

Scaffolds

Never use scaffolds that do not have proper guardrails installed.



Scaffolds

Scaffold platforms must be fully and properly planked



Scaffolds

Never stack blocks, bricks, or use ladders on top of scaffolds for extra height.



Scaffolds

Workers must have a safe way to access the scaffold.



Scaffolds

Never use blocks, bricks, walk boards, and other unsafe methods to access a scaffold.



Scaffolds

- Use only ladders designed for use with scaffolds.
- The ladder must be firmly secured to the scaffold.



Powered Work Platforms

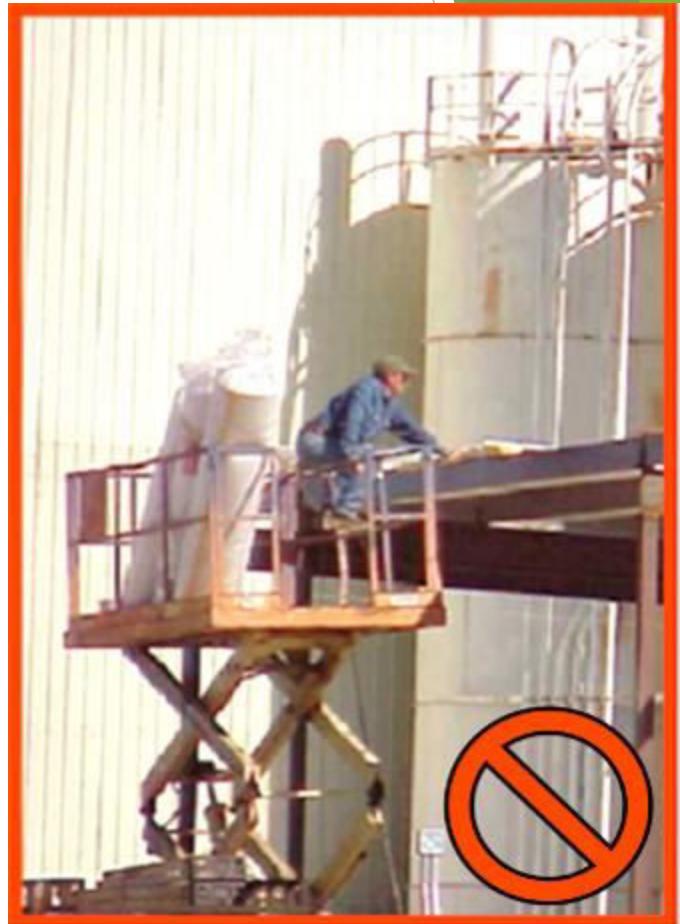
Powered platforms include:

- man-baskets placed on a forklift,
- aerial lifts, and
- scissor lifts.



Powered Work Platforms

Always make sure you have proper fall protection and training before using a powered platform.



Powered Work Platforms

Only use equipment that is designed for lifting personnel.



Stairs

Stairways must have a stair rail along each unprotected side or edge.



Stairs

Stairs that have walls on both sides must have at least one hand rail on the right-hand side when climbing down.



Ladders

Never use stairs
that are not
complete or
unsafe.



Ladders

- ▶ Ladders must be inspected prior to use.
- ▶ Ladders must be kept in a good condition and safe location.



Ladders

Do not stand on the top of a ladder.



Ladders

Read labels on ladders for instructions to ensure proper use



Ladders

- ❑ Always maintain good footing on a step ladder.
- ❑ Use the correct size ladder for the work that is to be done.



Ladders

Always use the right equipment for the job:

- Ladders
- Lifts
- Scaffolds



Ladders

Never straddle or sit on top of a step ladder.



Ladders

- ❑ An A-Frame ladder must be fully opened and locked into position.
- ❑ Use ladders only for their designed purpose.



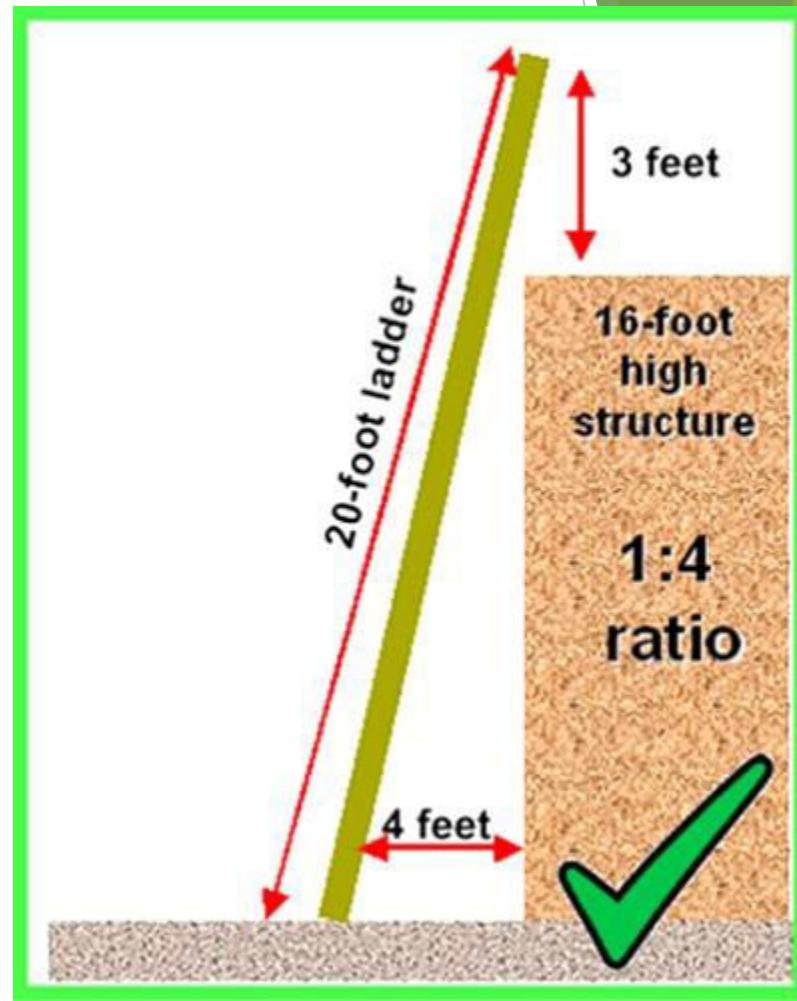
Ladders

Only use ladders on stable and level surfaces to prevent accidental movement.



Ladders

- Ladders must be positioned at a safe angle to avoid potential fall hazards when climbing.
- Extension ladders must extend 3' over the landing for safe access.



Ladders

When using a portable ladder for access to an upper landing surface, the side rails must extend at least 3' above the upper landing surface.



Ladders

- Proper use
vs.
 Improper application



Ladders

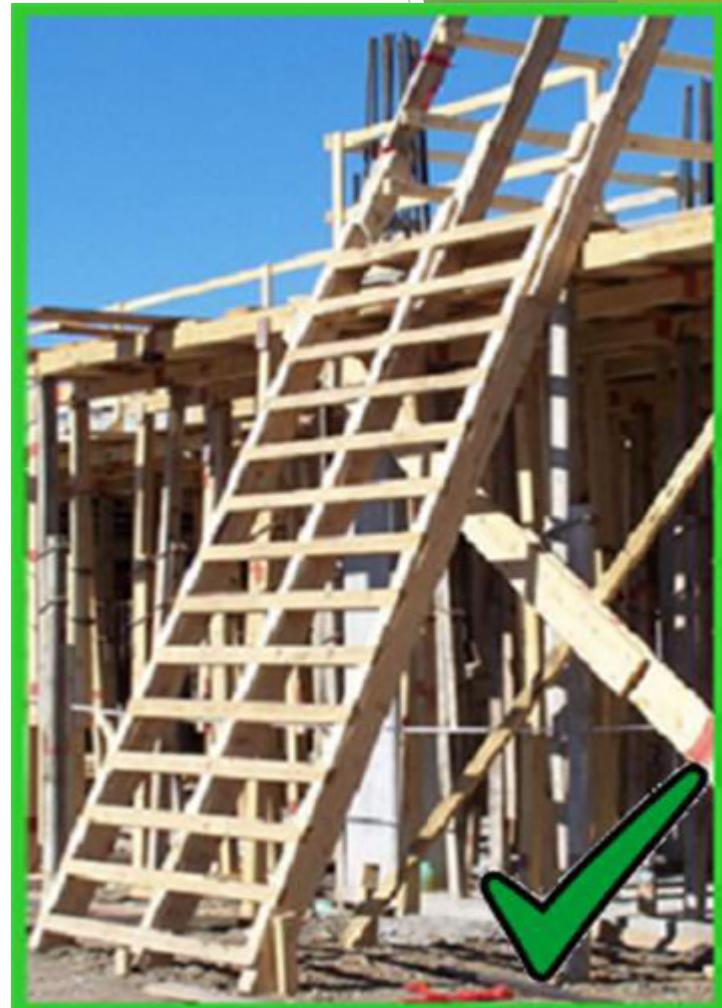
- ▶ Maintain contact with the ladder using both hands to keep a safe grip.
- ▶ Face ladder when going up or down.
- ▶ Never climb a ladder while carrying any materials.



Job Made Ladders

Job made ladders must be properly constructed:

- Steps equally spaced
- No missing steps or rungs
- No sharp edges or nails sticking out



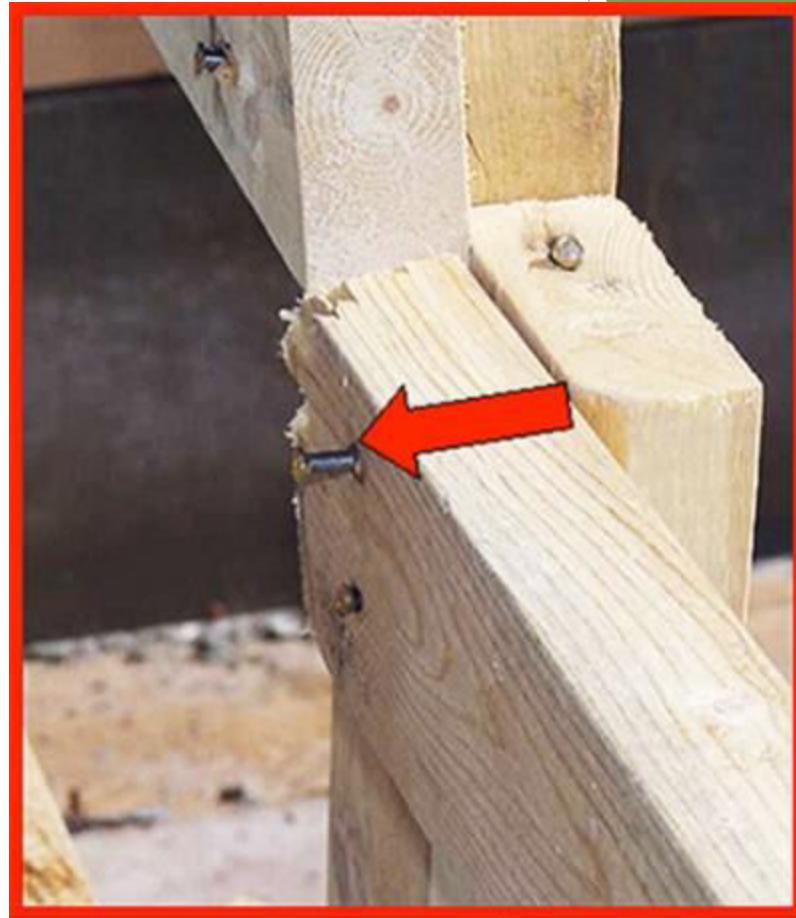
Job Made Ladders

- ❑ Never use a job made ladder that is damaged or missing steps.
- ❑ Only use a job made ladder that has been properly built.



Job Made Ladders

- ❑ Job made ladders must also be constructed so that no nails protrude or sharp edges exist.
- ❑ Nails and sharp edges can catch on clothing and cause falls.



QUIZ



You will be presented with a specific hazard recognition question to test your understanding of this material.

Question 1

Before using a ladder, inspect it for which of the following?

- A. Cracks in the frame
- B. Broken or missing rungs
- C. Oil, grease or other substances on the rungs
- D. All of the above

Question 1

Before using a ladder, inspect it for which of the following?

The correct answer is:

D - All of the above

Question 2

Job made ladders may be used if the steps are equally spaced with no steps missing and no sharp edges or nails sticking out.

- A. True
- B. False

Question 2

Job made ladders may be used if the steps are equally spaced with no steps missing and no sharp edges or nails sticking out.

The correct answer is:

A – True

Question 3

When erecting scaffolding, the base plate must be placed on what?

- A. A Firm Foundation
- B. Cement Blocks
- C. Soft Dirt
- D. Wood Blocks

Question 3

When erecting scaffolding, the base plate must be placed on what?

The correct answer is:

A – A Firm Foundation

Question 4

When working on scaffolding and you need a little more height, you must do the following:

- A. Stand on a saw-horse
- B. Jump
- C. Erect another section of scaffolding
- D. Use a ladder

Question 4

When working on scaffolding and you need a little more height, you must do the following:

The correct answer is:

C – Erect another section of scaffolding

Question 5

Stairs that are incomplete and missing handrails are acceptable to use during the construction phase of the project.

- A. True
- B. False

Question 5

Stairs that are incomplete and missing handrails are acceptable to use during the construction phase of the project.

The correct answer is:

B – False

Accident Prevention

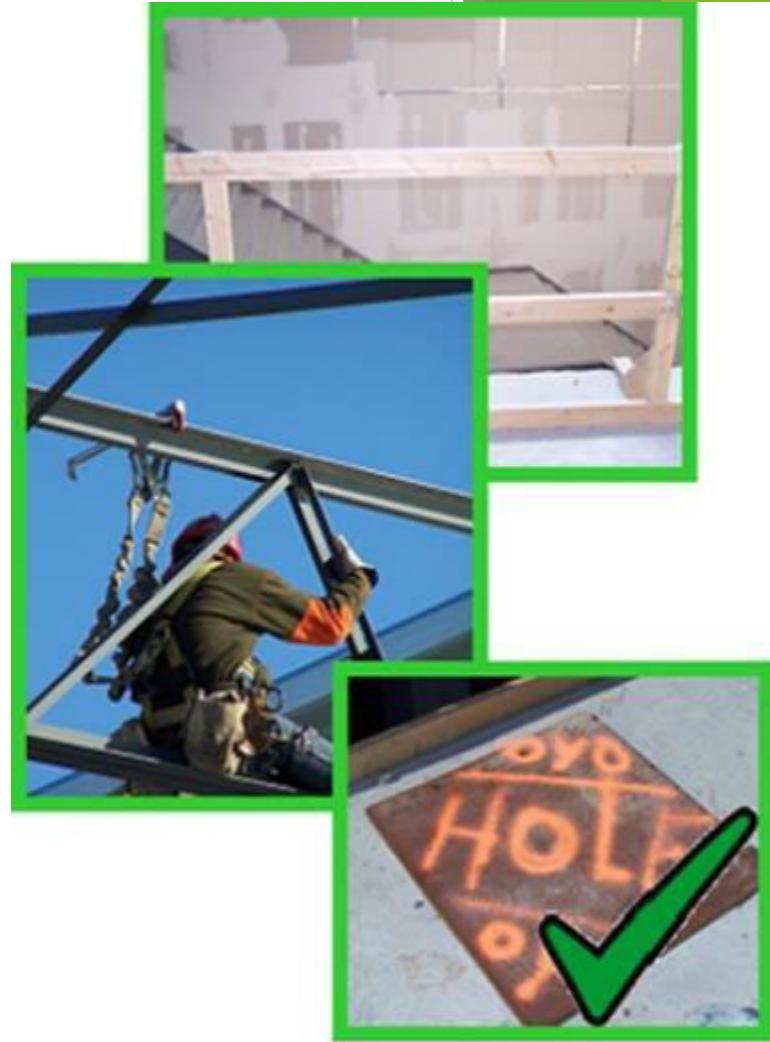
A willing, positive attitude towards safety will help make a safer work environment.



Preventing Fall Accidents

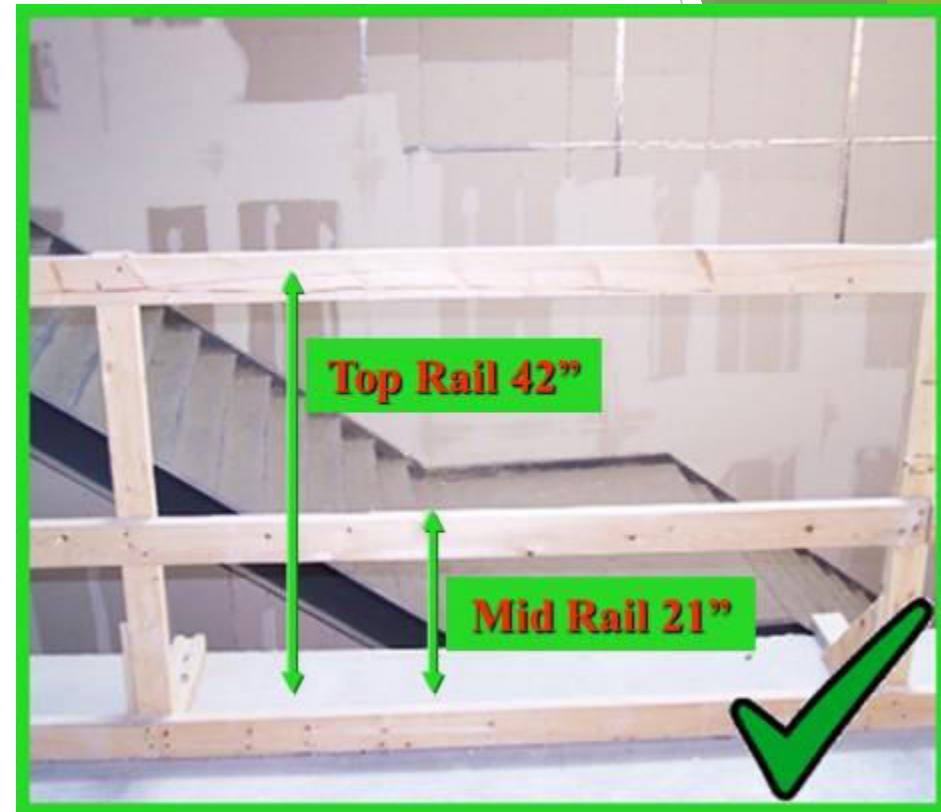
- Construction work performed at 6' or higher above a lower level requires fall protection.

- Some fall protection methods include:
 - Guardrails
 - Warning lines
 - Fall arrest systems and
 - Floor covers



Guardrails

- Guardrails must have a top rail, a mid rail and a toe board.
- The top rail must be at least 42" from the working surface.



Guardrails

- All guardrails must be constructed with a top rail and a mid rail.
- The top rail must support 200 lbs. of force downward and outward.



Guardrails

- Cable guardrails must meet the same rules as wood guardrails.
- The top rail must be at least 42" high and resist up to 200 lbs.



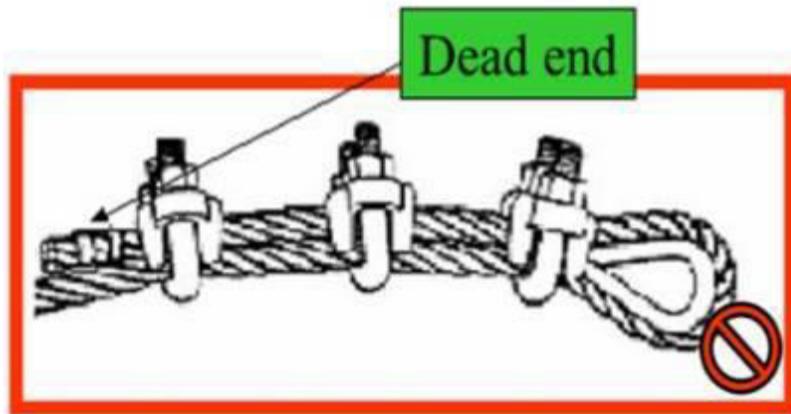
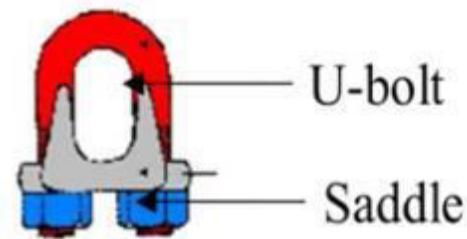
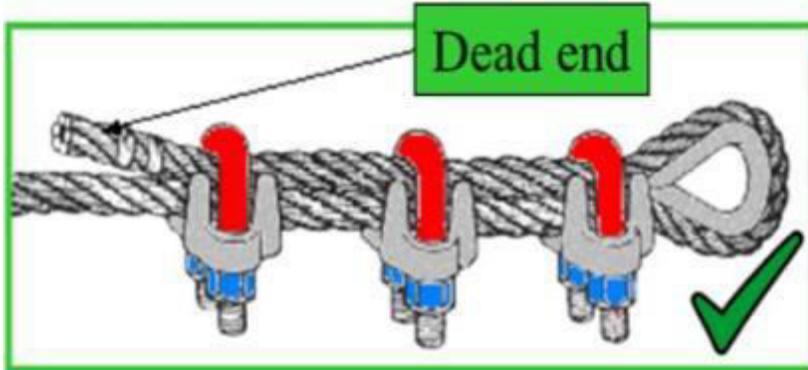
Cable Guardrails

Steel cable guardrails must have the top rail flagged every 6 feet.



Cable Guardrails

The clamps used for a steel cable system must be placed correctly.



Warning Lines

- Warning lines are used to keep workers away from an unsafe edge.
- The warning line must be at least 6' away from the edge.



Warning Lines

- Warning lines must withstand 16 lbs. of tipping force.
- The warning line must be at least 34" from the ground.



Warning Lines

- Warning lines must be maintained.
- Report any unsafe condition to your supervisor.



Warning Lines

Never work in an area if the warning line has been knocked down or damaged.



Personal Fall Arrest Systems

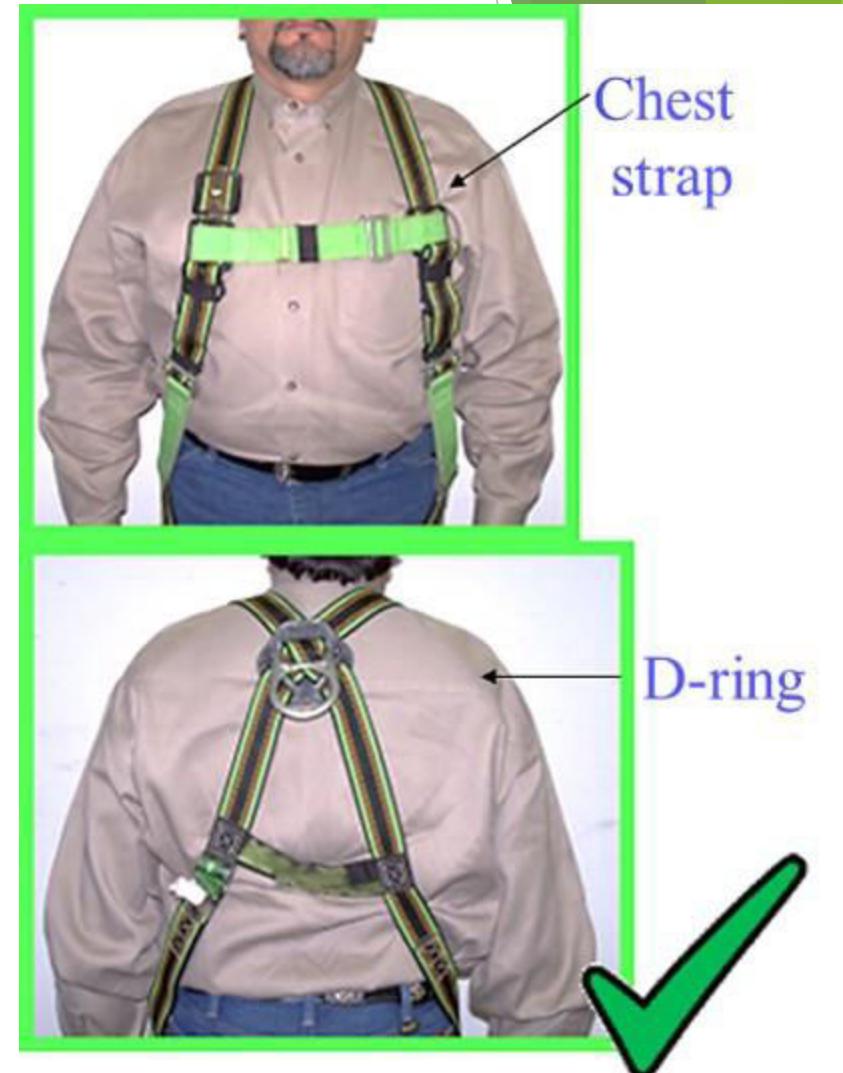
The fall arrest system components are:

- body harness,
- lanyard, and
- anchorage point



Personal Fall Arrest Systems

- Body harness must be worn properly.
- D-ring must rest between the shoulders and the chest strap must be secured.



Personal Fall Arrest Systems

Body harness
must be:

- inspected before use,
- adjusted to fit the worker, and
- free from other visible damage.



Personal Fall Arrest Systems

Lanyards must be in good condition and free from visible damage.



Personal Fall Arrest Systems

Lanyard must attach to the D-ring on the body harness.



Personal Fall Arrest Systems

Never anchor or tie off to pipes, wood structures, electrical wires, or other areas not designed for anchorage points.



Personal Fall Arrest Systems

- ❑ The anchorage point is the place where you tie off to or hook to.
- ❑ The anchorage point must support the force of a person falling.



Personal Fall Arrest Systems

A life line is used to allow a worker to stay tied off while he moves through the work area.



Personal Fall Arrest Systems

Workers must always be tied off when working with a personal fall arrest system.



Floor Covers

The cover must be marked to make sure everyone knows it is a safety device.



Floor Covers

All floor holes where an employee could fall through must be covered or guarded.



Floor Covers

- ❑ Sky-lights are another form of floor holes.
- ❑ Never sit, stand, or place any materials on sky-lights.



Floor Covers

- Pier holes must be guarded or protected.
- Either a guard rail system or floor hole cover can be used.



QUIZ



You will be presented with a specific accident prevention question to test your understanding of this material.

Question 1

While working in the construction industry, at what height is fall protection required?

