equipment, not people.



Other Lanyards & Lifelines



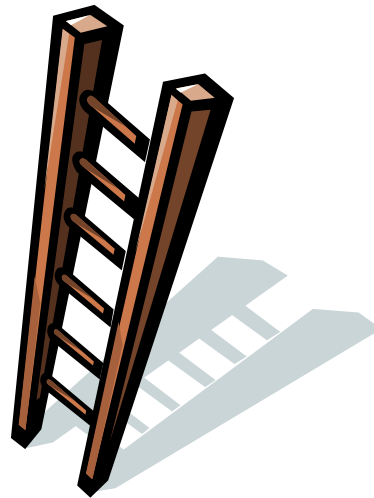
Safety Tips for Use of Fall Protection

- Talk to your Supervisor before using equipment.
- Consider and understand the alternative methods.
- Always have a work plan before you get started and ask questions. Maybe there is an easier way to do the job and fall protection won't be necessary
- Make sure all equipment is appropriate.
- Do not use damaged equipment.
- Make sure you are trained in the use of the particular equipment, with a hands-on demonstration (try the stuff on!)
- Do not work alone.
- If required for the work, complete a permit, e.g., confined space entry.
- If you are having any problems while doing the work using the fall protection system, stop the work immediately and contact your Supervisor.

Ladder Safety – Summary of the Basics

- Use fiberglass or wood for electrical work
- Observe the “Belt Buckle Rule” – never lean or reach out on the ladder further than your belt buckle
- Use Both Hands Going Up or Down
“3 Body Part Rule” – Always have at least 3 limbs on the ladder – 2 hands and 1 foot or 2 feet and 1 hand.
- Don’t place near doors or high traffic areas. Use barriers or cones.
- Do not lean ladder up against an unstable surface. Tie off a ladder at chest height or at the top if possible.
- Place on solid, even ground. The feet can flip to “dig” into the ground for anchorage.
- Never use a ladder for anything other than a ladder.

Extension Ladders



Stepladders

What's Wrong With These Pictures?



What's Wrong With These Pictures?



Summary

- Slips, trips, and falls constitute the majority of general industry accidents.
- OSHA's standards for walking and working surfaces include requirements for housekeeping, guarding floor and wall openings and holes, industrial stairs and ladders.
- Keeping working surfaces clean, dry, and uncluttered can prevent many workplace accidents.