- A. 4 feet
- B. 10 feet
- C. 6 feet
- D. 8 feet

Question 1

While working in the construction industry, at what height is fall protection required?

The correct answer is:

C – 6 feet

Question 2

Guardrails are designed to protect you from falling. The top rail must be inches high and be able to withstand pounds of force.

- A. 42 / 300
- B. 36 / 300
- C. 42 / 200
- D. 36 / 200

Question 2

Guardrails are designed to protect you from falling. The top rail must be inches high and be able to withstand pounds of force.

The correct answer is:

C - 42 / 200

Question 3

Guardrails can be made of wood or steel cables. When using steel cables the cable clamps must be placed:

- A. In alternating directions
- B. With the U-bolt on the dead end of the cable
- C. With the saddle on the dead end of the cable
- D. None of the above, clamps are not required

Question 3

Guardrails can be made of wood or steel cables. When using steel cables the cable clamps must be placed:

The correct answer is:

B – With the U-bolt on the dead end of the cable

Question 4

When inspecting a harness before using it, you should look for the following:

- A. Cuts/Abrasions
- B. Burns
- C. Other visible damage
- D. All the above

Question 4

When inspecting a harness before using it, you should look for the following:

The correct answer is:

D – All the above

Question 5

Floor holes can include which of the following:

- A. Pier holes, skylights and stair openings
- B. Pier holes, skylights and window openings
- C. Skylights, stair openings and doorways
- D. Skylights, stair openings and open sided floors

Question 5

Floor holes can include which of the following:

The correct answer is:

A – Pier holes, skylights and stair openings

Thank You For Attending!



Questions



**FALL PROTECTION
TRAINING
OSHA - SUSAN HARWOOD
TRAINING GRANT**

WELCOME

- Please sign the attendance sheet
- Take one handout
- Answer the pre-test

LOCATION

- Emergency Exits
- Emergency Stairs
- Location of restrooms
- Location of water fountains

DISCLAIMER

This material was produced under grant number SH-31201-SH7 from the Occupational Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U. S. Department of Labor, nor does mention of trade names, commercial products, or organizations imply endorsement by the U. S. Government.

AGENDA

- Welcome
- Introduction to OSHA
- Worker's rights
- Introduction to Fall Protection
 - Recognition of Fall Hazards
 - Basic Fall Prevention Principles
 - Basic Fall Protection Principles
 - Brief Review of Applicable Standards
- Break



AGENDA

- Controlling the Hazard
 - Hierarchy of Controls
 - Restrain
 - Components
 - Fall Clearance
 - Inspections
- Rescue
- Certificates



INTRODUCTION TO OSHA

Overview of anti-retaliation provisions, employee rights, employer responsibilities, whistleblower laws, and OSHA's complaint investigation procedures

WHY IS OSHA IMPORTANT TO YOU?

- OSHA began because, until 1970, there were no national laws for safety and health hazards.
- On average, 12 workers die every day from job injuries
- Worker deaths in America are down—on average, from about 38 worker deaths a day in 1970 to 12 a day in 2013.

• WORKER FATALITIES

- 4,836 workers were killed on the job in 2015
- Falls — 364 out of 937 total deaths in construction in CY 2015 (38.8%)

DISCUSSION QUESTIONS

- When, during your work experience, did you first hear about OSHA?
- What did you think about OSHA then?
- What do you think OSHA's job is?

HISTORY OF OSHA

- OSHA stands for the Occupational Safety and Health Administration, an agency of the U.S. Department of Labor
- OSHA's responsibility is worker safety and health protection
- On December 29, 1970, President Nixon signed the OSH Act
- This Act created OSHA, the agency, which formally came into being on April 28, 1971



OSHA'S MISSION

- To save lives
- To prevent injuries
- To protect America's workers



**Job Safety and Health
IT'S THE LAW!**

All workers have the right to:

- A safe workplace.
- Raise a safety or health concern with your employer or OSHA, or report a work-related injury or illness, without being retaliated against.
- Receive information and training on job hazards, including all hazardous substances in your workplace.
- Request an OSHA inspection of your workplace if you believe there are unsafe or unhealthy conditions. OSHA will keep your name confidential. You have the right to have a representative contact OSHA on your behalf.
- Participate (or have your representative participate) in an OSHA inspection and speak in private to the inspector.
- File a complaint with OSHA within 30 days (by phone, online or by mail) if you have been retaliated against for using your rights.
- See any OSHA citations issued to your employer.
- Request copies of your medical records, tests that measure hazards in the workplace, and the workplace injury and illness log.

This poster is available free from OSHA.

Employers must:

- Provide employees a workplace free from recognized hazards. It is illegal to retaliate against an employee for using any of their rights under the law, including raising a health and safety concern with you or with OSHA, or reporting a work-related injury or illness.
- Comply with all applicable OSHA standards.
- Report to OSHA all work-related fatalities within 8 hours, and all inpatient hospitalizations, amputations and losses of an eye within 24 hours.
- Provide required training to all workers in a language and vocabulary they can understand.
- Prominently display this poster in the workplace.
- Post OSHA citations at or near the place of the alleged violations.

FREE ASSISTANCE to identify and correct hazards is available to small and medium-sized employers, without citation or penalty, through OSHA-supported consultation programs in every state.

Contact OSHA. We can help.

1-800-321-OSHA (6742) • TTY 1-877-889-5627 • www.osha.gov



STRATEGIES TO REDUCE INJURIES AND DEATHS

- Strong, fair, and effective enforcement.
- Outreach, education, and compliance assistance.
- Partnerships and other cooperative programs.



Outreach Training Program

Construction General Industry Maritime Disaster Site

PARTNERSHIP
An OSHA Cooperative Program

Labels for hazardous substances in your workplace

HCS Pictograms and Hazards

Health Hazard  <ul style="list-style-type: none">• Carcinogen• Mutagenicity• Reproductive Toxicity• Respiratory Sensitizer• Target Organ Toxicity• Aspiration Toxicity	Flame  <ul style="list-style-type: none">• Flammables• Pyrophorics• Self-Heating• Emits Flammable Gas• Self-Reactives• Organic Peroxides	Exclamation Mark  <ul style="list-style-type: none">• Irritant (skin and eye)• Skin Sensitizer• Acute Toxicity (harmful)• Narcotic Effects• Respiratory Tract Irritant• Hazardous to Ozone Layer (Non-Mandatory)
Gas Cylinder  <ul style="list-style-type: none">• Gases Under Pressure	Corrosion  <ul style="list-style-type: none">• Skin Corrosion/ Burns• Eye Damage• Corrosive to Metals	Exploding Bomb  <ul style="list-style-type: none">• Explosives• Self-Reactives• Organic Peroxides
Flame Over Circle  <ul style="list-style-type: none">• Oxidizers	Environment (Non-Mandatory)  <ul style="list-style-type: none">• Aquatic Toxicity	Skull and Crossbones  <ul style="list-style-type: none">• Acute Toxicity (fatal or toxic)

Labels for a hazardous chemical must contain:

- Name, Address and Telephone Number
- Product Identifier
- Signal Word
- Hazard Statement(s)
- Precautionary Statement(s)
- Pictogram(s)

OSHA INSPECTIONS

- The OSH Act authorizes OSHA compliance safety and health officers (CSHOs) to conduct workplace inspections at reasonable times.
- OSHA conducts inspections without advance notice, except in rare circumstances (e.g. Imminent Danger)
- In fact, anyone who tells an employer about an OSHA inspection in advance can receive fines and a jail term.

INSPECTIONS PROCESS

- A typical OSHA on-site inspection includes four stages:
 1. Presentation of inspector credentials.
 2. An opening conference.
 3. An inspection walk-around.
 4. A closing conference.

OSHA'S INSPECTION PRIORITIES

Priority	Category of Inspection
1st	Imminent Danger: <i>Reasonable certainty an immediate danger exists</i>
2nd	Fatality/Catastrophe: <i>Reported to OSHA; inspected ASAP</i>
3rd	Complaints/Referrals: <i>Worker or worker representative can file a complaint about a safety or health hazard</i>
4th	Programmed Inspections: <i>Cover industries and employers with high injury and illness rates, specific hazards, or other exposures.</i>

OSHA'S COMPLAINT INVESTIGATIONS

- OSHA evaluates each complaint to determine how it can be handled best—an off-site investigation or an on-site inspection
- Before beginning an inspection, OSHA staff must be able to determine from the complaint that there are reasonable grounds to believe that a violation of an OSHA standard or a safety or health hazard exists.
- If OSHA has information indicating the employer is aware of the hazard and is correcting it, the agency may not conduct an inspection after obtaining the necessary documentation from the employer.

RIGHTS AS A WHISTLEBLOWER

- Employee may file a complain with OSHA under Section 11(c) if your employer retaliates against you by taking unfavorable personnel action because you engaged in protected activity relating to workplace safety and health.
- OSHA requires that complaints must be filed within 30 days after the alleged retaliation.

RIGHTS AS A WHISTLEBLOWER

- Your employer may be found to have retaliated against you if your protected activity was a contributing or motivating factor in its decision to take unfavorable personnel action against you. Such actions may include:
 - ✧ Firing or laying off
 - ✧ Blacklisting
 - ✧ Denying overtime or promotion
 - ✧ Disciplining
 - ✧ Denying benefits
 - ✧ Failing to hire or rehire
 - ✧ Intimidation
 - ✧ Reassignment affecting promotion prospects
 - ✧ Reducing pay or hour

QUESTIONS ABOUT OSHA?

INTRODUCTION TO FALL PROTECTION

OBJECTIVES

- Recognize, avoid and prevent fall hazards in construction
 - Identify major fall hazards
 - Describe types of fall hazards
 - Protect him/herself from fall hazards
 - Recognize employer requirements to protect workers from fall hazards

FALLS IN CONSTRUCTION

- Did you know?
Falls from elevation account for one third
of all deaths in construction.



FALLS IN CONSTRUCTION

- FALLS ARE THE LEADING CAUSE OF DEATH IN CONSTRUCTION.
- In 2015, there were 350 fatal falls to a lower level out of 937 construction fatalities (BLS data). These deaths are preventable.

FALLS IN CONSTRUCTION

- It is important that safety and health programs contain provisions to protect workers from falls on the job.
- The following hazards cause the most fall-related injuries:
 - Unprotected Sides, Wall Openings, and Floor Holes
 - Unguarded Protruding Steel Rebars
 - Improper Scaffold Construction
 - Misuse of Portable Ladders

OSHA REGULATIONS ON FALL PROTECTION

- ✓ **General Industry:**

Fall protection required when working at 4 feet above lower level

- ✓ **Construction Industry:**

Fall protection required when working at 6 feet above lower level

- Employer's operations will completely or mostly fall under one of the sectors listed and will follow their regulations.

OSHA'S FALL PREVENTION CAMPAIGN

PLAN

ahead to get the job done safely.

PROVIDE

the right equipment.

TRAIN

everyone to use the equipment safely.

OSHA'S FALL PREVENTION CAMPAIGN

PLAN ahead to get the job done safely

When working from heights, such as ladders, scaffolds, and roofs, employers must plan projects to ensure that the job is done safely.

PROVIDE the right equipment

Workers who are six feet or more above lower levels are at risk for serious injury or death if they should fall.

TRAIN everyone to use the equipment safely

Falls can be prevented when workers understand proper set-up and safe use of equipment.

ROOF SAFETY

- Employees must be trained to avoid fall hazards on a roof and properly use fall protection equipment-this includes safety measures like:
 - ✓ Make sure your harness fits and is not defective when using PFAS
 - ✓ Always stay connected/tie off
 - ✓ Ensure that all anchor points are safe
 - ✓ Protect all holes, openings and skylights
 - ✓ Don't sit or walk on skylights or other openings

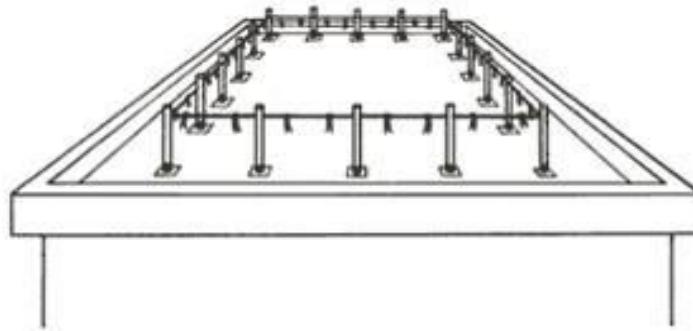
WARNING LINES – 1926 ROOFING

- 4-sided set of lines in-place to warn workers of edge hazard

- NOT a guardrail
- Distances from edge:

- ✓ **6'** - General
 - ✓ **10'** – “Mechanical Equipment”

- Permit work inside w/ no PFAS
- Points of access, materials handling areas, storage areas, and hoisting areas connected by access path formed by two warning lines
 - ✓ Rope / Wire / Chain Gate or “Other Barricade”
 - ✓ Offset Access



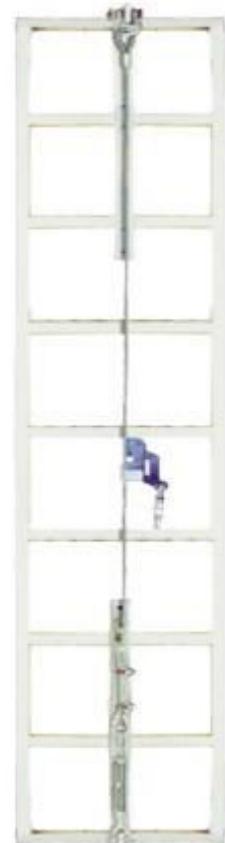
LADDER REGULATIONS

- Where are temporary ladder regulations found?
 - 1910 – Subpart D
 - 1926 – Subpart X
- Fall protection required?
 - Since both of these are regulations of their own, separate from those for fall protection, OSHA **does not** require a PFAS.
 - That said, the recommendation would be to use one whenever possible.



FIXED LADDERS

- OSHA requires F.P. on **fixed** ladders at the following heights:
 - 20' – Current Subpart D / 24' Proposed Subpart D
 - 24' – Construction
- Options for protection include:
 - Poor:** Cage / Well
 - Better:** SRL
 - Best:** Vertical Lifeline (VLL)
- VLL Components:
 - Flexible Cable / Rigid Rail
 - Rope / Cable / Bargrab



MISUSE OF PORTABLE LADDERS



No standing on the top step! Employee training on proper use of ladders will help prevent unsafe use.



Do not use! Ladders in need of repair must be taken out of service immediately or replaced.



Danger! The spreader isn't fully open (WAC 296-876-40050).



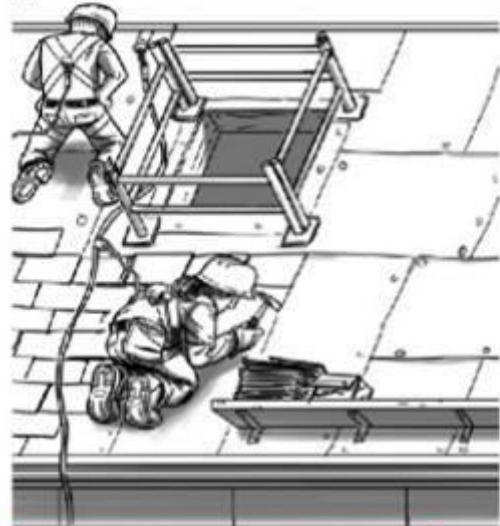
Ladder secured to roof.

This one seems properly inclined and secured

PLAN-PROVIDE-TRAIN

FALLS FROM ROOFS CAN BE PREVENTED!

- Wear a harness and always stay connected
- Make sure your harness fits
- Use guardrails or lifelines
- Inspect all fall protection equipment before use
- Guard or cover all holes, openings, and skylights



PLAN ahead to get the job done safely.
PROVIDE the right roof equipment.
TRAIN everyone to use the equipment safely.



CDC
Centers
for
Disease
Control
and
Prevention

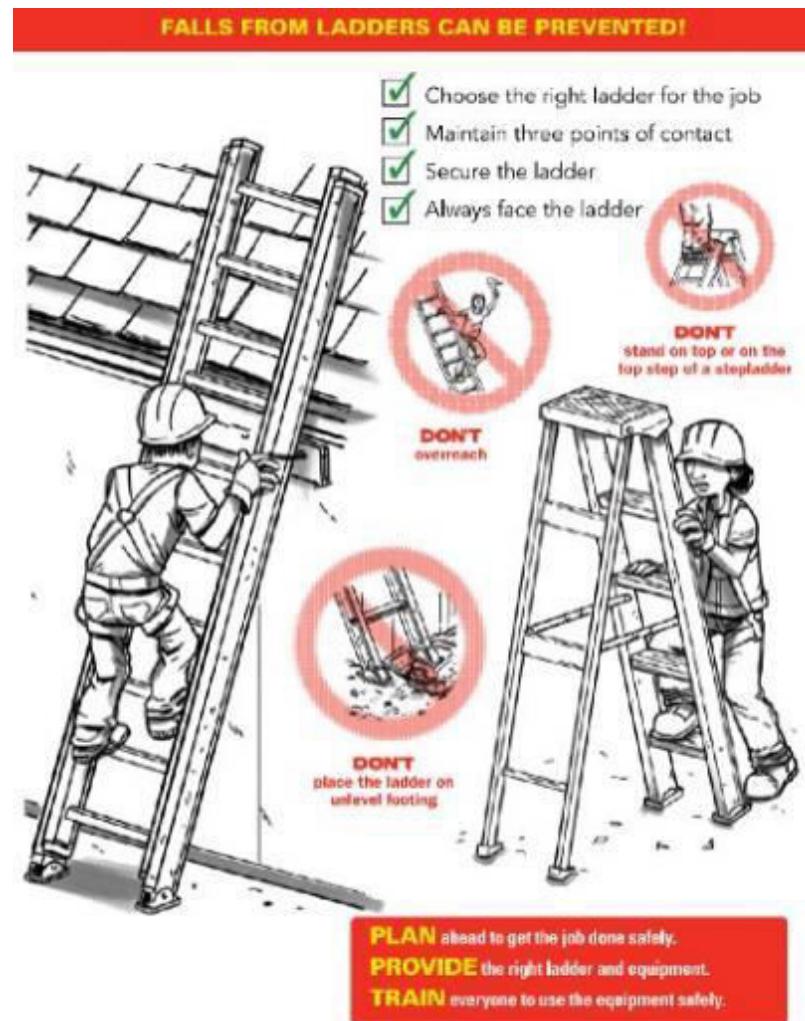
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PLAN-PROVIDE-TRAIN



PLAN-PROVIDE-TRAIN

FALLS FROM SCAFFOLDS CAN BE PREVENTED!

- Use fully planked scaffolds
- Ensure proper access to scaffold
- Plumb and level
- Complete ALL guardrails
- Ensure stable footing
- Inspect before use (by competent person)

DON'T use a ladder on top of a scaffold

DON'T stand on guardrails

DON'T climb cross-braces

PLAN ahead to get the job done safely.
PROVIDE the right scaffold and equipment.
TRAIN everyone to use the equipment safely.

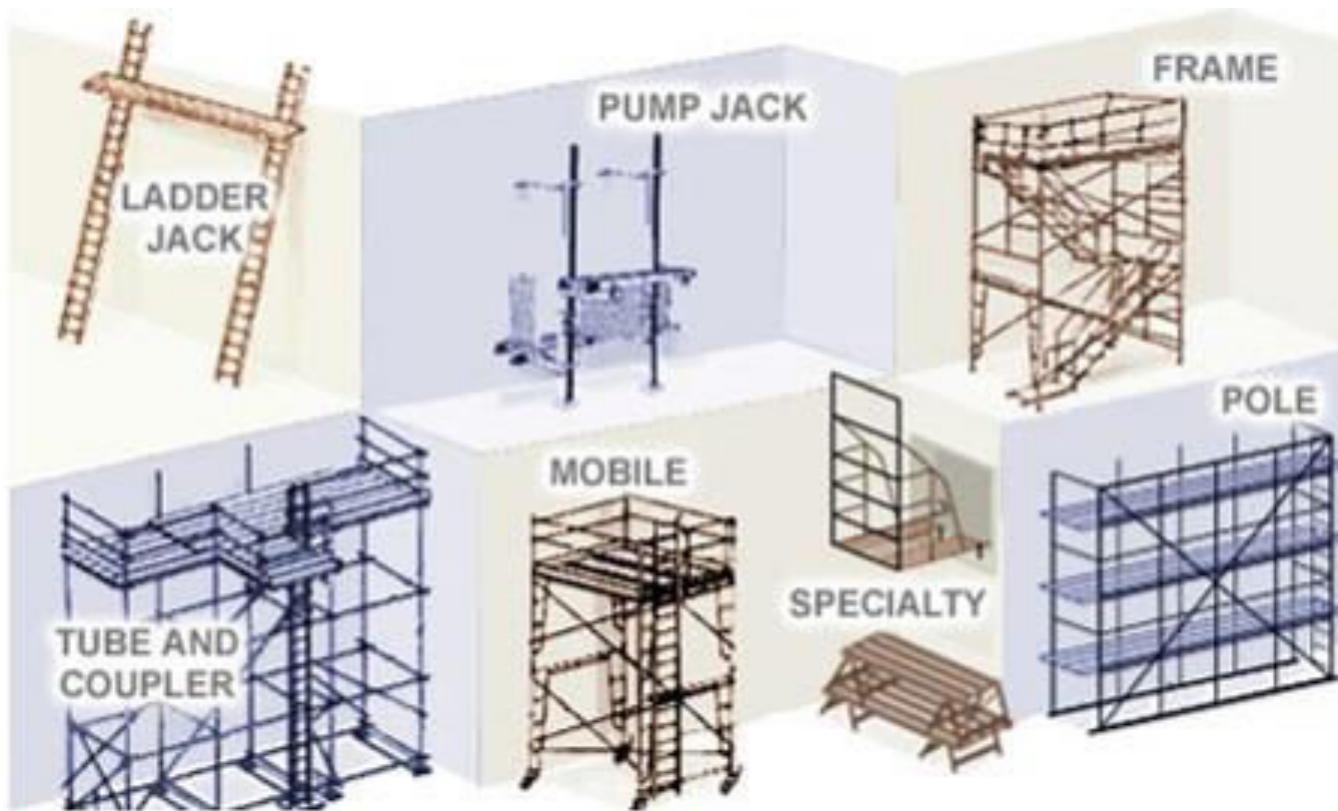
AERIAL LIFT FALL PROTECTION

- Is fall protection required?
- Where is the correct place to attach?
 - What about outside the basket?
 - Basket guardrails?
- Connector Options Hierarchy:
 - 1) Restraint Lanyard
 - 2) PFL
 - 3) Energy-Absorbing Lanyard
- General Prohibitions:
 - Moving large distances w/ the basket elevated
 - Standing on the basket guardrails



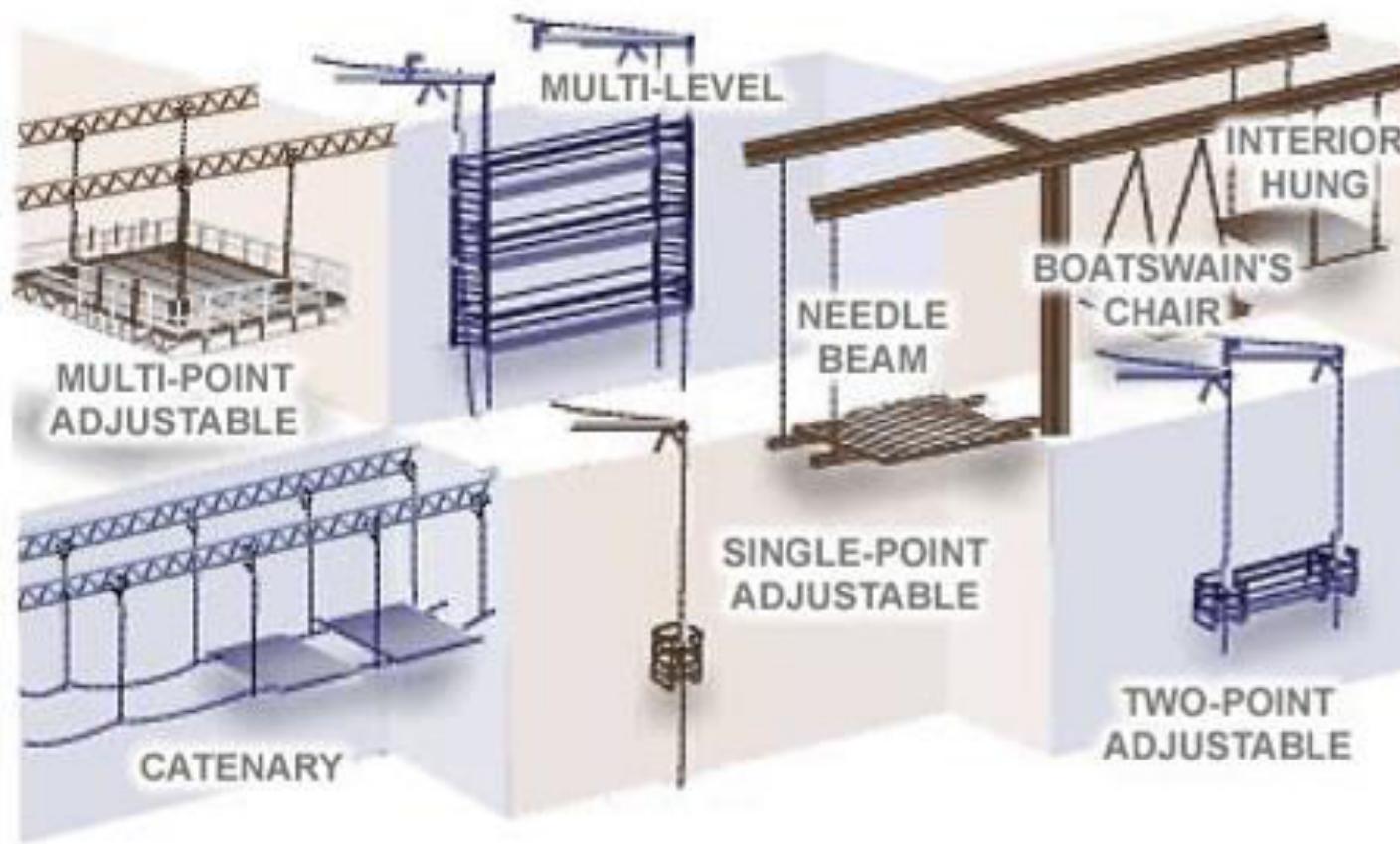
SCAFFOLD TYPES

Supported Scaffold



SCAFFOLD TYPES

Suspended Scaffold



SCAFFOLDS IN CONSTRUCTION

- Avoiding risks
 - Follow manufacturer's instructions.
 - Install guardrail systems along all open sides and ends of platforms.
 - Personal fall arrest system should be used on scaffolds higher than 10 feet.



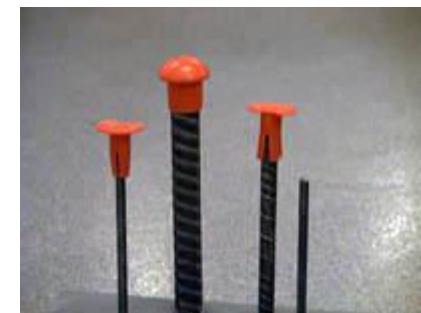
SCAFFOLDS IN CONSTRUCTION

- Falling objects
 - Wear hardhats
 - Barricade area below scaffold
 - Use panels or screens if material is stacked higher than the toe board.



REBAR CAPS

- The OSHA Standard requires that rebar "be guarded to eliminate the hazard of impalement." Not all guards provide that level of protection. In some circumstances, the force of a fall can cause rebar to push clear through a plastic cap and still impale a worker, or the worker can be impaled by the rebar and the cap together.



REBAR CAPS

- Only rebar caps designed to provide impalement protection, such as those containing steel reinforcement, should be used.
- This type of cap positions a 2 x 4 over the exposed rebar, and has been approved by California OSHA.



WHAT DOES FALL PREVENTION DO?

Catch The Fall



Fall Arrest

Safety Nets

Catch Platforms

Stop/Prevent The Fall



Restraint/Positioning

Guardrails

Warning Lines

Controlled Access Zones

Controlled Decking Zones

Safety Monitors

FALL PROTECTION DEFINITION

- Fall protection is a broad term that used to describe various types of equipment, [systems], and policies that help to minimize the potential for workers to be injured when managing tasks that are high above ground level. Companies often use a combination of safety equipment along with training personnel on how to use it.



RESULTS OF A FALL

- The average fatal fall is only 6 feet
- A 6' foot fall generates over 3,200 lb of force – that is the approximate weight of an average midsized car
- A fall from 10 feet has a 4 out of 5 probability of causing death or permanent injury
- A fall from 11 feet has an 8.5 out of 10 chance of causing death



FALL PREVENTION PLANNING

- A fall prevention plan identifies places where regular fall prevention methods, such as guardrails, cannot be used.
- These are called Controlled Access Zones.
- Safety monitoring system should be installed in Controlled Access Zones

OSHA REGULATIONS ON FALL PROTECTION

- ✓ **General Industry:**

Fall protection required when working at 4 feet above lower level

- ✓ **Construction Industry:**

Fall protection required when working at 6 feet above lower level

- Employer's operations will completely or mostly fall under one of the sectors listed and will follow their regulations.

FALL PREVENTION PLANNING

- Fall prevention systems and work practices must be in place before you start work.
- These must be prepared by a qualified person.
- Plan shall be maintained at the job site
- Qualified person should supervise the plan

Falls in Construction/Bridge Decking
[falls in construction bridge decking video](#)

AUTHORIZED PERSON

- Authorized Person:

A person approved or assigned by the employer to perform a specific type of duty or duties or to be at a specific location or locations at the jobsite.

- This is the “user” of the equipment.
- They know what they need to know in order to be able to perform their particular jobs



COMPETENT PERSON

Competent Person:

One who

- (1) is capable of identifying
 - [a] ***existing*** &
 - [b] ***predictable hazards*** in surroundings or work conditions which are unsanitary, hazardous, or dangerous to employees, and
- (2) who has ***authorization*** to take prompt corrective measures to eliminate them.



QUALIFIED PERSON

Qualified Person:

One who

(1) by possession of a

[i] *recognized degree,*

[ii] *certificate or*

[iii] *professional standing, or*

(2) who by extensive *knowledge, training, and experience*

has successfully demonstrated his ability to ***resolve problems*** relating to the subject matter, the work, or the project.



FALL HAZARD ANALYSIS

- Before finding a solution – the hazard must be evaluated.
- Use Hazard or Risk Prediction -- What are the conditions and behaviors to consider?
 - How will we get to the work area?
 - What are the hazards below the work area?
 - How high is the work area?
 - Are there holes or openings below or around the work area?
 - Are there slip or trip hazards around the work area?
 - How difficult is it to rescue someone if they fall?



FALL PROTECTION REQUIREMENT

- "Unprotected sides and edges." Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is **6 feet (1.8 m) or more** above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.
- On scaffolds, fall protection is required at 10 feet.

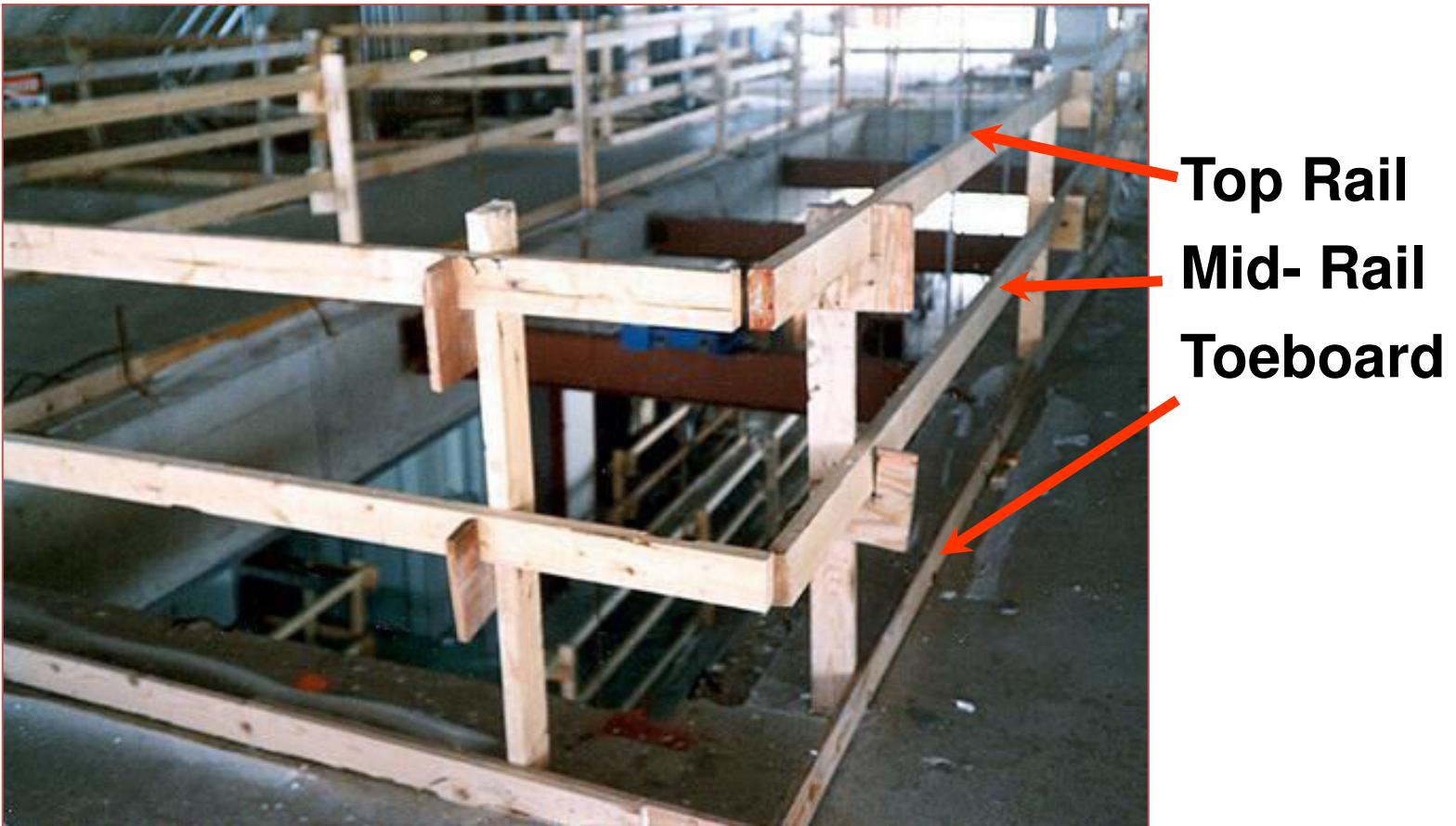
AVOIDING FALL HAZARDS

- Construct all floor hole covers so they will effectively support two times the weight of employees, equipment, and materials that may be imposed on the cover at any one time.
- **In general, it is better to use** fall prevention systems, such as **guardrails**, than fall protection systems, such as safety nets or fall arrest devices, because they provide more positive safety means.

GUARDRAILS

- **3 Components:**
 - (1) Top Rail
 - ✓ 42" or 42" +/- 3"
 - ✓ Strength?
 - (2) Mid Rail
 - ✓ Midway between top rail and ground (screens / mesh an option)
 - (3) Toe Board
 - ✓ Purpose? / Height?
- **Note:**
 - ✓ Rails shall not overhang (due to being a projection hazard).
 - ✓ No steel or plastic banding

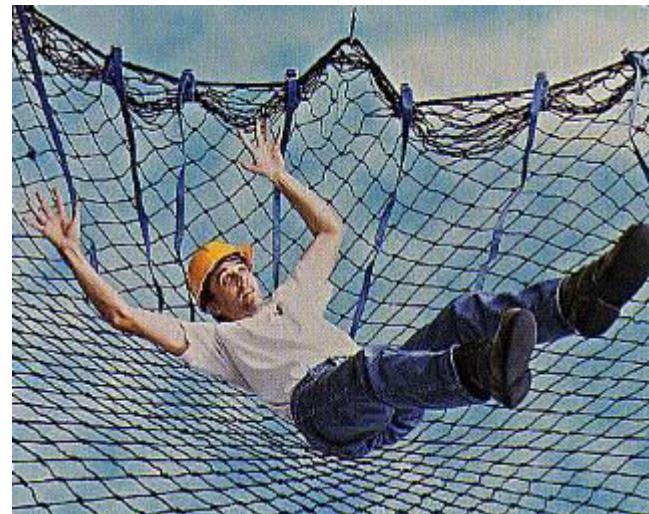
GUARDRAILS



- Top rails 42 +/- 3 in: between 39 and 45 inches tall
- Toe boards at least 3 1/2 inches high

USE OF SAFETY NETS

- Assumes the fall will occur



SAFETY NET SYSTEMS

- **Safety nets must be inspected** for wear, damage, and other deterioration at least once a week, and after any occurrence which could affect the integrity of the system.
- **Defective nets shall not be used**, and defective components must be removed from service.
- Objects which have fallen into the safety net, such as scrap pieces, equipment, and tools, must be removed as soon as possible from the net and at least before the next work shift.

SAFETY NETS

- Not a debris net
- This is meant to catch falling people.
- Form of collective and passive F.P.
- Sometimes used during work on bridge projects or pre-fab building construction



Safety Net in Residential Construction



SafetyRespect® Safety Net System

SKYLIGHTS & HOLES

- Skylights & Roof Floor Openings
 - Back / Trip into;
 - Step on weak area of roof;
 - Hole hidden by non-load-supporting covering
- Hole Covers:
 - Be able to support at least twice the load imposed upon them
 - Be secured to prevent accidental displacement

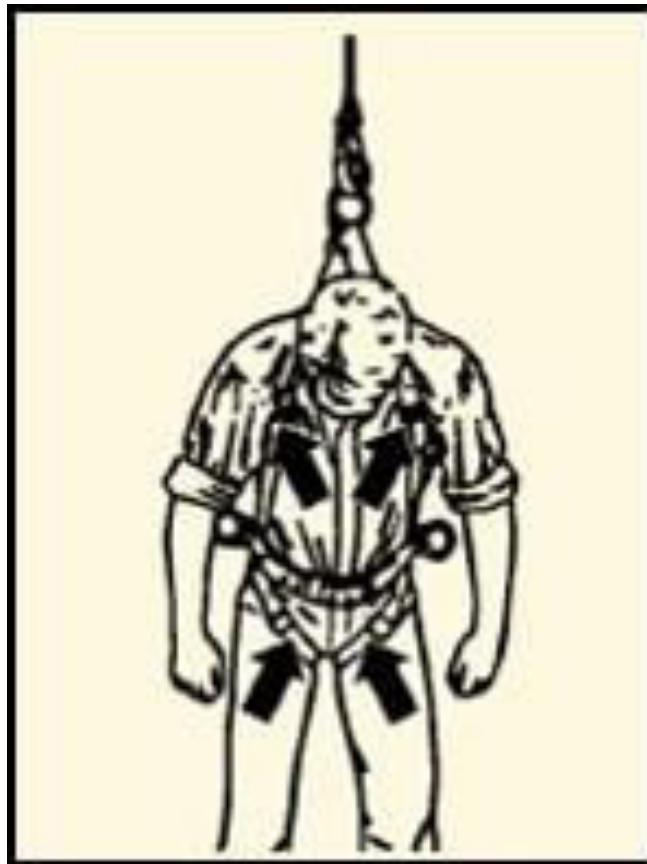


NIOSH FACE Skylight Fatality



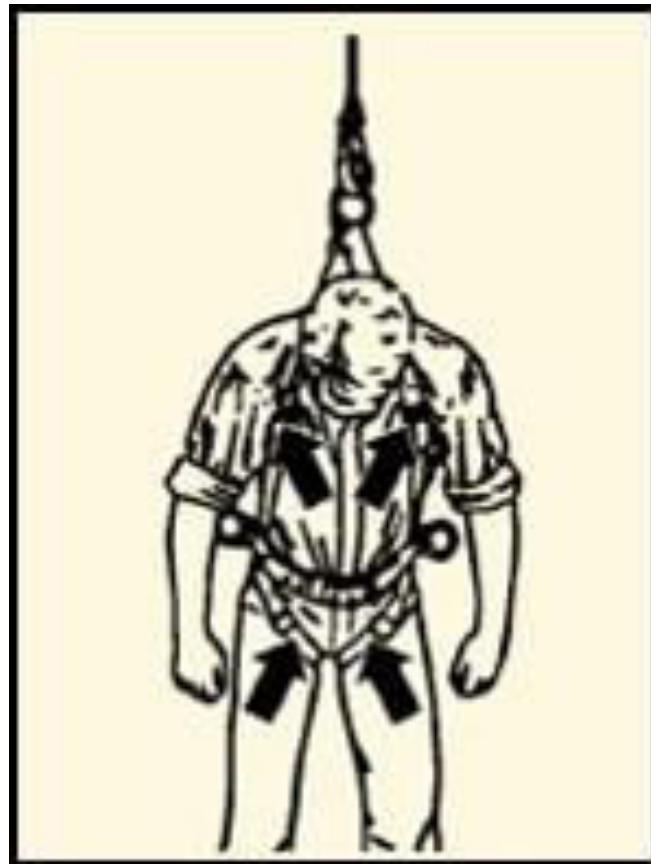
PERSONAL FALL ARREST SYSTEMS

Includes an anchor point, a lifeline, and a safety harness



PERSONAL FALL ARREST SYSTEMS

Once a Personal Fall Arrest System has been used in a fall, it must be removed from service right away.



ANCHORAGE POINT

- Secure location of attachment for the worker's F.P. gear:
- Typical “anchorage / anchor points” include:
 - Large Columns • Large Beams • Concrete • Roof Panel / Understructure
- OSHA Anchorage Requirements:
 - Option A: 5,000 lbs.
 - Option B: Safety Factor of 2 per a Q.P.



TEMPORARY ANCHORAGE CONNECTORS



Anchorage Connector Straps / Chain



Workman® FP Stryder™



Workman Reusable Roof Anchor



Removable Concrete Anchorage Connectors

PERMANENT ANCHORAGE CONNECTORS



D-Plate Anchorage Connector / MEGA Swivel



Fixed Roof Anchor



Weld-On Puck



BeamGlide™ Trolley

CONNECTORS



Connectors



D- Rings

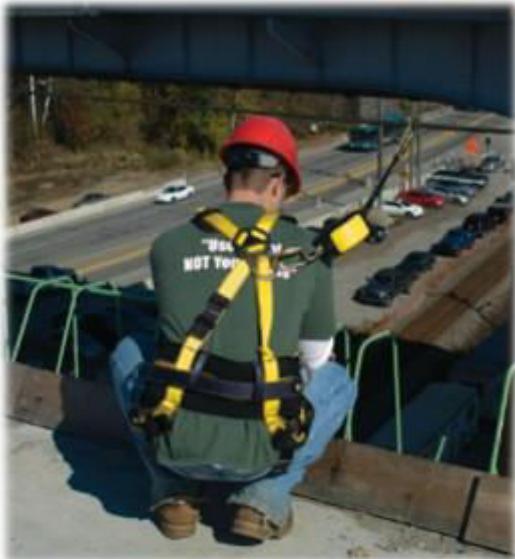


Snaphooks

CONNECTING DEVICES

Self-Retracting Lifelines

- Drum-wound line is slowly extracted from or retracted back into the housing in normal use
- Like a car seatbelt, locking off in a fall



PFL

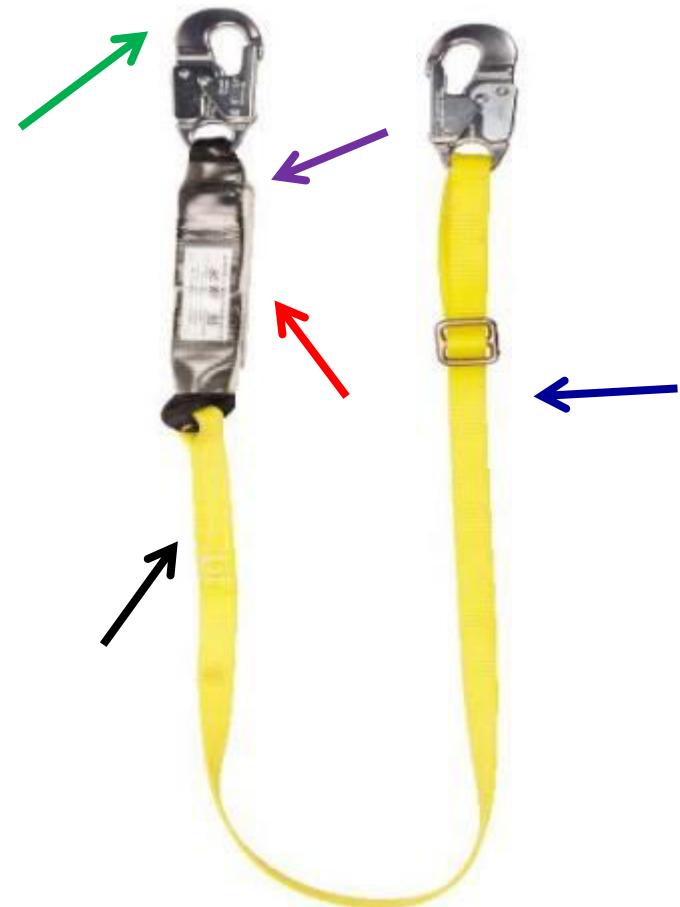


Web SRL



LANYARDS

- Inspections should be recorded in log
 - If past prescribed inspection interval, mark as “unusable.”
 - Many inspection points are similar to those on a harness.
- Lanyard Inspection Points:
 - **Hardware**
 - **Energy-Absorber**
 - **Webbing**
 - **Tags**
 - **Stitching**

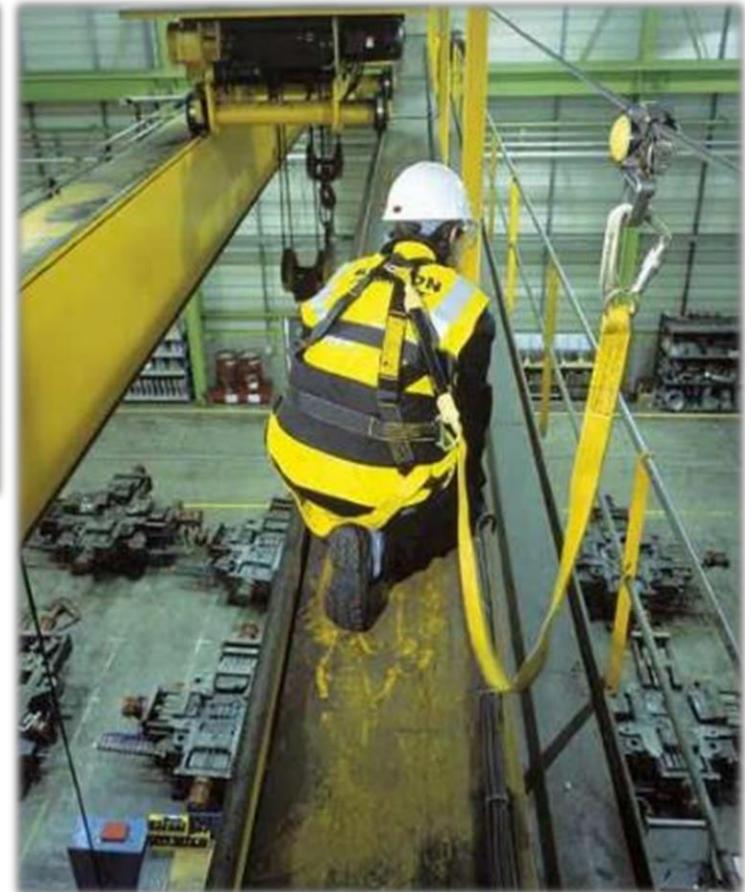


SELF RETRACTABLE LINES

- **Snaphook or Carabiner (2)**
 - No cracks, breaks, bends, corrosion
 - Check functionality.
- **Load Indicator**
 - A broken indicator indicates fall force exposure.
- **Housing**
 - No breaks or deformation that affects operation
- **Labeling**
 - Must be present and legible
- **Lifeline (Web or Cable)**
 - Check entire length of line with gloves and cloth.
 - Check retraction of lifeline.
 - Check lock-off of device.

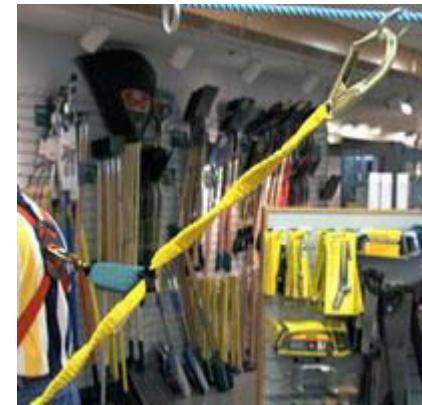


PERMANENT HORIZONTAL LIFELINES (HLLS)



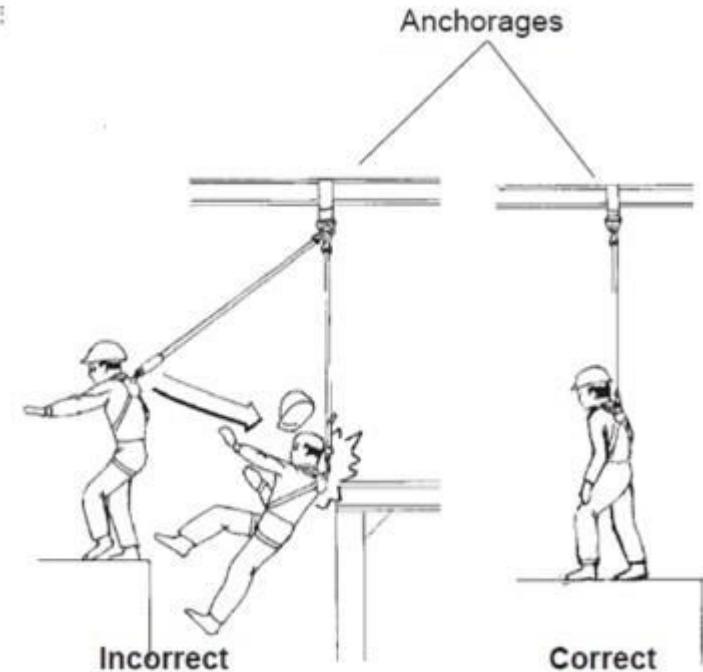
- Designed by a Qualified Person
- No. of workers per system?
 - Limits on # per span
- Systems
 - Specially Engineered

VERTICAL LIFELINE/LANYARD



ANCHORAGE POINT

- Other considerations include:
 - **Location:**
 - ✓ Above
 - ✓ Vertically inline with the worker
 - **Rescue:**
 - ✓ What does OSHA say about how quickly rescue must take place?
 - ❖ “Prompt”



Note: Although the picture demonstrates a lanyard, this is a common issue when utilizing self-retracting lifelines (SRLs).



BODY HARNESS



PFAS INSPECTION



WEBBING

- Webbing are the ropes and straps used in lifelines, lanyards, and strength components of body harnesses. The webbing must be made from synthetic fibers.



CONNECTING DEVICES



Anchorage Connector Straps / Chain



Workman® FP Stryder™

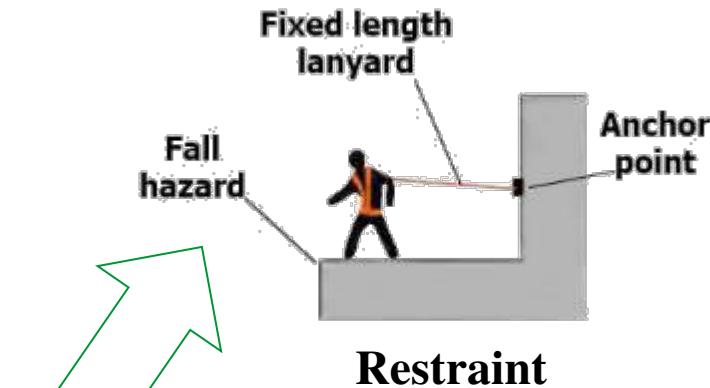
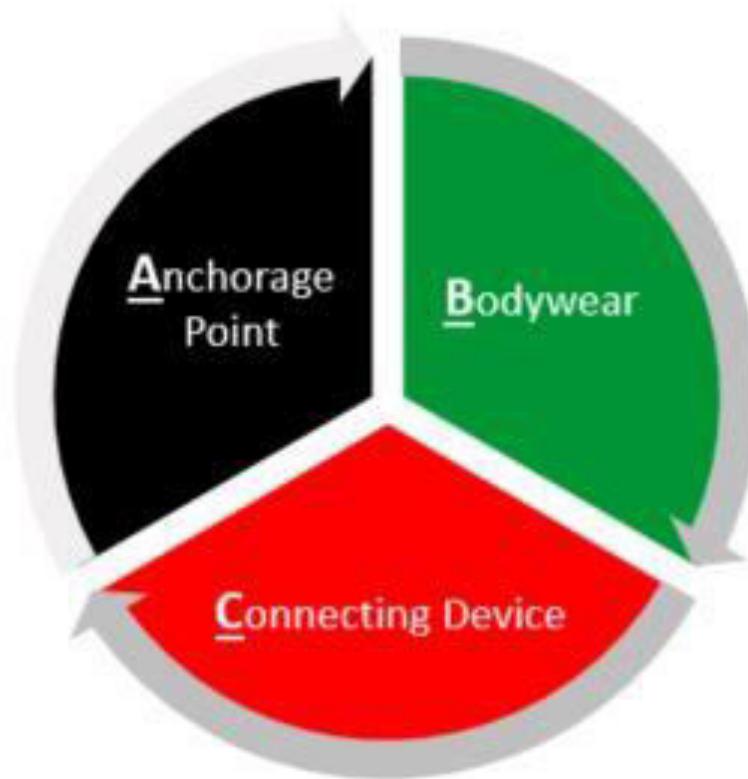


Workman Reusable Roof Anchor



Removable Concrete Anchorage Connectors

PERSONAL FALL PROTECTION SYSTEM

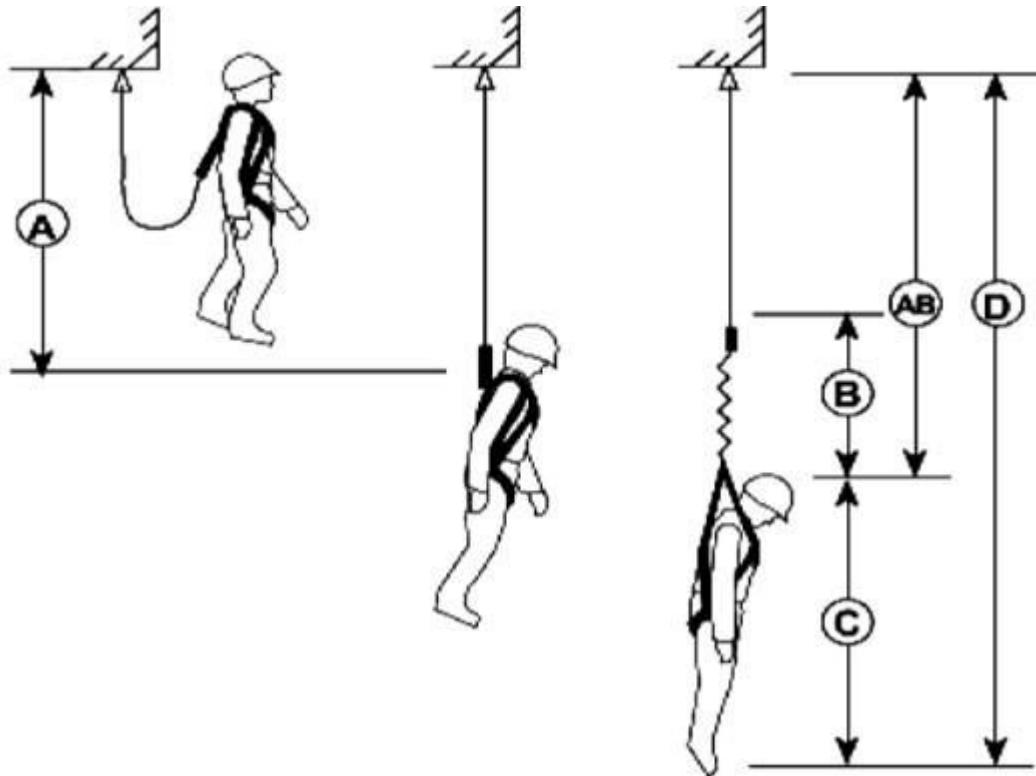


Restraint



Positioning

FALL CLEARANCE - LANYARD



A = 6 Feet (1.83 m)

B = 3 ½ Feet (1.07 m)

AB = 9 ½ Feet (2.9 m)

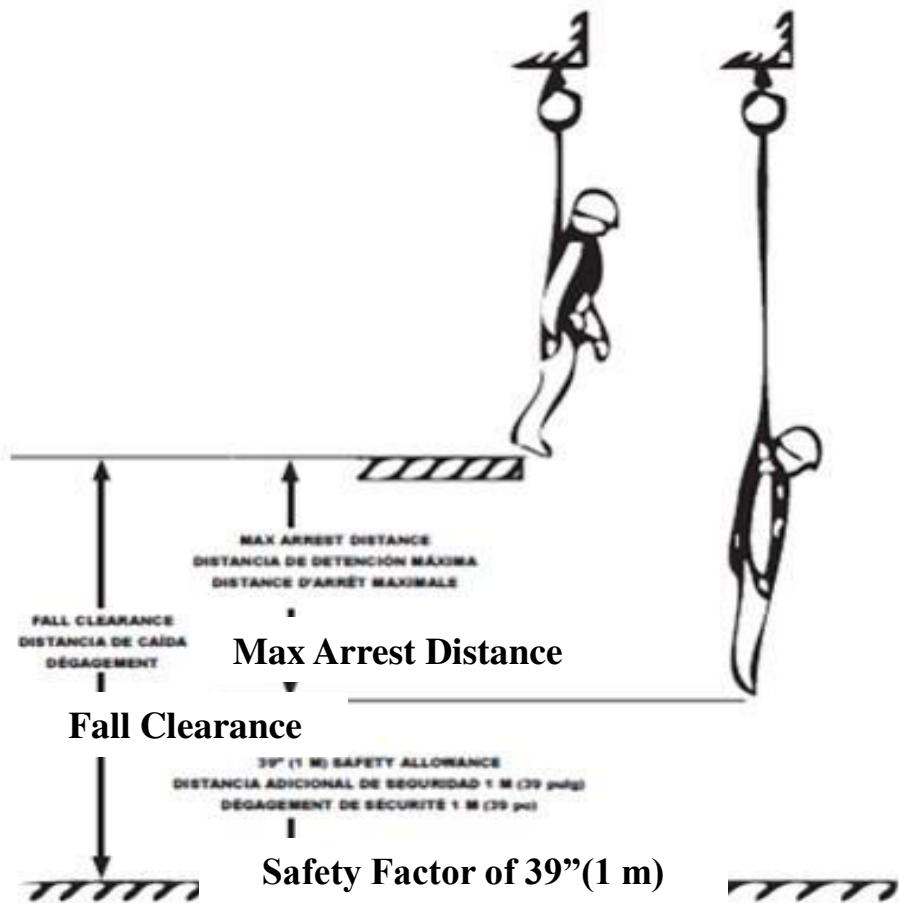
C = 6 Feet (1.82 m)

+ 3 (0.9m) Safety Margin

D = 18 ½ Feet (5.33 m)

Safety Margin: 3'

FALL CLEARANCE - SRL



A Typical Example

MAD = 4 ½ Feet (1.37 m)

+ 39" (1 m) Safety Margin

D = 7'9" Feet (2.4 m)

FALL PROTECTION - RESCUE PLAN

- Each time PPE is used, there must be a rescue plan!
 - You must be able to rescue someone in a minimum amount of time.
 - Identify the normal conditions and allowances.
 - Define the plan during the Hazard and Risk Prediction.



RESCUE EQUIPMENT

- Rescue Cradle
 - Person is rescued in a physically neutral position.
- Full Body Harness
 - May be different
 - Allows longer suspension
- Anthron
 - Self-Rescue
 - Great in a panic
- Rescue Equipment Kits
 - Rescue Utility Set
- Rescue Hoist
 - Confined Space Application
 - Able to reset



FALL RESCUE PROCEDURES

- Manage the people needed to operate the rescue equipment
- Protect rescue personnel during rescue operations
- Emergency medical technicians should give first aid if needed.
- The fall prevention plan must include provisions for quick rescue.



QUESTIONS?



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SUPPORTING MATERIAL

WHAT IS A FALL HAZARD?

❑ Types of Fall Hazards:

- ❑ Falls to a lower level
- ❑ Falls to the same level
- ❑ Slips & trips
- ❑ Falls from ladders
- ❑ Falls from scaffolds
- ❑ Falls from roofs
- ❑ Falls from equipment



UNPROTECTED SIDES, WALL OPENINGS, AND FLOOR HOLES

- Almost all sites have unprotected sides and edges, wall openings, or floor holes at some point during construction. If these sides and openings are not protected at your site, injuries from falls or falling objects may result, ranging from sprains and concussions to death.

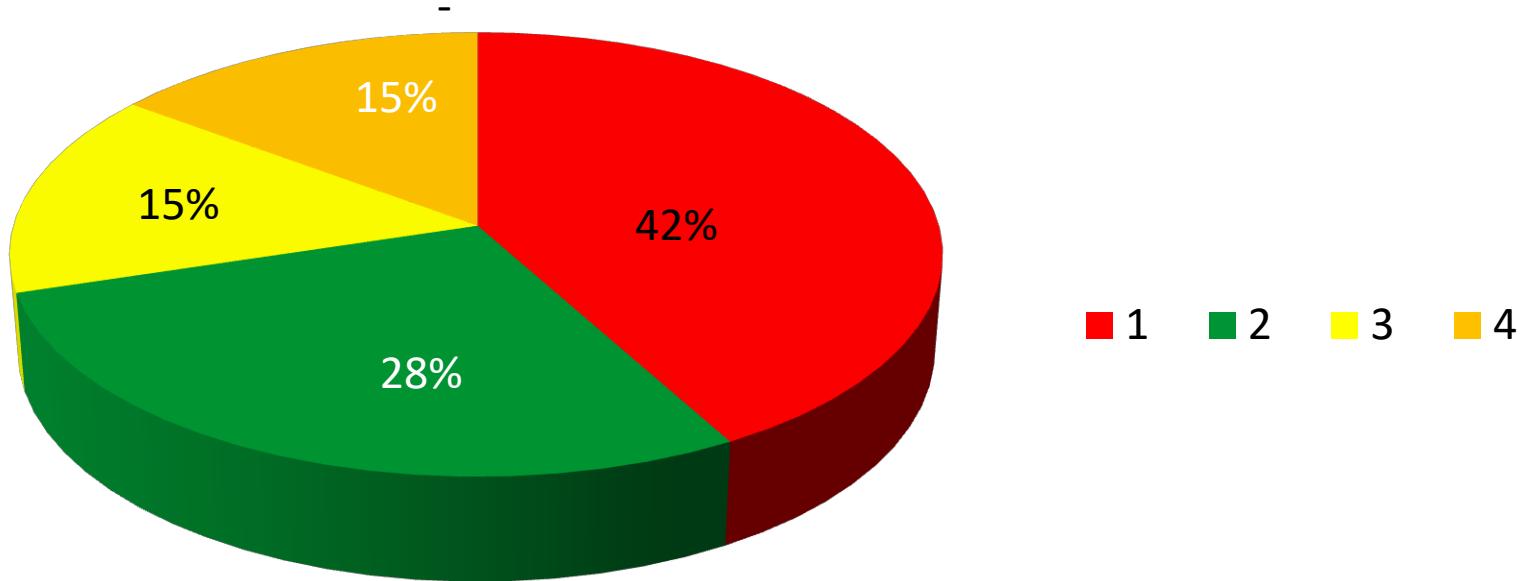
A FALL WITH A 1.8 M (6 FT) LANYARD

<u>Time</u>	<u>Physical Response</u>	<u>Free-Fall Distance</u>	<u>Velocity</u>
0.1 sec	Unaware	5.1 cm (2 in)	1.0 m/s (3.3 ft/s)
0.2 sec	Aware	20.3 cm (8 in)	2.13 m/s (7 ft/s)
0.5 sec	Start to Move	1.22 m (4 ft)	4.88 m/s (16 ft/s)
0.61 sec	Slight Movement	1.83 m (6 ft)	5.97 m/s (19.6 ft/s)
0.7 sec	Impact	2.41 m (7.9 ft)	7.01 m/s (23 ft/s)
0.9 sec	Rebound	3.96 m (13 ft)	8.84 m/s (29 ft/s)
1.0 sec	Suspend	4.9 m (16 ft)	9.75 m/s (32 ft/s)

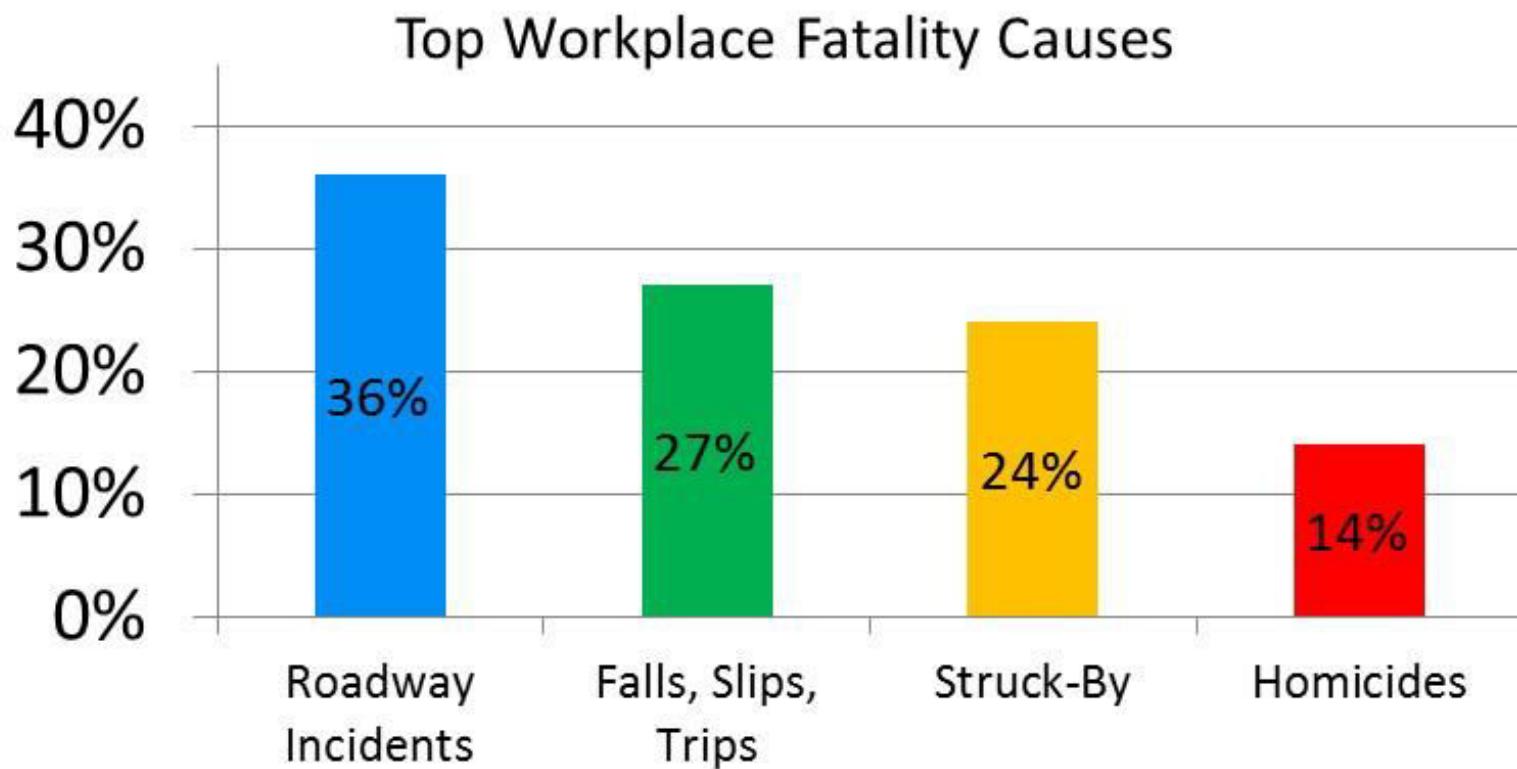


DISABLING INJURIES

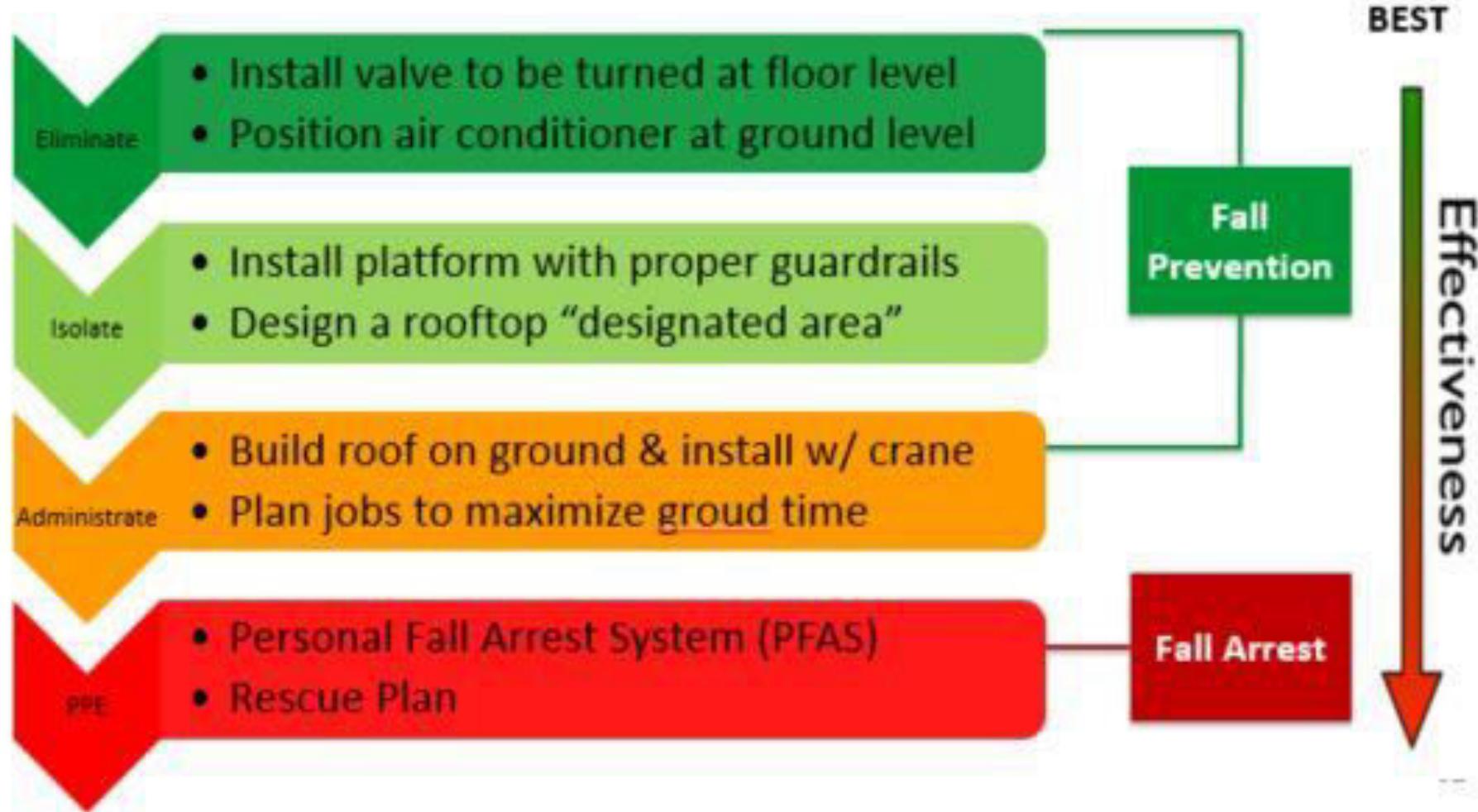
Top 4 Disabling Injuries 2016
Liberty Mutual Workplace Safety Index



WORKPLACE FATALITIES



HIERARCHY OF CONTROLS





Guardrails



Safety Nets



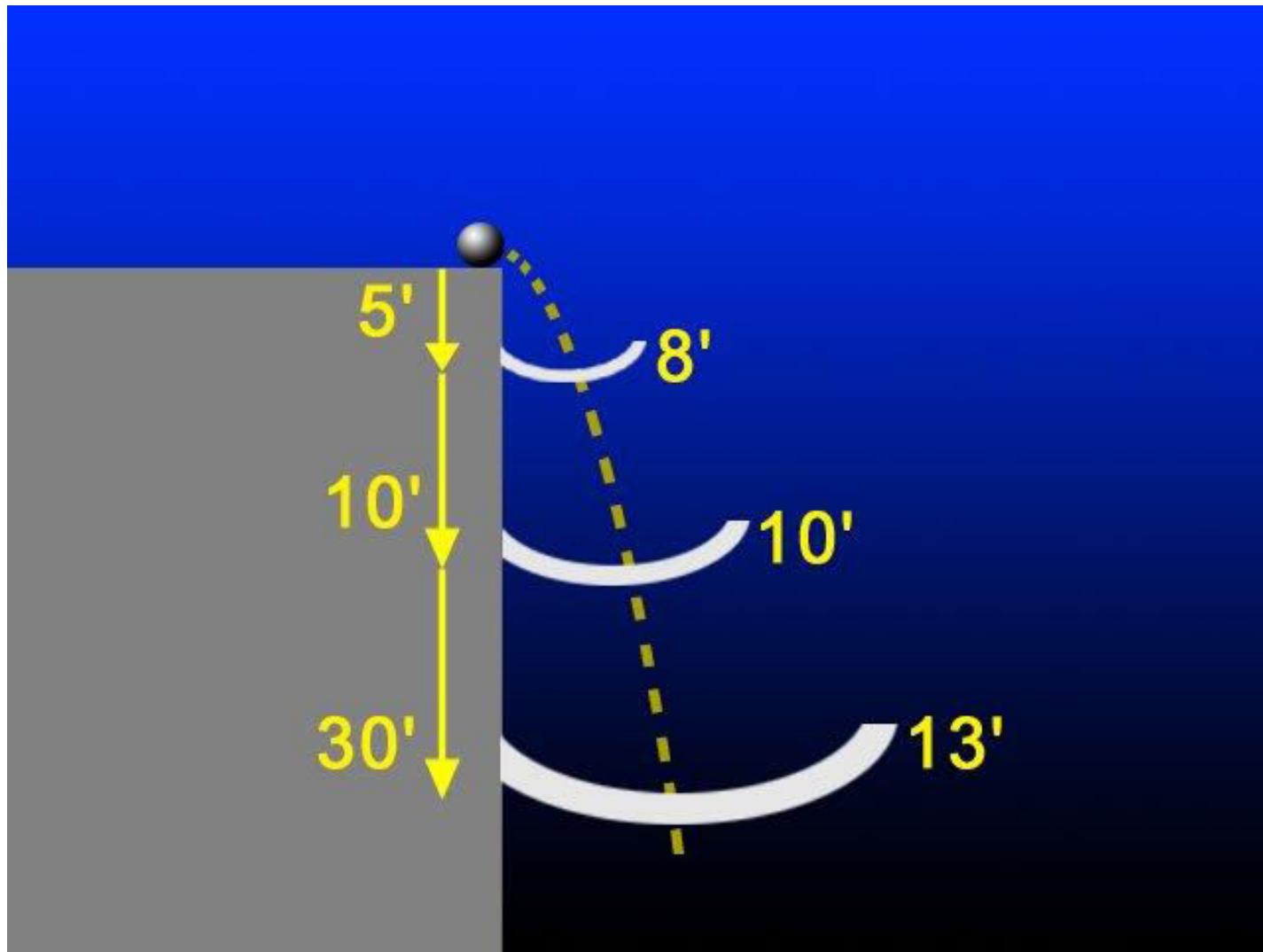
P.F.A.S.

FALL HAZARD ANALYSIS

- Before finding a solution – the hazard must be evaluated.
- Use Hazard or Risk Prediction -- What are the conditions and behaviors to consider?
 - How will we get to the work area?
 - What are the hazards below the work area?
 - How high is the work area?
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 - Are there slip or trip hazards around the work area?
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SAFETY NETS



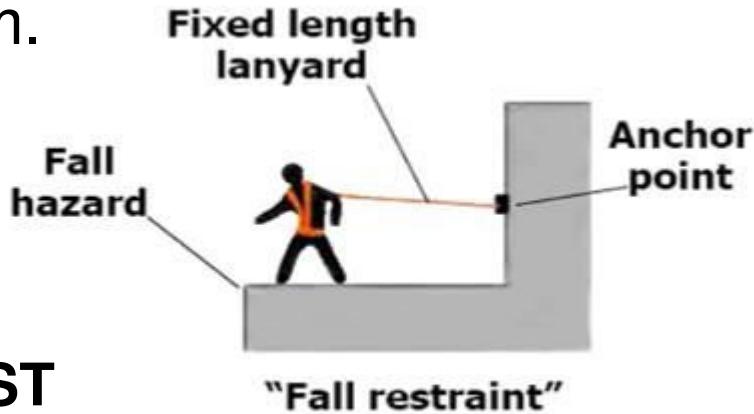
FALL PREVENTION OPTIONS

- Platforms and Railings
- Lifts
- Scaffolding
- Ladders
- Fall Restraint Systems
- Mobile Stairs



COMMONLY USED TERMS

- **FALL RESTRAIN**
 - Prevents people from reaching a fall hazard through a tie off system.



- **FALL ARREST**
 - Stops a fall that is in progress through a tie off system.



PERSONAL FALL ARREST SYSTEMS

- Ensure that personal fall arrest systems will, when stopping a fall:
 - Limit maximum arresting force to 1,800 pounds.
 - Be rigged such that an employee can neither free fall more than 6 feet nor contact any lower level.
 - Bring an employee to a complete stop and limit maximum deceleration distance to 3½ feet.
 - Have sufficient strength to withstand twice the potential impact energy of a worker free falling a distance of 6 feet, or the free fall distance permitted by the system, whichever is less

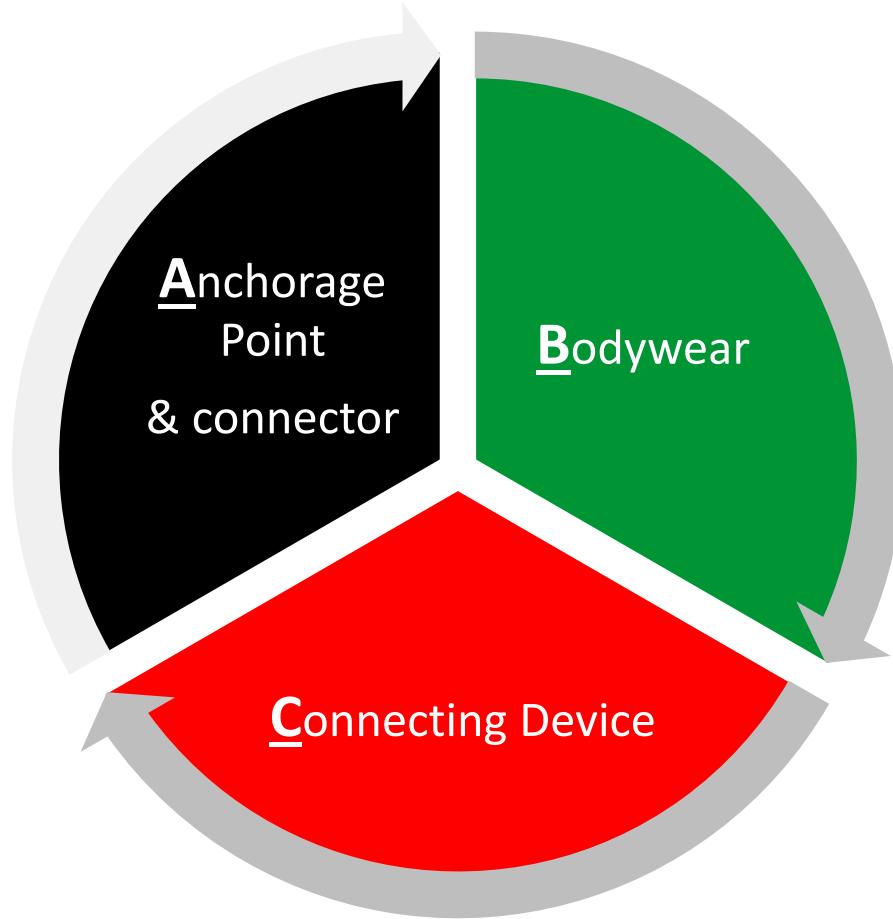
PERSONAL FALL ARREST SYSTEMS

- Remove systems and components from service immediately if they have been subjected to fall impact, until inspected by a competent person and deemed undamaged and suitable for use.
- Promptly rescue employees in the event of a fall, or assure that they are able to rescue themselves.
- Inspect systems before each use for wear, damage, and other deterioration, and remove defective components from service.

PERSONAL FALL ARREST SYSTEM

- Do not attach fall arrest systems to guardrail systems or hoists.
- Rig fall arrest systems to allow movement of the worker only as far as the edge of the walking/working surface, when used at hoist areas.

PERSONAL FALL ARREST SYSTEM



Rescue

ATTACHMENT LOCATION

- The attachment of the body harness must be located in the center of the wearer's back, near the shoulder level, or above the head.



BODY HARNESS

- Body harnesses are designed to minimize stress forces on an employee's body in the event of a fall, while providing sufficient freedom of movement to allow work to be performed.
- Do not use body harnesses to hoist materials.

CONNECTING DEVICES

Self-Retracting Lifelines

- Drum-wound line is slowly extracted from or retracted back into the housing in normal use
- Like a car seatbelt, locking off in a fall



PFL



Web SRL



ANSI Z359.14 – 2014

- **Class A SRL**

- “Maximum Arrest Distance” = 24”
- Average Arrest Force = 1,350 lb. (1,800 lb. peak)



- **Class B SRL**

- “Maximum Arrest Distance” = 54”
- Average Arrest Force = 900 lb. (1,800 lb. peak)



- **“Leading Edge” (LE-SRL)**

- Inline energy absorber at attachment end to user's back
- Specifically tested for going over sharp edges



- **Factory Recertification**

- Based on frequency of use from date of service



HORIZONTAL LIFELINE

- Horizontal lifelines are to be designed, installed, and used under the supervision of a qualified person, and as part of a complete personal fall arrest system which maintains a safety factor of at least two.
- On suspended scaffolds or similar working platforms with horizontal lifelines that may become vertical lifelines, the devices used to connect to a horizontal lifeline must be capable of locking in both directions on the lifeline.

LADDER SAFETY

- Employees must be trained to properly use a ladder- this includes safety measures like:
- Maintain three points of contact
- Place the ladder on level footing
- Always face the ladder
- Secure the ladder by locking the metal braces at the center of the ladder
- Don't overreach
- Don't walk the ladder

MISUSE OF PORTABLE LADDERS

- You risk falling if portable ladders are not safely positioned each time they are used. While you are on a ladder, it may move and slip from its supports. You can also lose your balance while getting on or off an unsteady ladder. Falls from ladders can cause injuries ranging from sprains to death.

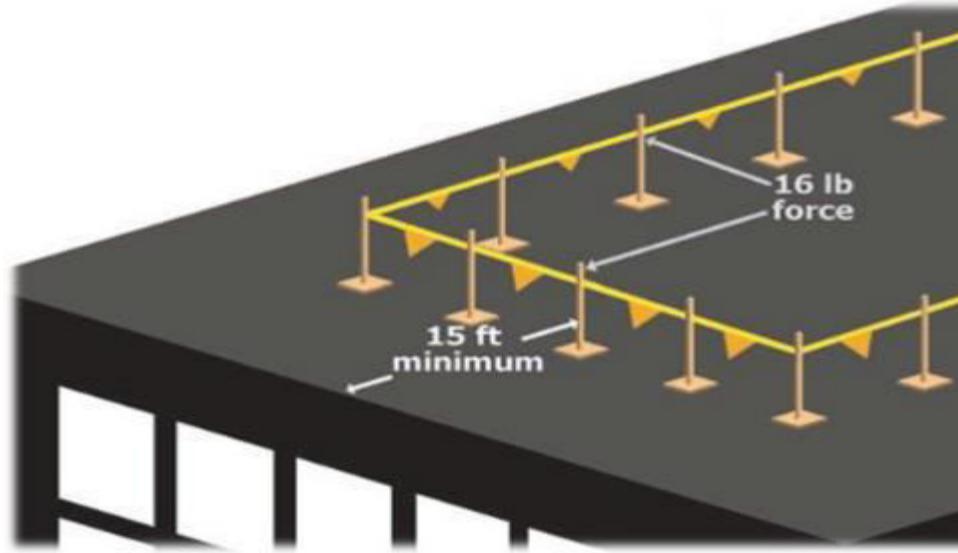
MISUSE OF PORTABLE LADDERS

- **Position portable ladders so the side rails extend at least 3 feet above the landing.**
- Secure side rails at the top to a rigid support and use a grab device when 3 foot extension is not possible.
- Make sure that the weight on the ladder will not cause it to slip off its support.
- Before each use inspect ladders for cracked or broken parts such as rungs, steps, side rails, feet and locking components.
- Do not apply more weight on the ladder than it is designed to support [For additional information, see Ladder Safety].
- Use only ladders that comply with OSHA design standards [29 CFR 1926.1053(a)(1)].

[link to OSHA Publication about portable ladder](#)

WARNING LINES – 1926 NON-ROOFING

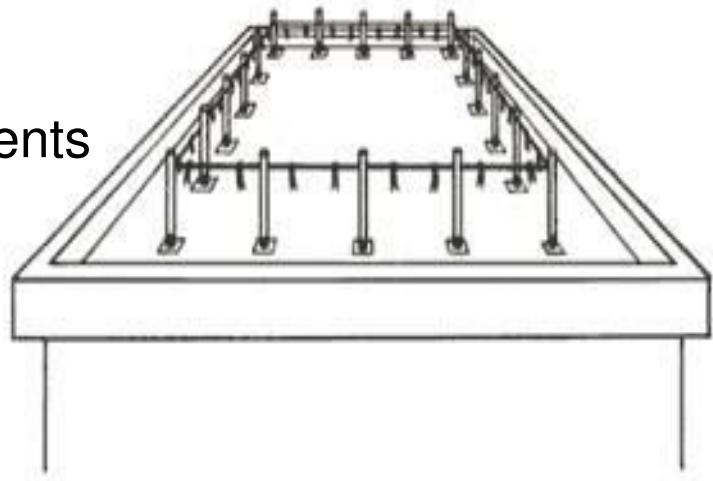
- Originally *just* for roofers doing roofing work
 - May 12th, 2000 LOI permitted use for other activities, with restrictions



“Fall Protection Myths and Misconceptions: Working Within the OSHA System”

DESIGNATED AREA - 1910

- 4-sided set of lines in-place to warn workers of edge hazard
 - Permitted, in 2003, by P. Subpart D
 - ✓ “De Minimis Violation”
 - ✓ Work must be of “temp. nature”
 - Permit work inside w/ no PFAS
 - Most rules mirror 1926 requirements
 - Distances?



G.I. “Maintenance Work”

CONNECTORS

- Connectors, including D-rings and snap hooks, must be made from drop-forged, pressed or formed steel, or equivalent materials. They must have a corrosion-resistant finish, with smooth surfaces and edges to prevent damage to connecting parts of the system.
- D-Rings must have a minimum tensile strength of 5,000 pounds, and be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or becoming permanently deformed.

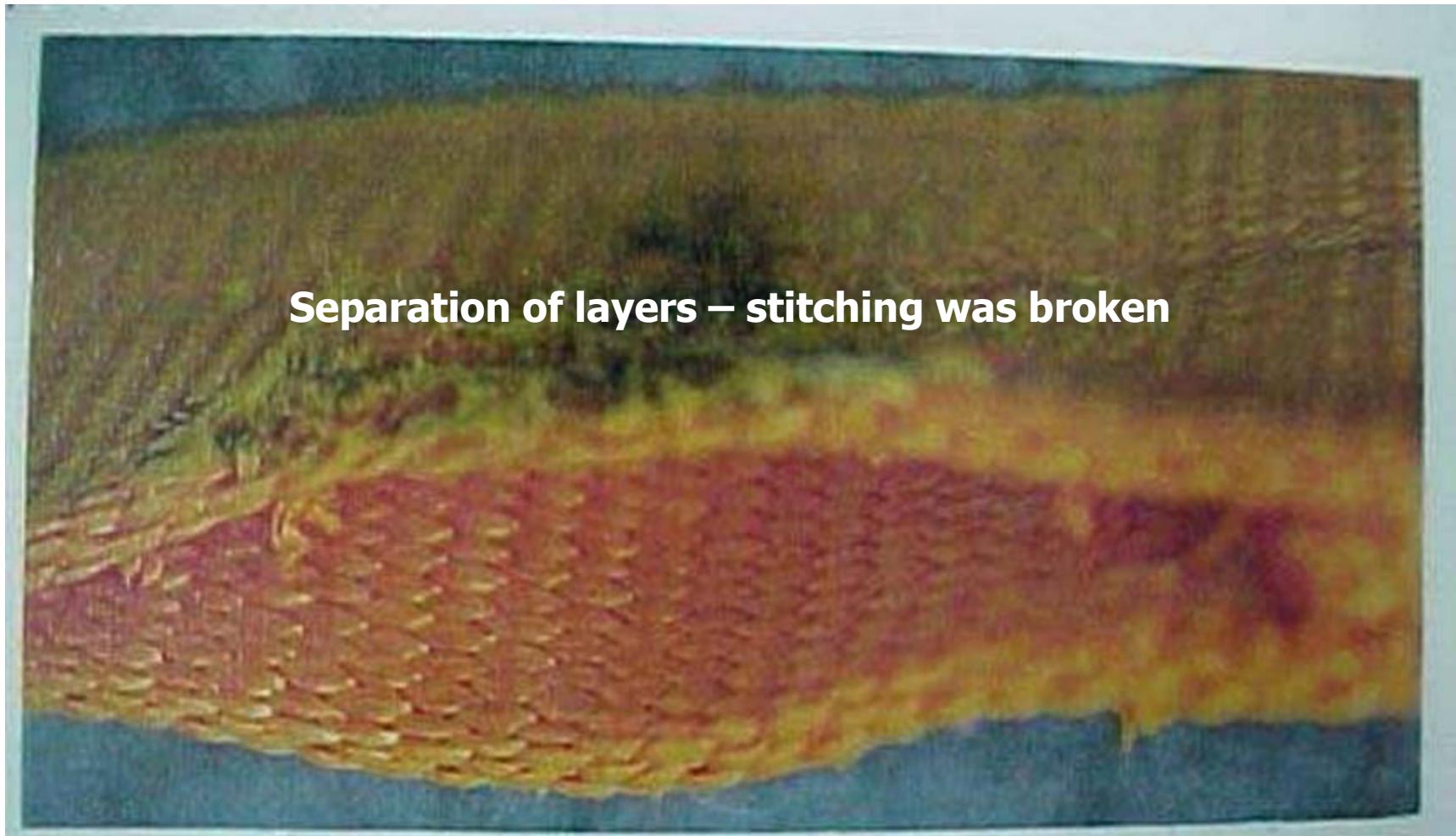
CONNECTORS

- Snaphooks must have a minimum tensile strength of 5,000 pounds, and be proof-tested to a minimum tensile load of 3,600 pounds without cracking, breaking, or becoming permanently deformed. They must also be locking-type, double-locking, designed and used to prevent the disengagement of the snaphook by the contact of the snaphook keeper with the connected member.
- Unless it is designed for the following connections, **snaphooks must not be engaged:**
 - Directly to webbing, rope, or wire.
 - To each other.
 - To a D-ring to which another snaphook or other connector is attached.
 - To a horizontal lifeline.
 - To any object which is incompatibly shaped in relation to the snaphook such that the connected object could depress the snaphook keeper and release itself.

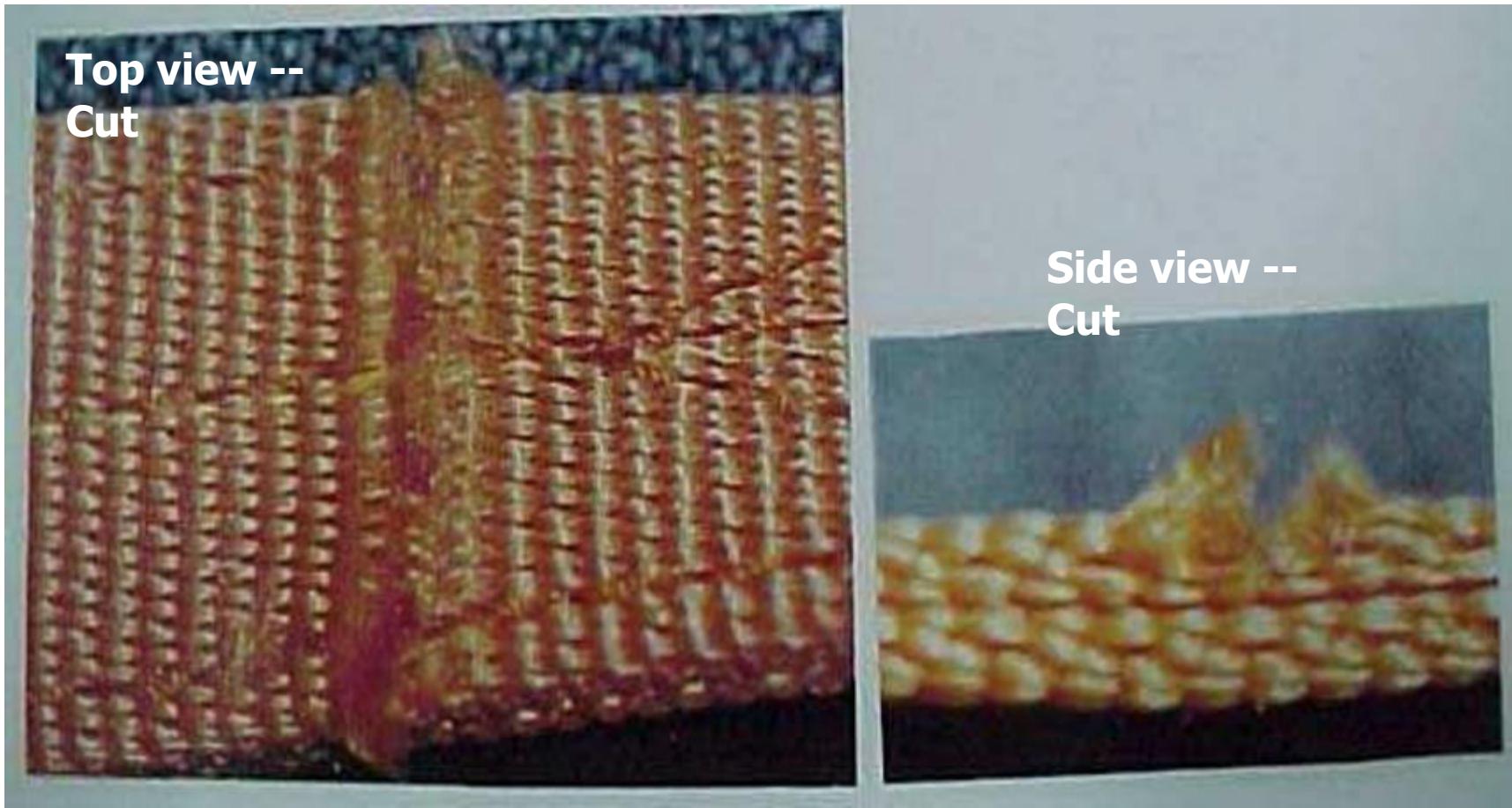
EXAMPLES OF PPE FAILURES



EXAMPLES OF PPE FAILURES



EXAMPLES OF PPE FAILURES



EXAMPLES OF PPE FAILURES



Damage due to heat – inside fiber exposed



Hardened surface due to exposure to paint

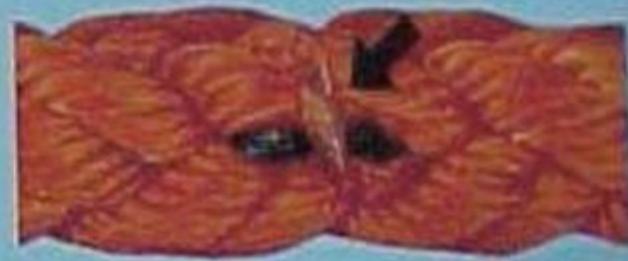
EXAMPLES OF PPE FAILURES



Outside plastic cover is damaged – inside exposed

Stretching due to force or heat – incorrect shape

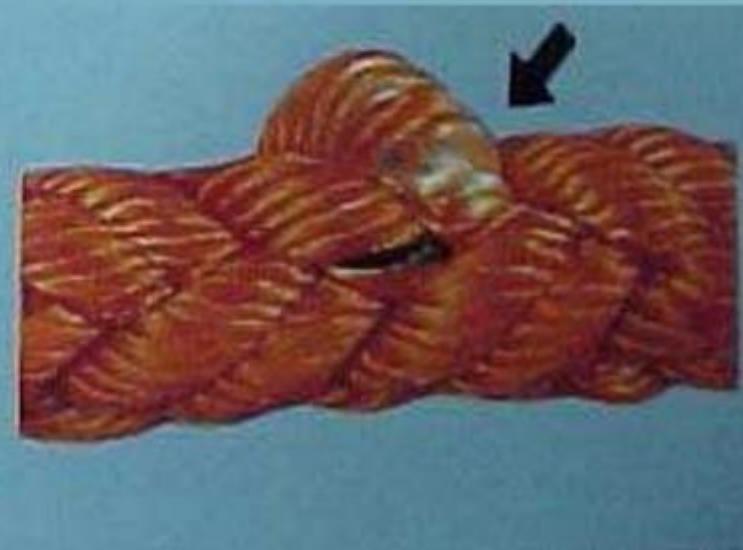
EXAMPLES OF PPE FAILURES



Damage due to spark or heat – surface damaged



**Buckling
damage**

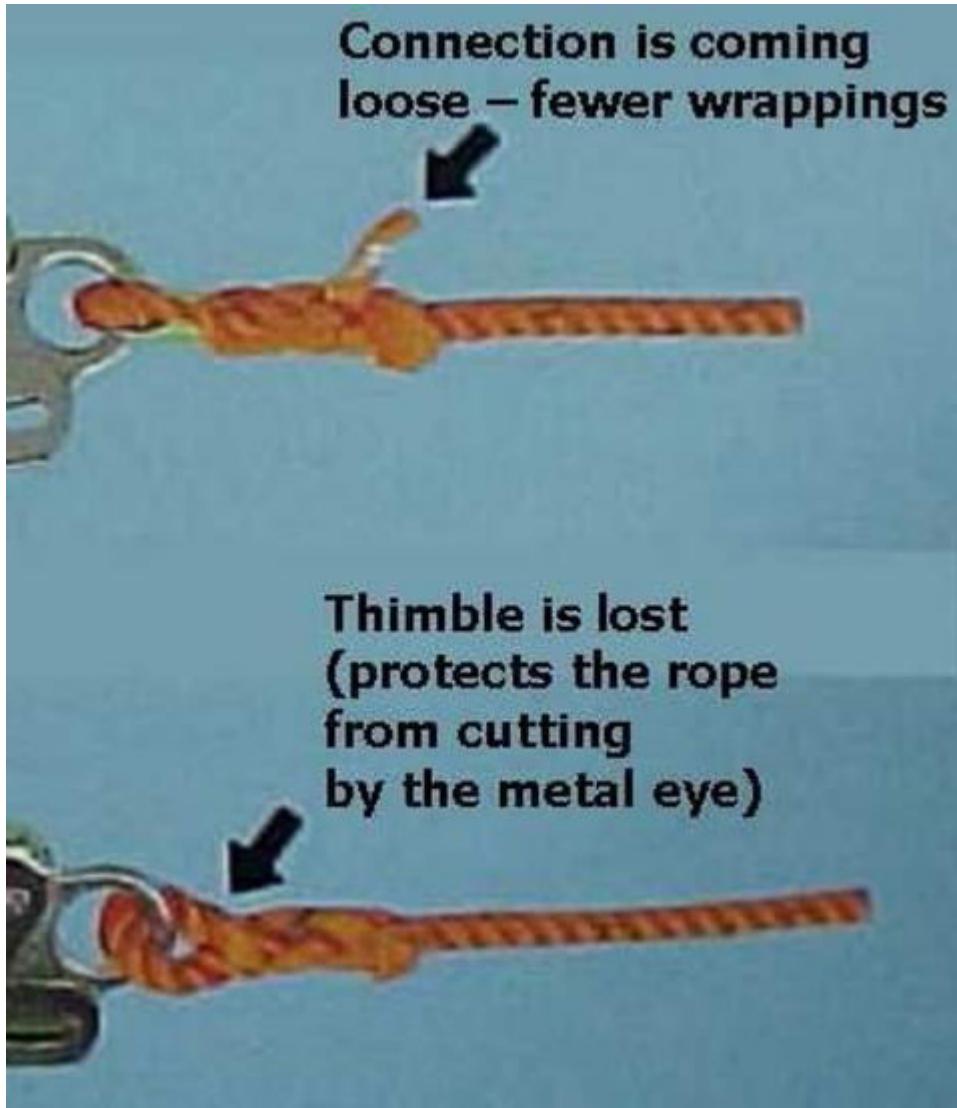


EXAMPLES OF PPE FAILURES

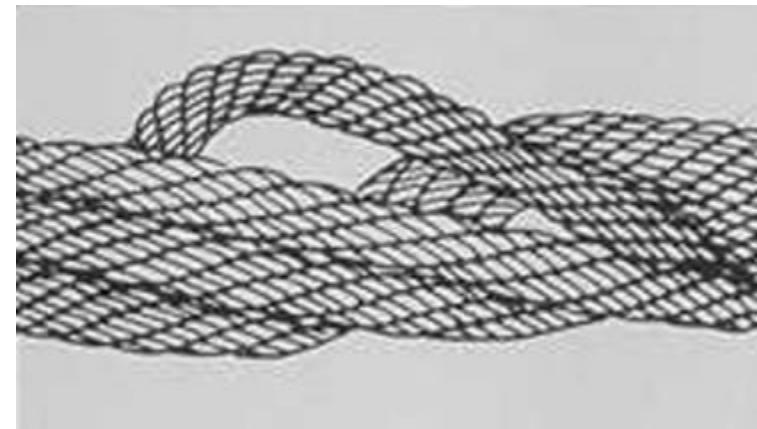
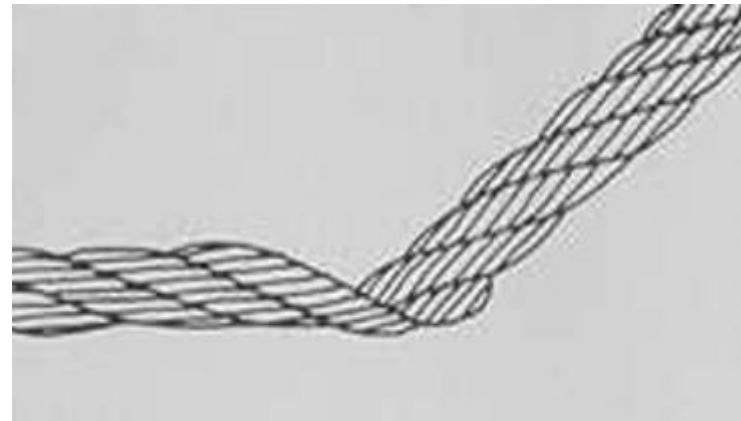
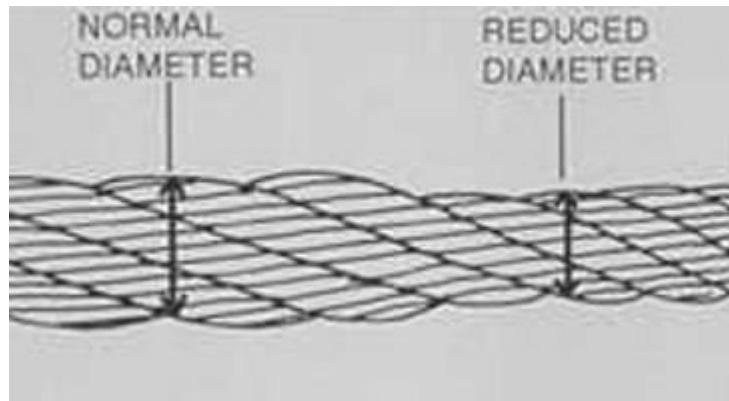


**Damage due to chemicals and paint –
surface is hardened**

EXAMPLES OF PPE FAILURES



EXAMPLES OF PPE FAILURES

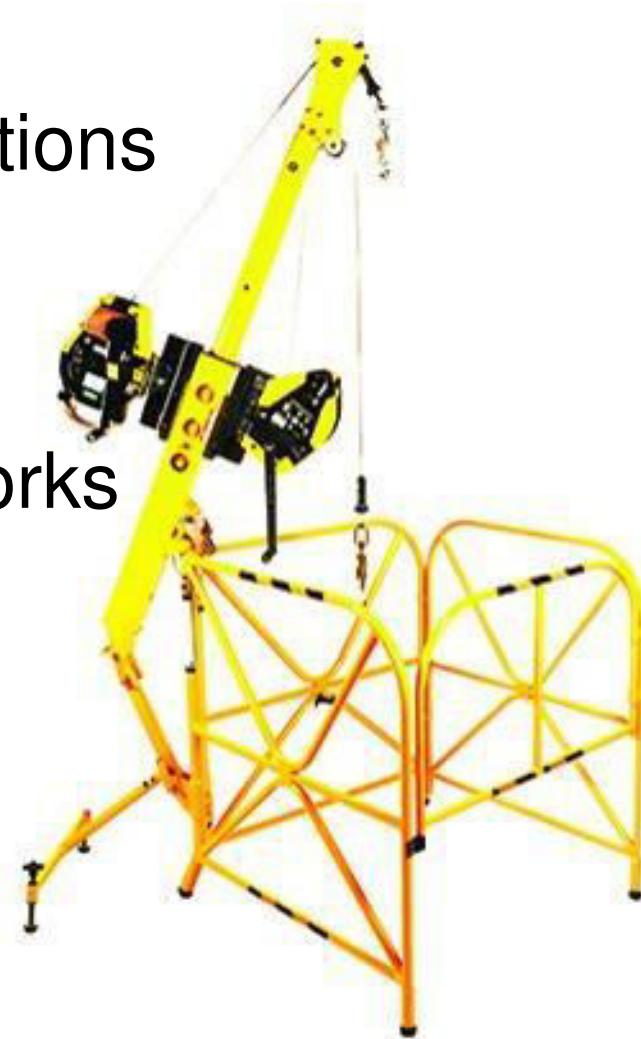


EXAMPLES OF PPE FAILURES

- Suspension trauma, also known as orthostatic intolerance, is an effect which occurs when the human body is held upright without any movement for a period of time.
- If the person is strapped into a harness or tied to an upright object they will eventually suffer the central ischemic response.
- If one faints but remains vertical, **one risks death due to one's brain not receiving the oxygen it requires**

REVIEW

- Fall Hazard scenarios have options
 - Fall Prevention
 - Fall Protection
- Must choose which solution works best for your situation
- Fall Protection
 - Inspection
 - Training
 - Rescue



SCAFFOLD SAFETY

- Employees must be trained to safely set up and use scaffolds- this includes safety measures like:
- During setup: fully plank scaffolds, complete all guardrails, ensure stable footing and plumb and level
- Ensure proper access to scaffolds
- A competent person must inspect the scaffold before use
- Don't climb over cross braces
- Don't stand on guardrails
- Don't use a ladder on a scaffold

SCAFFOLDS IN CONSTRUCTION

Suspended Scaffold



SCAFFOLDS IN CONSTRUCTION

Suspended Scaffold



SCAFFOLDS IN CONSTRUCTION

Aerial Lift Scaffold



SCAFFOLD IN CONSTRUCTION

- How many things are wrong here?



IS THIS A FALL HAZARD?

YES

Workers could fall while climbing on the shoring structure to set it up and remove it.

Ladders and lifts must be provided.



Photos in this presentation are from the OSHA Region 4 National Photo Archive and OSHA Region 5.

IS THIS A FALL HAZARD?

YES



Workers are exposed to a fall hazard greater than 6 feet, while working near stairwell opening.

**Workers must
be protected
from falls
over 6 feet.**

IS THIS A FALL HAZARD?

YES

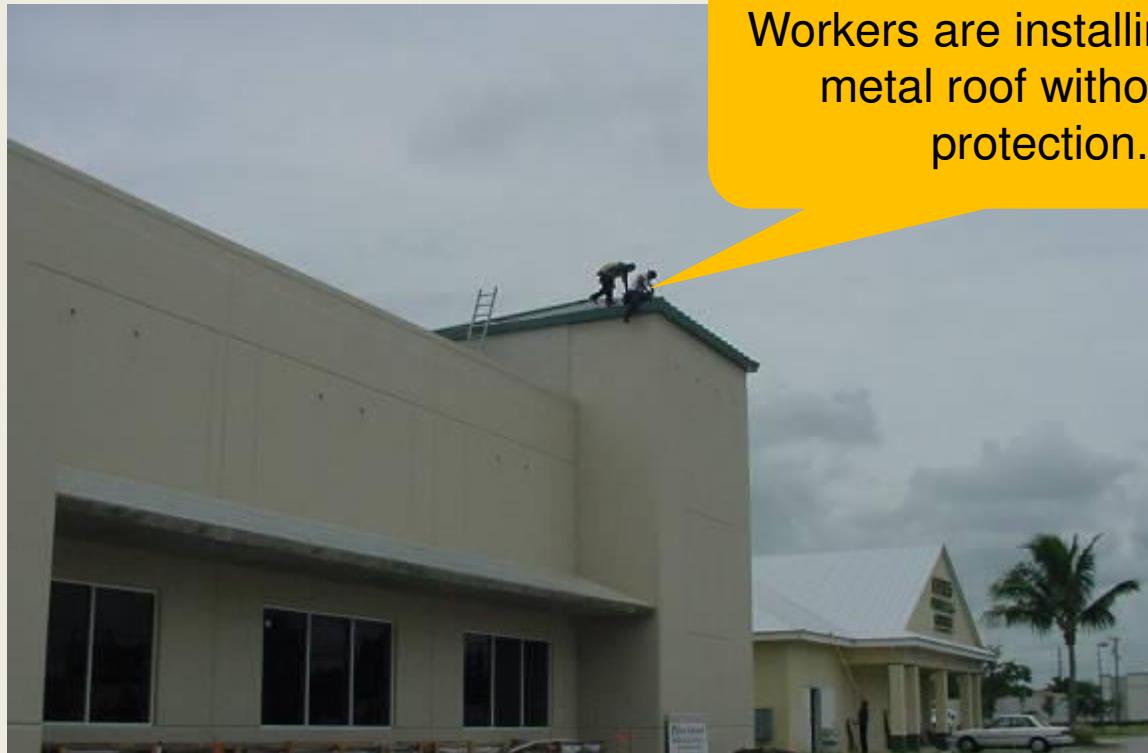
Unprotected open-sided floors 6 feet or more above ground level.



Guardrail systems, safety net systems or personal fall arrest systems are required.

IS THIS A FALL HAZARD?

YES



Workers are installing a new metal roof without fall protection.

NOTE: Remember that ladders must extend 3 feet above the landing area.

IS THIS A FALL HAZARD?

YES

Lack of fall protection for workers on fabricated frame scaffolds.



Planks appear to be overloaded and there is no safe access for workers.

The workers are exposed to a 35-foot fall hazard from a scaffold while stacking blocks prior to overhand bricklaying operations.

CAN YOU IDENTIFY THE FALL HAZARD?

YES

Ladder to work platform is not of sufficient length.

It must extend 3 feet above the working surface.



IS THIS A FALL HAZARD?

YES

Worker is working off of the top of a step ladder.

The top of a stepladder shall not be used as a step.



CAN YOU IDENTIFY THE FALL HAZARDS? **YES**

A worker is working from a carpenters' scaffold that has no guardrail, extends too far beyond either end, and is not wide enough.

The worker inside of the window is not provided with fall protection as there is no standard guardrail for the window.

The worker also does not have proper access to the scaffold.

The worker working below is exposed to the struck-by hazards of tools and equipment falling from the employees working above.

NOTE: A competent person must supervise as scaffolds are erected, moved and taken apart.

IS THIS A FALL HAZARD?



Falls in Construction Re-Roofing
[Link to webcast about reroofing](#)

YES

Worker working on an 8:12 pitch roof with only the lifeline tied to his waist as fall protection.



**Employer
must
provide full
body
harnesses.**

IS THIS A FALL HAZARD?



YES

Scaffold was not erected with guardrails in areas where workers were working at heights greater than 10 feet.



WARNING
THIS AREA IS A PROHIBITED CONSTRUCTION SITE.
ANYONE TRESPASSING WILL

12:01 PM

Fall Prevention Planning

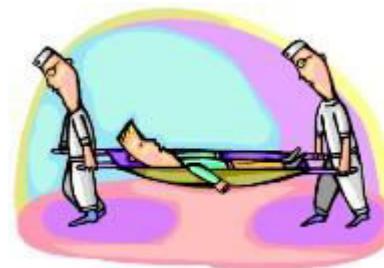


Lanyards and Personal Fall Arrest System in use

Fall prevention systems and work practices must be in place before you start work.

FALL RESCUE PROCEDURES

- If the worker may be hurt, call 9–1–1.
- Figure out the best way to rescue the fallen worker.
- Locate the nearest rescue anchor
- Look for the nearest safe working level for the fallen worker
- Identify equipment needed to get the fallen worker to a safe working level



IS THIS A GOOD GUARDRAIL?



PERSONAL FALL ARREST SYSTEMS

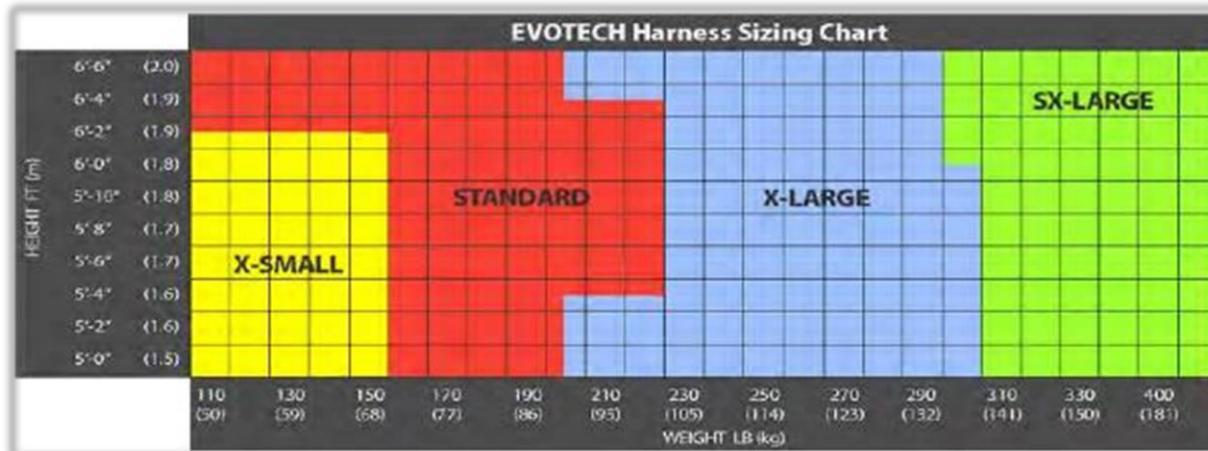
Body belts are not acceptable as part of a personal fall arrest system



BODYWEAR

- The Body Harness

- *Holds* the person in it during the fall
 - ✓ Will only work if worn correctly
- *Distributes* fall forces to specific locations
 - ✓ Prior to 1998 another type of “bodywear” was permissible. What was it?
- Is NOT “one size fits all.”



Fall Protection and Prevention

- ▶ A, B, C's to life



Fall Protection and Prevention

Disclaimer

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Fall Protection and Prevention

Welcome

- Seriousness of Falls
- Fall Protection Planning
- Components of a Fall Arrest System

Fall Protection and Prevention

- Seriousness of Falls
- Fall Protection Planning
- Components of a Fall Arrest System

Module-1

Fall Protection and Prevention

Deaths in
construction
from falls

Falls –
384 out of 991
total deaths in
construction in
2016

(38.7%)

SOURCE- osha.gov/oshstats/

Fall Protection and Prevention

According to the CDC

Trauma to the brain (TBI) was the cause of death in 41% of fall fatalities

<https://www.cdc.gov/traumaticbraininjury/severe.html>

Fall Protection and Prevention - Part 2

- ▶ The median lethal distance for falls is four stories or 48 feet... according to the reference book “Trauma Anesthesia”.
- ▶ This means that 50% of people who fall four stories will die.
- ▶ It doesn't take much of a fall to cause damage. "From a height of 3 meters (roughly 10 feet) you could fracture your spine"

Fall Protection and Prevention - Part 3

- ▶ Prevention strategies should emphasize
- ▶ Education, training, creating safer environments
- ▶ Prioritizing fall-related research
- ▶ Establishing effective policies to reduce risk.

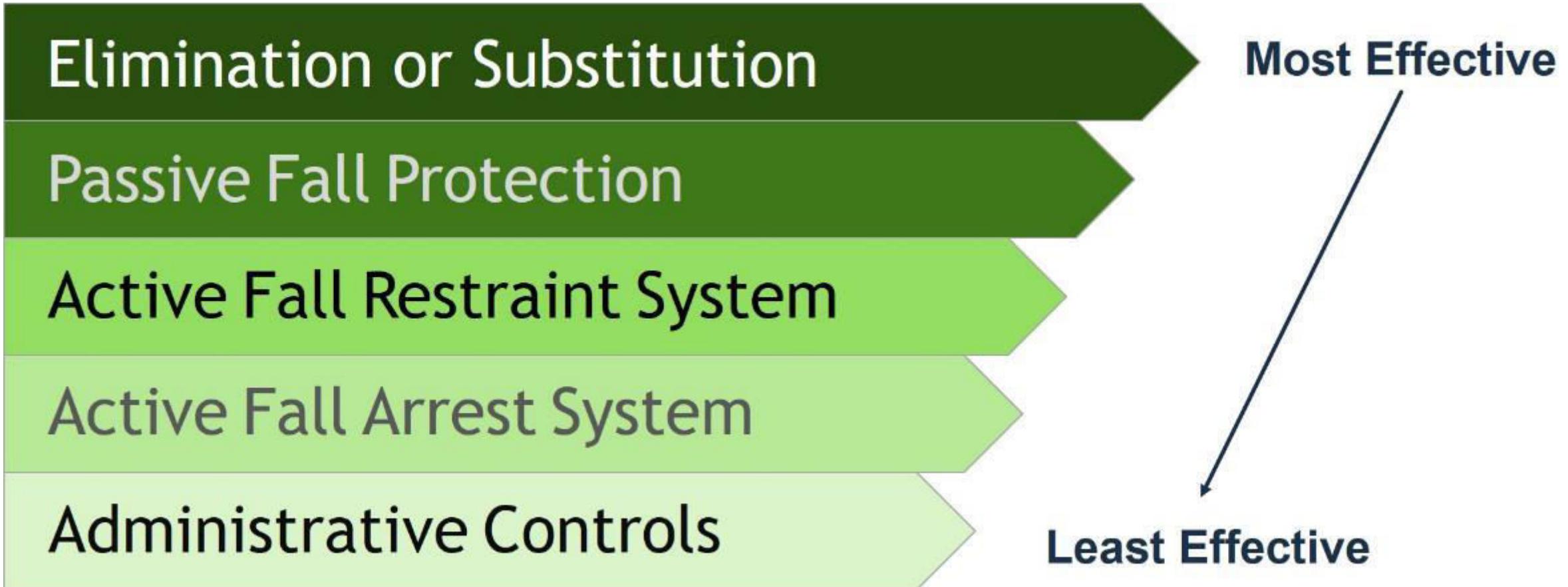
source- www.who.int/en/news-room/fact-sheets/detail/falls

Fall Protection and Prevention

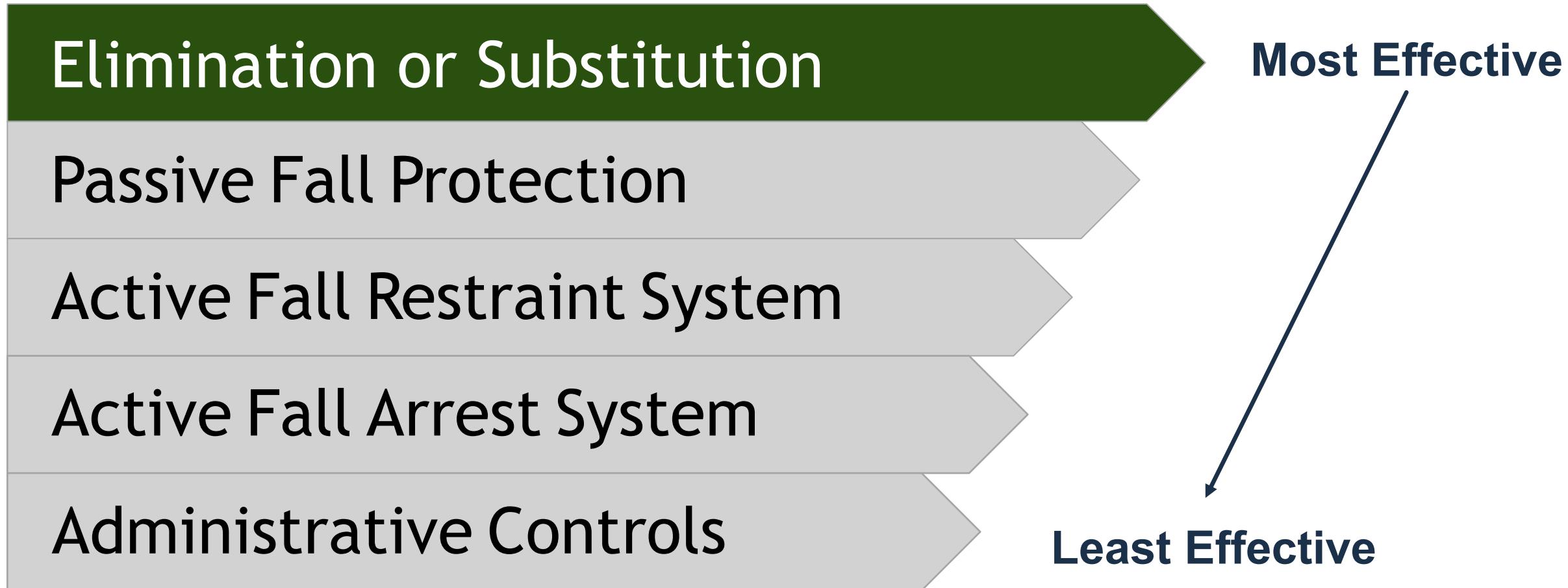
Module-2 • Fall Protection Planning

- Seriousness of Falls
- Components of a Fall Arrest System

HIERARCHY OF FALL PROTECTION



FALL PROTECTION PLANNING



Fall Protection and Prevention - Part 4

► Elimination or Substitution

The preferred solution to all fall hazards is elimination. The reason for exposure to the fall hazard is challenged and evaluated to determine if a change in the procedure, practice, location or equipment will eliminate exposure to the fall hazard. Specifying equipment be located on the ground, or in an equipment room rather than by the edge of the roof, is an example of hazard elimination.

Best Practice

The hierarchy should be applied to any hazard before buying inappropriate equipment or systems. By evaluating a fall hazard using the hierarchy, the best solution is often very evident.

FALL PROTECTION PLANNING - PART 2

Elimination or Substitution

Most Effective

Passive Fall Protection

Active Fall Restraint System

Active Fall Arrest System

Administrative Controls

Least Effective

Fall Protection and Prevention - Part 5

► Active Fall Restraint System

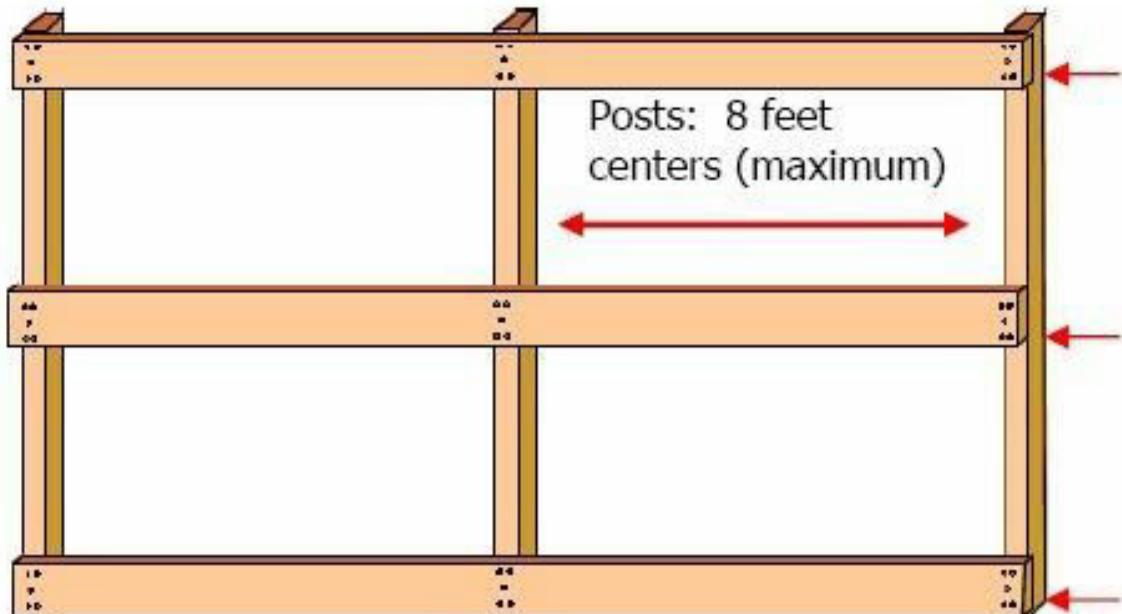
Physical barriers like guardrails around unprotected edges and covers over holes are examples of passive fall protection.

Passive protection is generally considered to provide a higher level of safety since the opportunity for error is less than using personal protective equipment (PPE). The initial costs of passive protection, while possibly high, are often more efficient than the long-term costs of PPE.

A thorough hazard assessment provides the information needed to make these kinds of decisions to maximize cost-effectiveness.

Fall Protection and Prevention - Part 6

► Active Fall Restraint System- OSHA structured



Top Rail: Shall be 42 inches (plus or minus 3 inches) above walking/working level and support a 200 lb force.

Mid Rail: Shall be installed between the top rail and walking/working surface (generally, 21 inches) and support a 150 lb force.

Toe Boards: Shall be 3 1/2 inches high and support a 50 lb force.

FALL PROTECTION PLANNING - PART 3

Elimination or Substitution

Most Effective

Passive Fall Protection

Active Fall Restraint System

Active Fall Arrest System

Administrative Controls

Least Effective

Fall Protection and Prevention - Part 7

► Active Fall Restraint System

Fall restraint systems are set up in such a manner that a fall cannot occur. Fall restraint systems use PPE to restrict the worker's range of movement so they cannot physically travel to the fall hazard.

Fall restraint systems are often underutilized because they are not specifically mentioned in many regulations, but they are preferred over fall arrest systems. Free fall distance is not an issue for fall restraint systems, therefore arresting forces, clearance requirements, secondary injuries, and rescue issues are virtually eliminated.

Fall restraint is always better than fall arrest. Fall restraint systems prevent most secondary injuries due to the fall and make rescue easy since the worker is still accessible.

Fall Protection and Prevention - Part 8

- ▶ NOT an Active Fall Restraint System

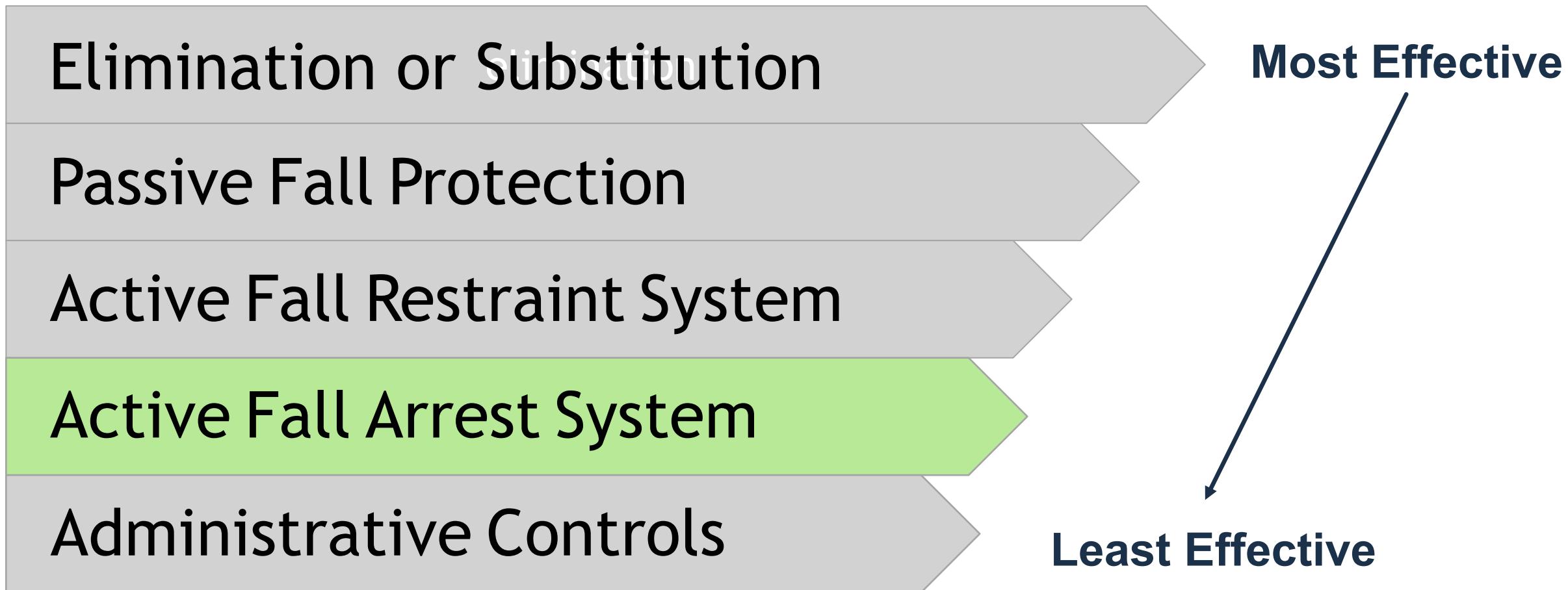


Fall Protection and Prevention - Part 9

► Active Fall Restraint System- Good Example



FALL PROTECTION PLANNING - PART 4



Fall Protection and Prevention - Part 10

► Active Fall Arrest System

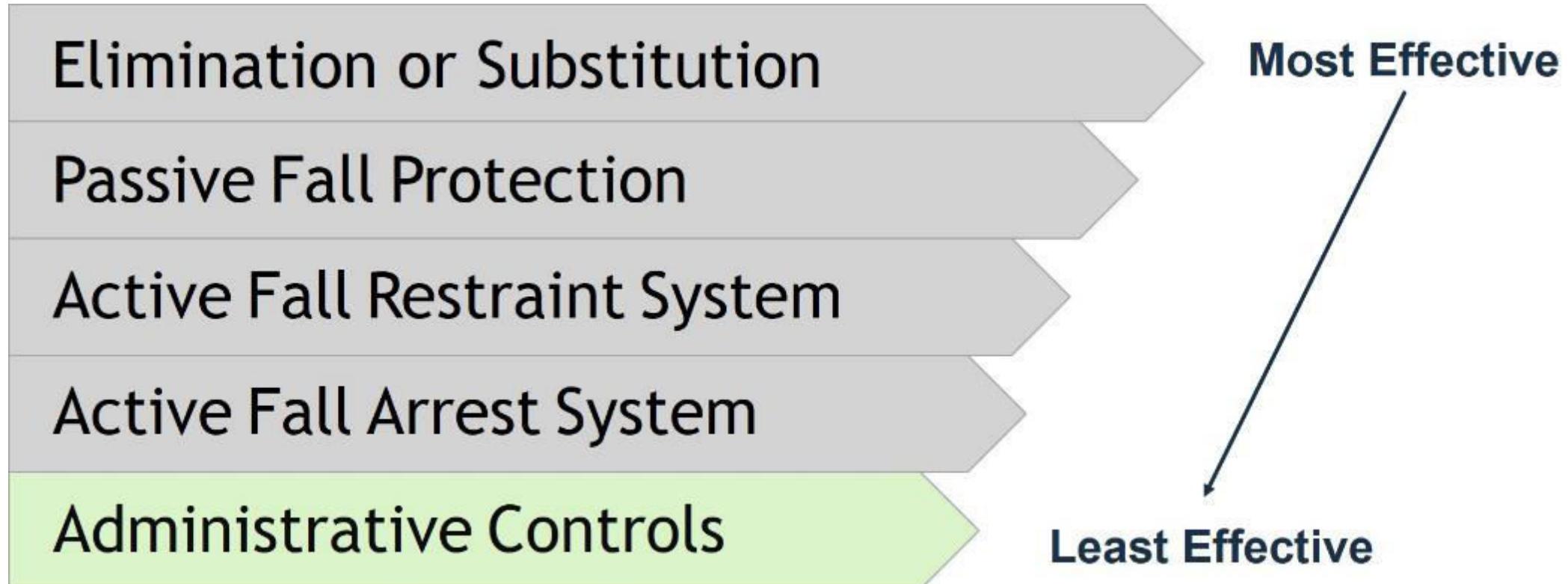
Fall arrest systems are erected in such a manner that a fall can occur, but the fall is arrested within acceptable force and clearance margins.

Fall arrest systems have a higher risk associated with them, since we must stop the falling worker within an acceptable level of force and prevent him/her from contacting the surrounding structure or the ground.

Training for both fall restraint and fall arrest systems is key.

ANSI Z359.2-2007 includes specific information about fall protection training for authorized persons, competent persons, qualified persons, rescuers and trainers.

FALL PROTECTION PLANNING - PART 5



Fall Protection and Prevention - Part 11

► Administrative Controls

Administrative controls are work practices or procedures that increase a worker's awareness of a fall hazard. Please note that administrative controls are the least preferred method of protection because they do not provide a physical or positive means of protection.

Administrative controls are preventive measures taken to reduce the likelihood of a fall. These methods include Training, safety monitors, warning lines, designated areas, or control lines.

OSHA regulates the use of many administrative controls

It is mandatory on the fall protection program administrator to understand the jurisdictions and regulations that apply.

Fall Protection and Prevention

Module-2b

- Seriousness of Falls
- Fall Protection Planning
 - MUST INCLUDE RESCUE TRAINING**
- Components of a Fall Arrest System

Fall Protection and Prevention - Part 12

Employer Requirements

- ▶ OSHA 1926.502 (d)(20) states that:

“The employer shall provide for prompt rescue of employees in the event of a fall or shall assure that employees are able to rescue themselves.”

Rescue

- Personal Fall Arrest Systems require a rescue plan
- Employer must develop and communicate the rescue plan to all involved

Fall Protection and Prevention - Part 13

How long is too long while suspended in a full-body harness?



A recent survey found that almost all workers would not want to be left for longer than 15 minutes.

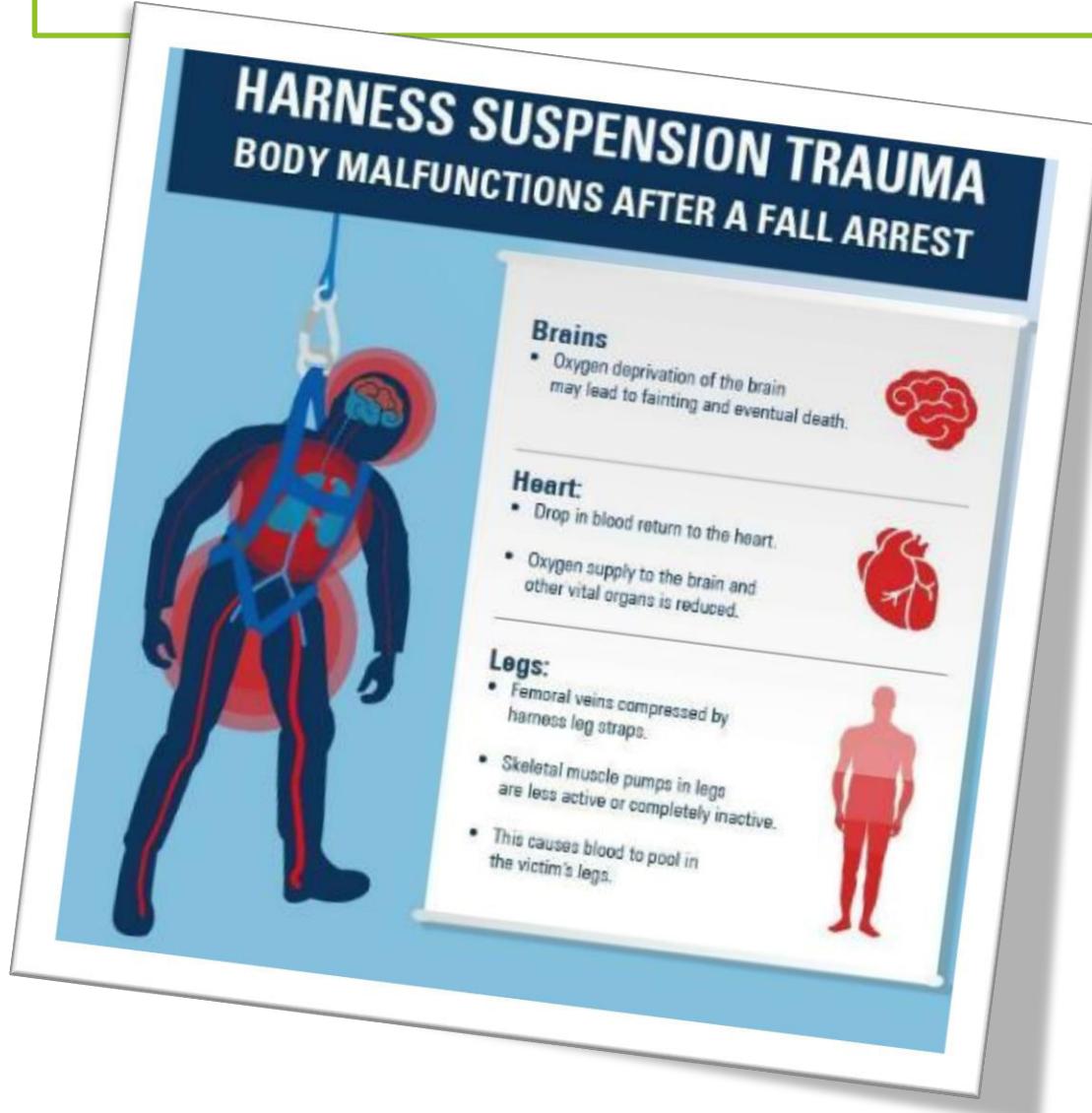
Average times were between 17 and 28 minutes (although they ranged from 3.5 right up to 60 minutes). This tells us that tolerance varies greatly from person to person, and that negative effects from the suspension can set in quickly.

While OSHA Standards don't specify a time rescues need to be carried out within, they have previously stated "research indicates that suspension . . .

**can result in unconsciousness, followed by death,
in less than 30 minutes."**

Fall Protection and Prevention - Part 14

After Rescue



After a fallen worker has been rescued, it is important to follow these steps to prevent the pooled blood from rushing back into their heart and brain all at once:

- Whatever plan you have written, it is vital that the lowering system can be controlled to prevent the worker's body from being laid flat as it reaches the ground.
- Anyone released from immobile suspension should be kept in a sitting position for **at least 30 minutes**
- Keep the harness on and do not release the leg straps
- Get Medical attention IMMEDIATELY

How Do You Prepare For A Fall?

- ▶ Develop a Fall Rescue Plan
- ▶ Locate rescue equipment
- ▶ Train workers
- ▶ Practice the plan



Photo: Fall Rescue

Fall Protection and Prevention

Module-3

- Seriousness of Falls
- Fall Protection Planning
- Components of a Fall Arrest System

Fall Protection and Prevention - Part 15

Personal Fall Arrest Systems (PFAS)

► A PFAS consists of the following components:

► **A**nchorage Point

► **B**ody Harness

► **C**onector

$$A + B + C = \text{PFAS}$$

Fall Protection and Prevention - Part 16

Personal Fall Arrest Systems (PFAS)

- ▶ A PFAS consists of the following components:

- ▶ A Anchorage Point



- ▶ B Body Harness

- ▶ C Connector

1926.502(d)(15)

Anchorage used for attachment of personal fall arrest equipment shall be independent of any anchorage being used to support or suspend platforms and capable of supporting at least 5,000 pounds (22.2 kN) per employee attached.

Fall Protection and Prevention - Part 17

Personal Fall Arrest Systems (PFAS)

- ▶ A PFAS consists of the following components:

▶ **A**nchorage Point

▶ **B**ody Harness

▶ **C**onector



OSHA defines a Body Harness as:

“... straps which may be secured about the employee in a manner that will distribute the fall arrest forces over at least the thighs, pelvis, waist, chest and shoulders with means for attaching it to other components of a personal fall arrest system”

Fall Protection and Prevention - Part 18

Personal Fall Arrest Systems (PFAS)

- ▶ A PFAS consists of the following components:

▶ **A**nchorage Point

▶ **B**ody Harness

▶ **C**onector



Connector

The connecting subsystem is the critical link which joins the body wear to the anchorage/anchorage connector. It can be an energy-absorbing lanyard, fall limiter, self-retracting lanyard, rope grab, or retrieval system. Connecting means will vary depending on whether the worker is equipped for personal fall arrest or work positioning and travel restriction

Fall Protection and Prevention - Part 19

- ▶ In almost every industry, there are areas where workers are subjected to fall hazards.

When selecting fall protection equipment, three components make up a complete fall protection system. These are the ABC's of fall protection:

Anchorage... Body support... Means of Connection

Each one must be in place and properly used to provide maximum worker protection.

The connecting device is the most critical link in assembling a safe fall protection system since it bears the greatest force during a fall.

Fall Protection and Prevention - Review

REVIEW



Knowledge Check

1. What is the first line of defense when it comes to falls in the workplace?
 - a. Control the fall itself once it occurs
 - b. Eliminate the fall hazard completely
 - c. With the fall hazard present, prevent the fall.
 - d. Use personal protective equipment

Knowledge Check - Part 2

1. What is the first line of defense when it comes to falls in the workplace?
 - a. Control the fall itself once it occurs
 - b. Eliminate the fall hazard completely
 - c. With the fall hazard present, prevent the fall.
 - d. Use personal protective equipment

Answer: b. Eliminate the fall hazard completely

Knowledge Check - Part 3

2. A worker is required to remove a section of guardrail in order to receive materials from a fork truck; which of the following provides the best protections to prevent a fall?
 - a. Avoid the edge
 - b. Use a personal fall arrest system
 - c. Use a fall restraint system
 - d. Use grab handles

Knowledge Check - Part 4

2. A worker is required to remove a section of guardrail in order to receive materials from a fork truck; which of the following provides the best protections to prevent a fall?
 - a. Avoid the edge
 - b. Use a personal fall arrest system
 - c. Use a fall restraint system
 - d. Use grab handles

Answer: c. Use a fall restraint system

Knowledge Check - Part 5

3. A personal fall arrest system (PFAS) anchorage point must be capable of handling ____ pounds.
 - a. 2,000
 - b. 3,000
 - c. 4,000
 - d. 5,000

Knowledge Check - Part 6

3. A personal fall arrest system (PFAS) anchorage point must be capable of handling ____ pounds.
- a. 2,000
 - b. 3,000
 - c. 4,000
 - d. 5,000

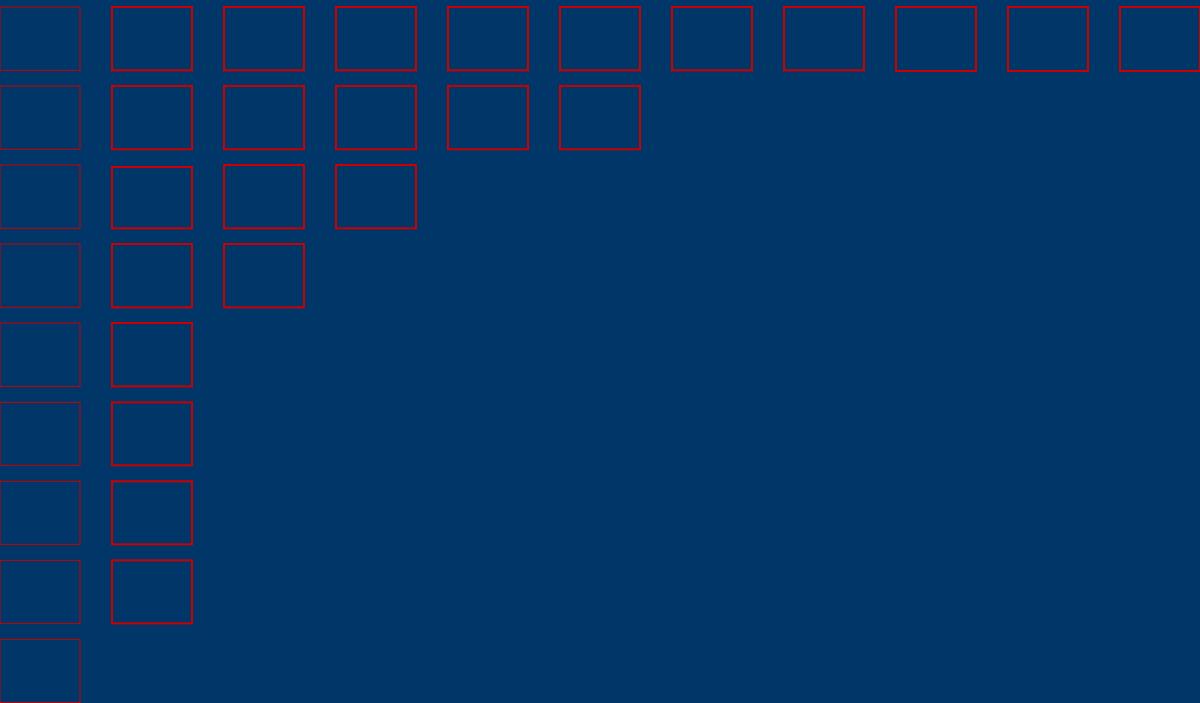
Answer: d. 5,000

Additional Resources

- ▶ OSHA website: <http://www.osha.gov> and OSHA offices: Call or Write (800-321-OSHA)
- ▶ Compliance Assistance Specialists in the area offices
- ▶ National Institute for Occupational Safety and Health (NIOSH) - OSHA's sister agency
- ▶ OSHA Training Institute Education Centers
- ▶ Public libraries

Roofing Industry Fall Protection from A to Z

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OSHA State Plan Highlights



Arizona

- Legislatively revised state's residential FP rules
- Used California rules as basis
- Federal OSHA may take over residential enforcement



California

“When work is of a short duration and limited exposure, such as minor patching, measuring, roof inspection ... these provisions may be temporarily suspended provided that adequate risk control is recognized and maintained.”

Article 30, section 1723



California

General fall-protection height requirement for workers is at heights greater than **7½** feet

- Roofing fall-protection height requirement: workers at heights greater than **20** feet (greater than 15 feet on residential tract work)

California, 0:12 to 4:12



- At heights more than 20 feet, if there is no parapet or a parapet less than 24 inches, employees must be protected by:
 - Warning lines and a “qualified person”
 - Guardrails
 - PFA systems
 - Eave barriers
 - Scaffold or catch platforms

When using backward-moving equipment, the parapet must be 36 inches high

This applies to “single-unit” roofing.



California

- Warning lines must be placed at 5 feet and 10 feet from roof edge when mechanical equipment is in use
- Warning-line height — between 34 and 45 inches
- Qualified person may be used to supervise workers on narrow or irregular-shaped roofs

California, slopes greater than 4:12; heights more than 20 feet



- 24-inch parapet
- PFA systems
- Scaffold or catch platforms
- Eave barriers
- Guardrails

This applies to “single-unit” roofing.



California

Multi-unit roof coverings (shingles);
slopes 0:12 to 5:12;
heights greater than 20 feet

- Roof jacks (slide guards)
- 24-inch-high parapet
- Other method of “equivalent protection”



California

Multi-unit roof coverings (shingles);
slopes greater than 5:12;
heights greater than 20 feet

- Roof jacks (slide guards) and safety lines when more than 7:12
- 24-inch-high parapet
- PFA system
- Scaffold or catch platform
- Eave barriers



Kentucky

- Requires fall protection in construction activities **10 feet** or more above a lower level
- Allows use of slide guards in residential roofing
 - Eave height of 25 feet or less
 - Slopes of 4:12 up to 8:12
 - Brackets spaced at 8 feet horizontally
 - Additional slide guards vertically up the roof at 8 foot intervals

Michigan

- Incorporated the federal construction standards
- Michigan OSHA has issued an interpretation relating to holes as being subordinate to the low-slope roofing provisions of 501(b)(10)



Michigan

For fall protection around holes or skylights—in addition to PFA systems, covers and guardrails—roofing warning-line systems may be used.



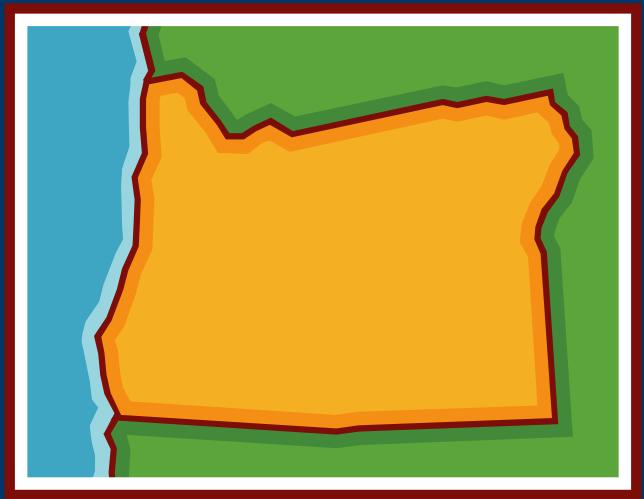
North Carolina



- Follows federal OSHA rules to large extent
- When using a warning-line system on low-slope roofs, the safety monitor must be in place at all times—even if no workers are outside the warning line
- Slide guards may not be used as the sole fall protection on residential roofing projects

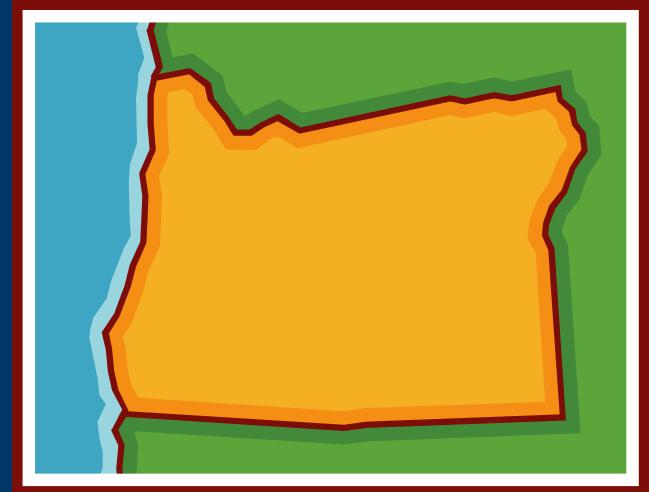
Oregon

- General fall-protection threshold height—10 feet
- Around holes, skylights, established floors, balconies, walkways—6 feet



Oregon

- Warning-line systems may be used on roof slopes of 2:12 or less.
 - Use of a safety monitor is restricted similarly



Washington

- Roofing workers on **low-slope** roofs must be protected from falls of 10 feet or greater
- Protect on **steep-slope** roofs at heights of 4 feet
- Requires a written fall-protection plan when fall hazards of 10 feet or more exist



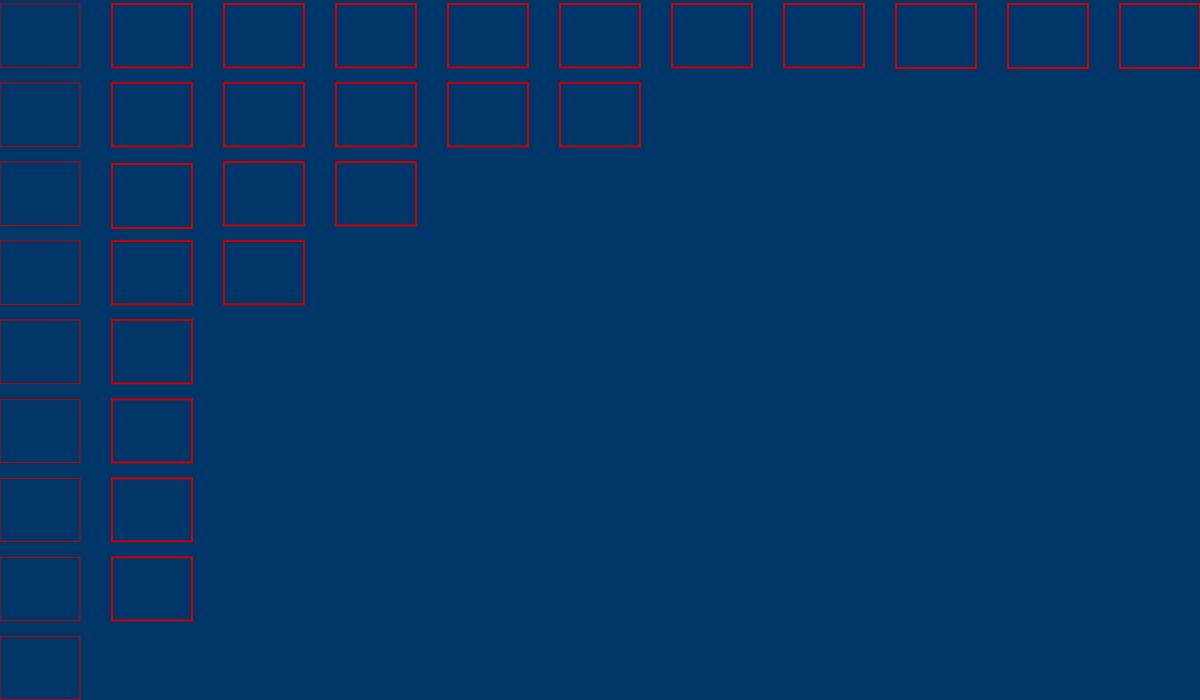
Washington

- Warning-line system may not be used on slopes greater than 4:12.
 - A warning line must be between 36 and 45 inches from roof surface.
- Safety monitor may be used alone on roofs 50 feet wide or less:
 - Safety monitor can have no other duties.
 - Safety monitor can monitor no more than eight workers.
 - Safety monitor must wear a distinguishing vest or other clothing.

Washington

A new rule allows for a “safety watch” system of fall protection in which a competent person monitors repair work of another individual on a low-slope roof without the need for warning lines, PFA system or other forms of fall protection.





Subpart H: Material Handling and Subpart T: Demolition

Subpart H—Handling and Disposal

Trash chutes provide one of the safer methods for removing trash from the roof:



- Trash chutes required when roofs are more than 20 feet high
- Must be secured to the building

Subpart H—Handling and Disposal

- Guardrail system should be placed around and behind the chute.
- Nail a 4-inch-thick, 6-inch-high piece of lumber just in front of the opening of the chute to provide a stop for a wheelbarrow. This will make it easier to tip and dump the load.
- A chain should be put across the opening to the trash chute when there is not activity at the chute.

Subpart T—Demolition Fall Protection

Any chute opening into which workers dump debris must be protected by a guardrail 42 inches above the floor or other surface on which workers stand to dump debris.



29CFR1926.852(e)

Workers without fall-protection

Subpart T—Demolition Fall Protection

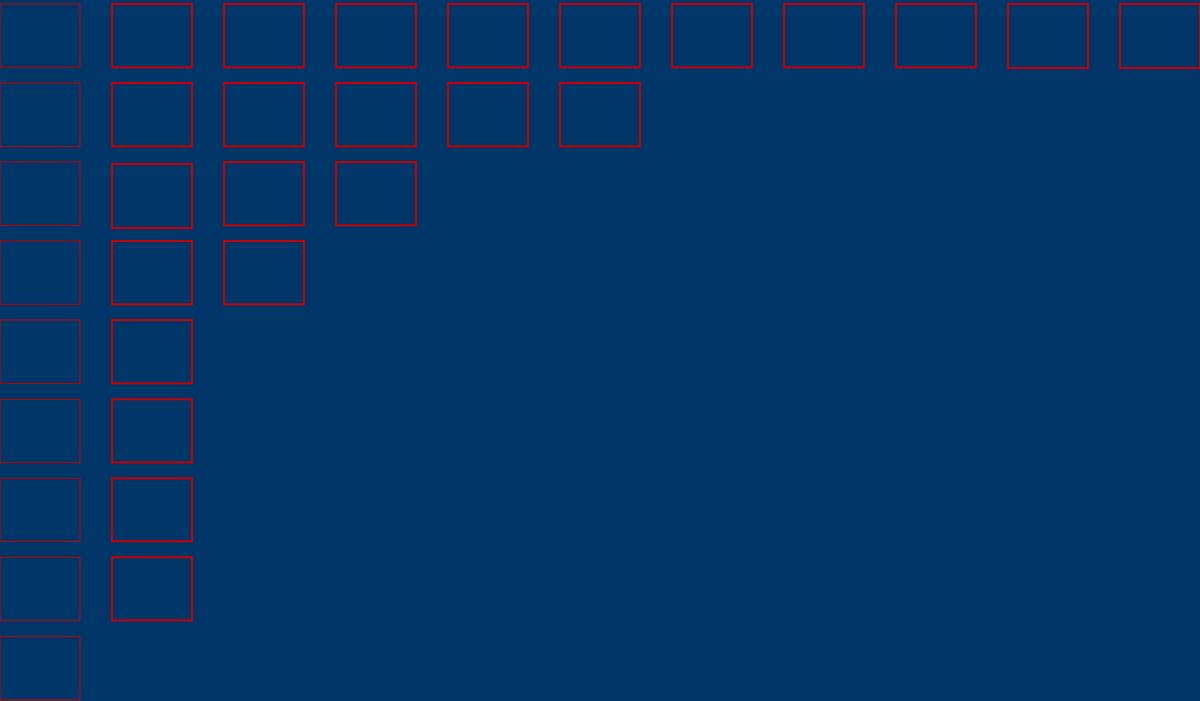


Chute opening with guardrail and bumper

You are reroofing an enormous warehouse and decide to use an ATV. The decision seems like a good one because the disposal of the tear-off material is going quickly.

What type of fall protection do you need at the point of disposal?





Subpart X: Ladders and Stairways

Ladder Video



BLS Statistics—Ladder Fatalities

- In 2013, 73 workers in the construction industry died in falls from ladders
- 46 died in falls from scaffolds



What type of fall protection does Subpart X require for portable ladders?



Hazards

- Stairways and ladders cause many injuries and fatalities among construction workers.
- About half the injuries caused by slips, trips and falls from ladders and stairways require time off the job.



Securing Ladders

- Secure ladders to prevent accidental movement caused by workplace activity.
- Only use ladders on stable and level surfaces unless secured.
- Do not use ladders on slippery surfaces unless secured or provided with slip-resistant feet.

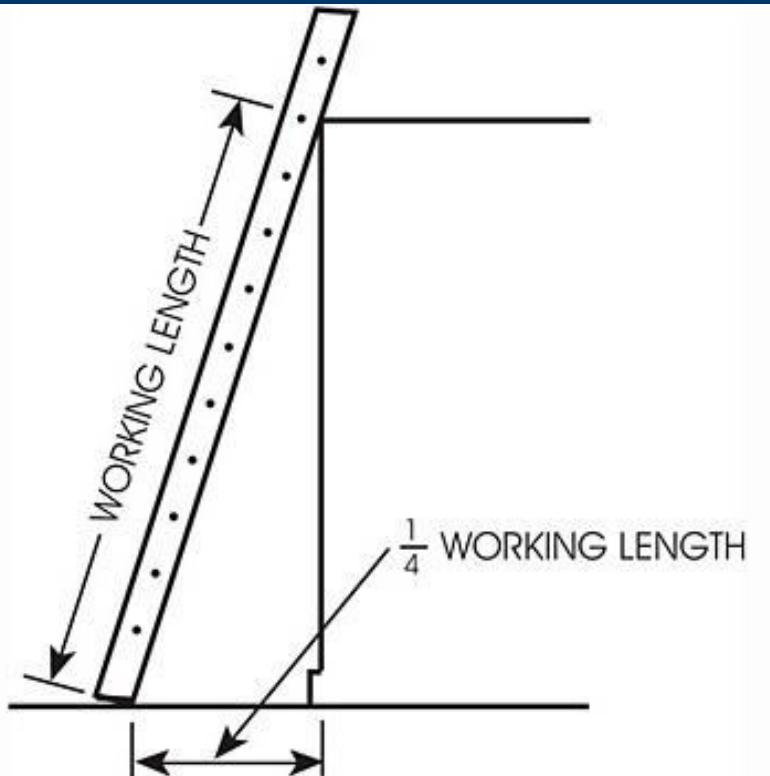
This ladder is not on a stable surface



Ladder Angle

Nonself-supporting ladders
(which lean against a wall
or other support):

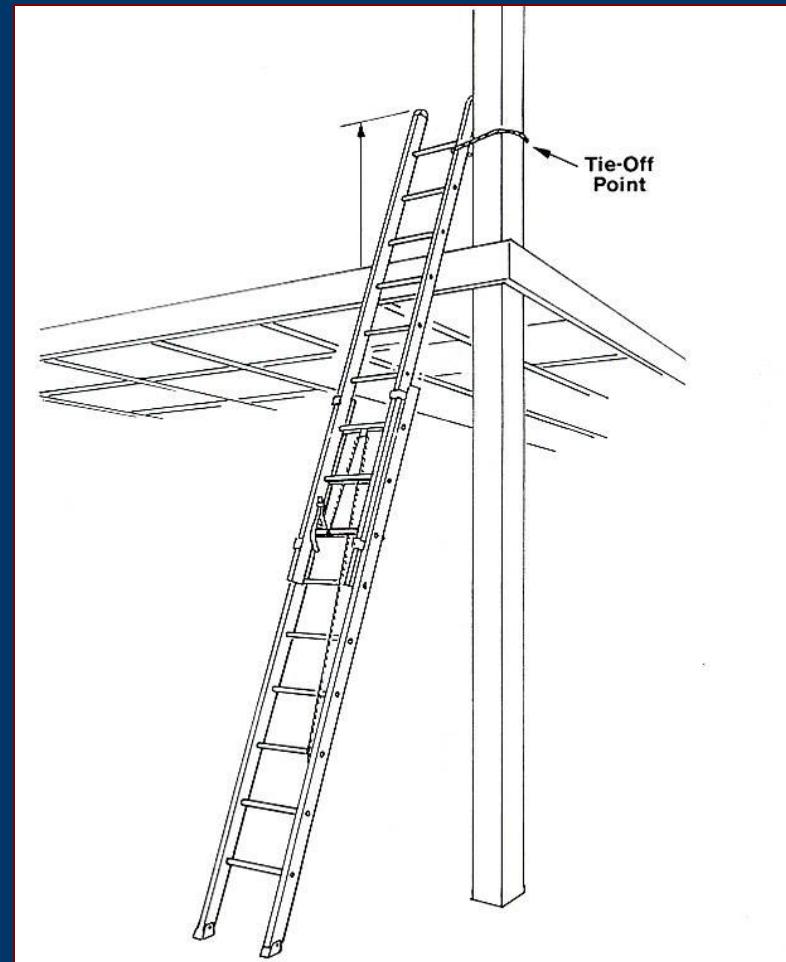
- Position at an angle where the horizontal distance from the top support to the foot of the ladder is $\frac{1}{4}$ the working length of the ladder



Ladder Rail Extension

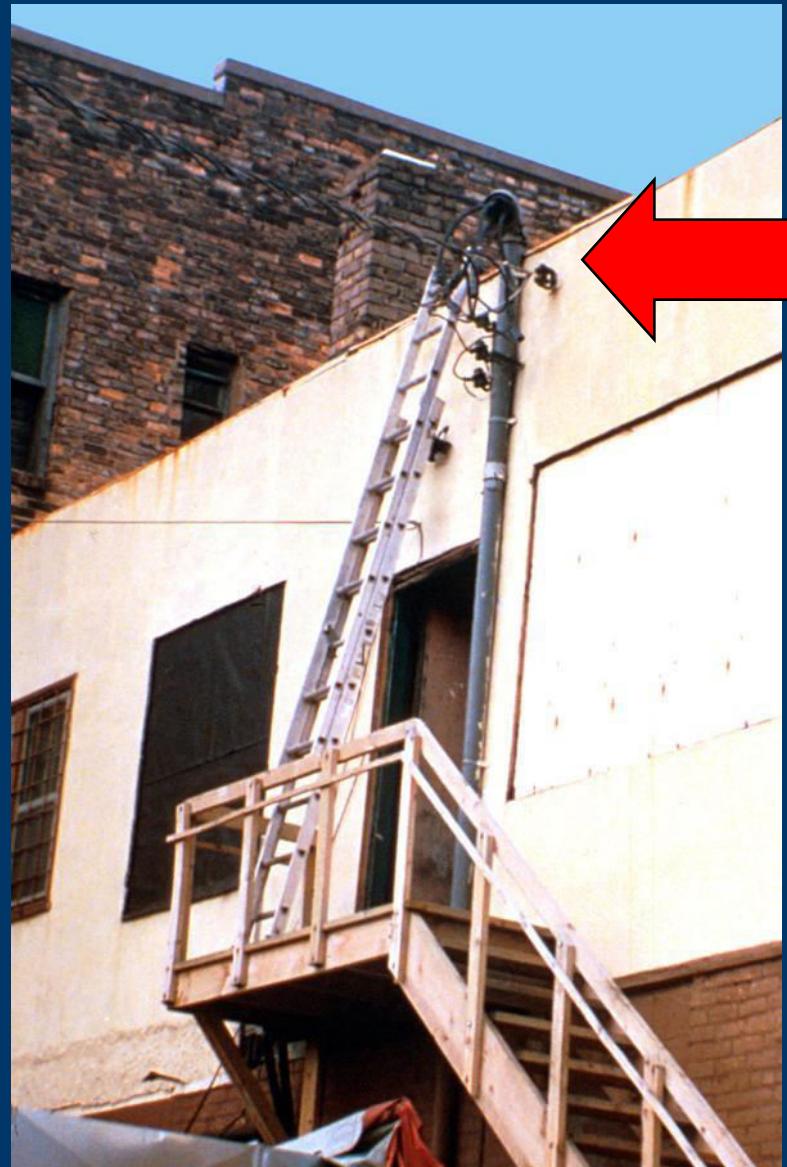
When using a portable ladder for accessing an upper landing surface, the side rails must extend at least 3 feet above the upper landing surface—the ladder must be tied-off and a grab rail provided if the 3-foot extension cannot be achieved.

29CFR1926.1053(b)(1)



Near Energized Electrical Equipment

If using ladders where a worker or ladder could contact exposed energized electrical equipment, the ladders must have nonconductive side rails such as wood or fiberglass.

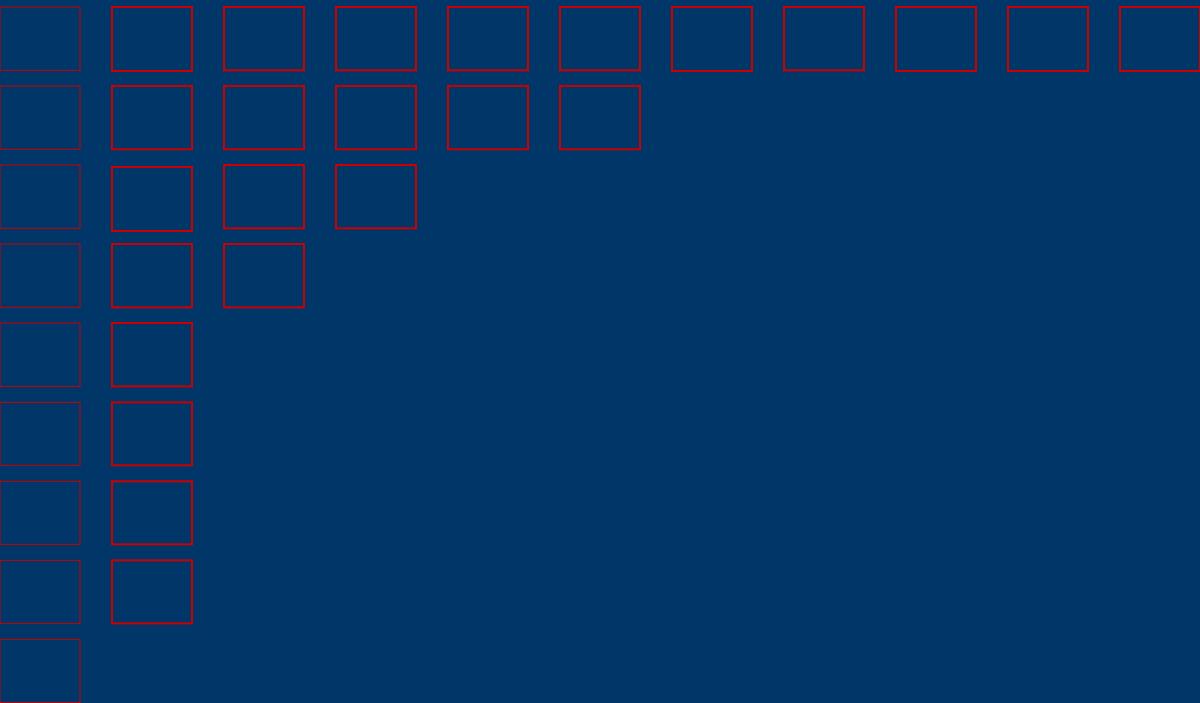


This is an unsafe condition

Top Step

Do not use the top or top step of a ladder as a step.





New Equipment

Guardian CB Pass-through System

- Bolt on Pass-thru option for CB-12 and 18 modification
- Permanent or temporary application
- Removable horizontal lifeline attachment
- Provides attachment for up to 4 workers in fall restraint
- Provides attachment for 1 worker in fall-arrest
- Will allow up to 120' span
- Pass-thru top allows for cable lifeline or direct attachment

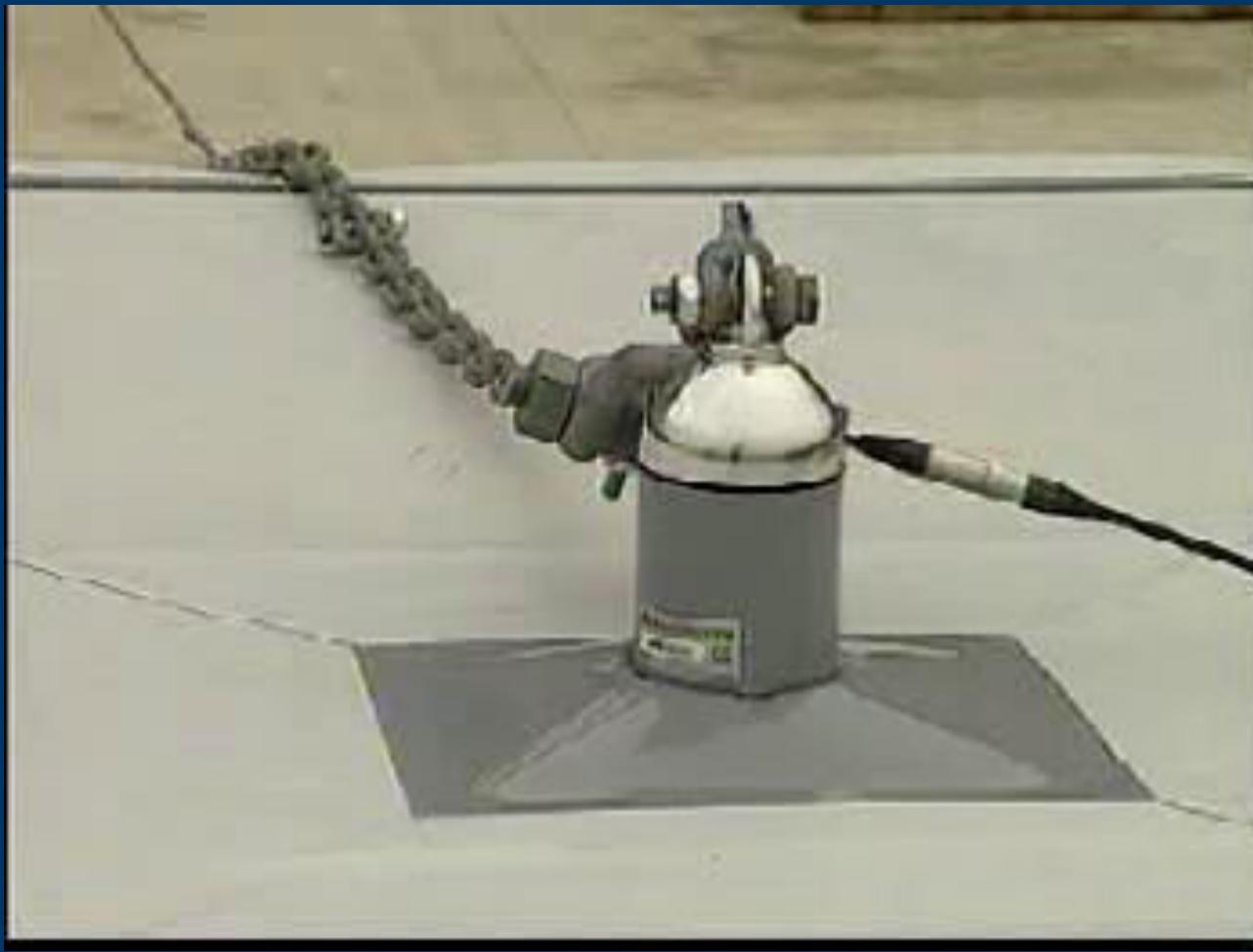


Latch Ways Pass-through System



Latchways Pass-through System

[show a demo video](#)



Free-standing Counterweight Anchors



Horizontal Lifeline System



Horizontal Lifeline System

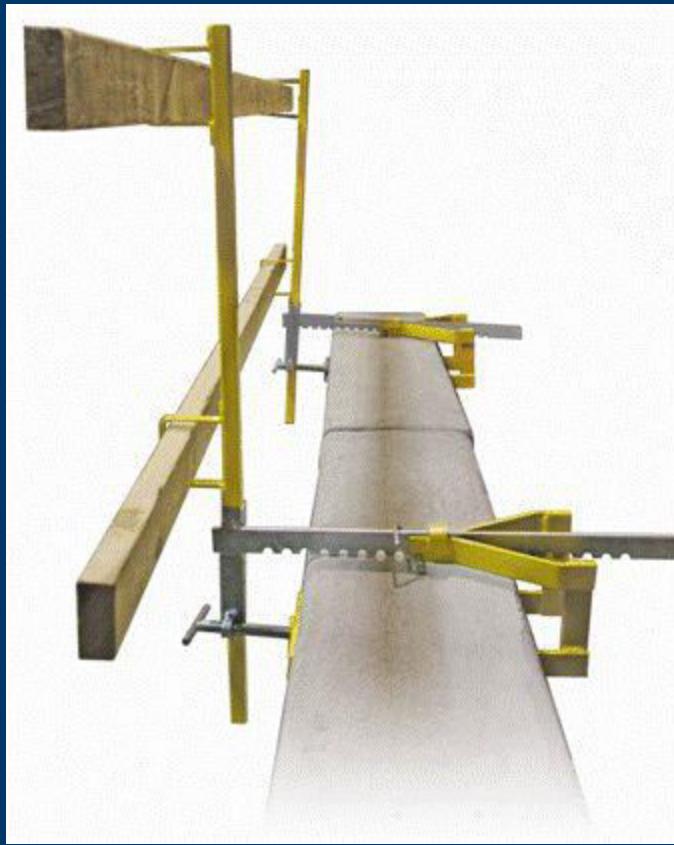
Horizontal Lifeline Fall Protection System



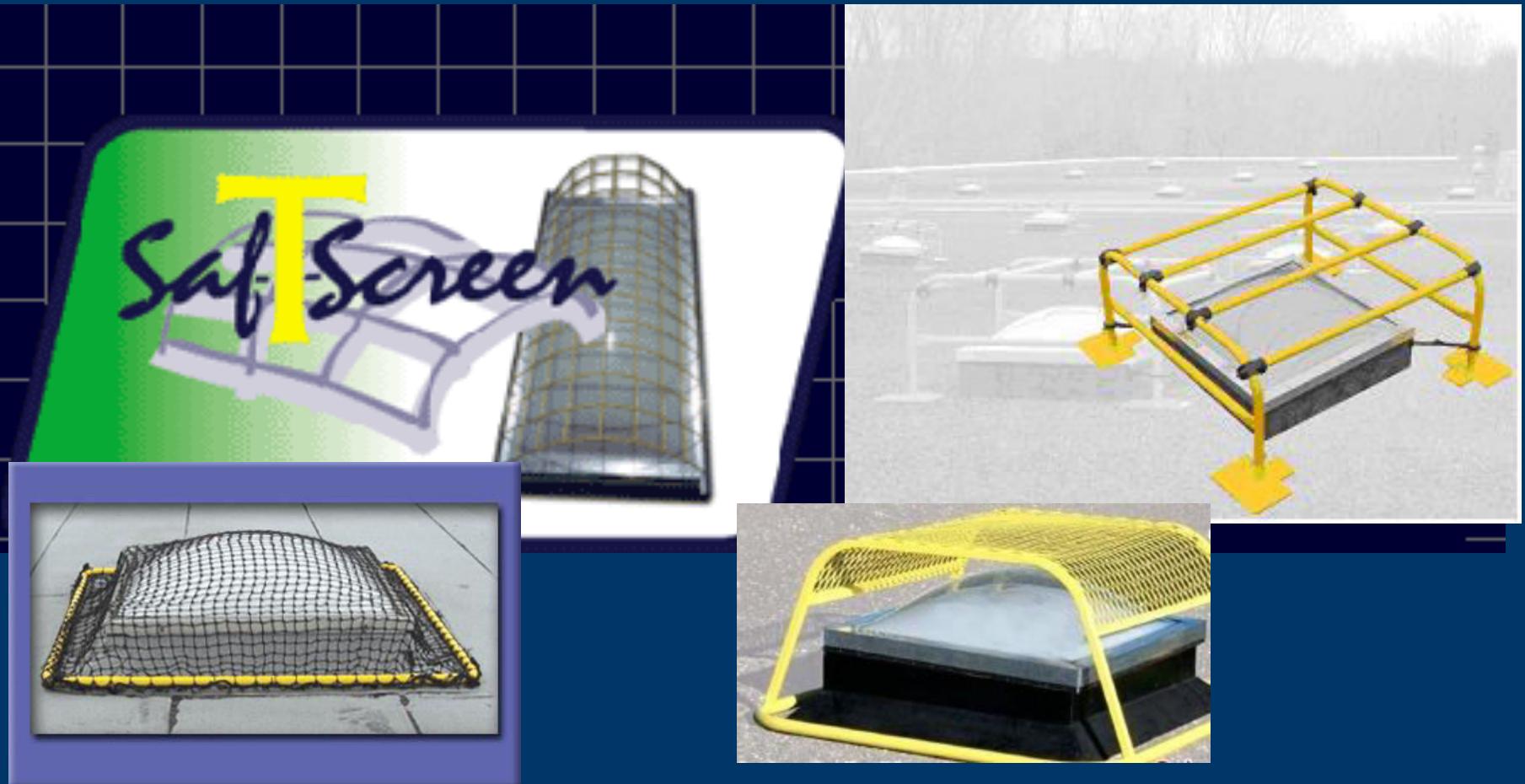
Another Cart System



Guardrail Systems Nonpenetrating



Skylight Protection—Exterior

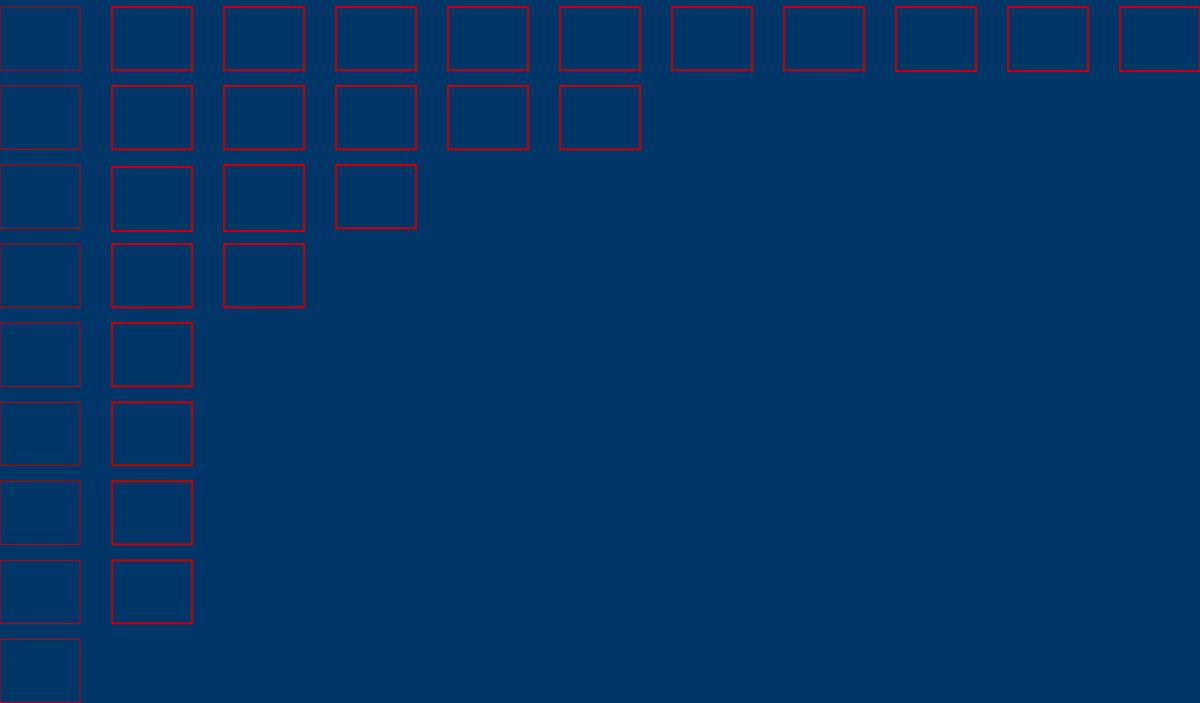


Skylight Protection—Interior



Others





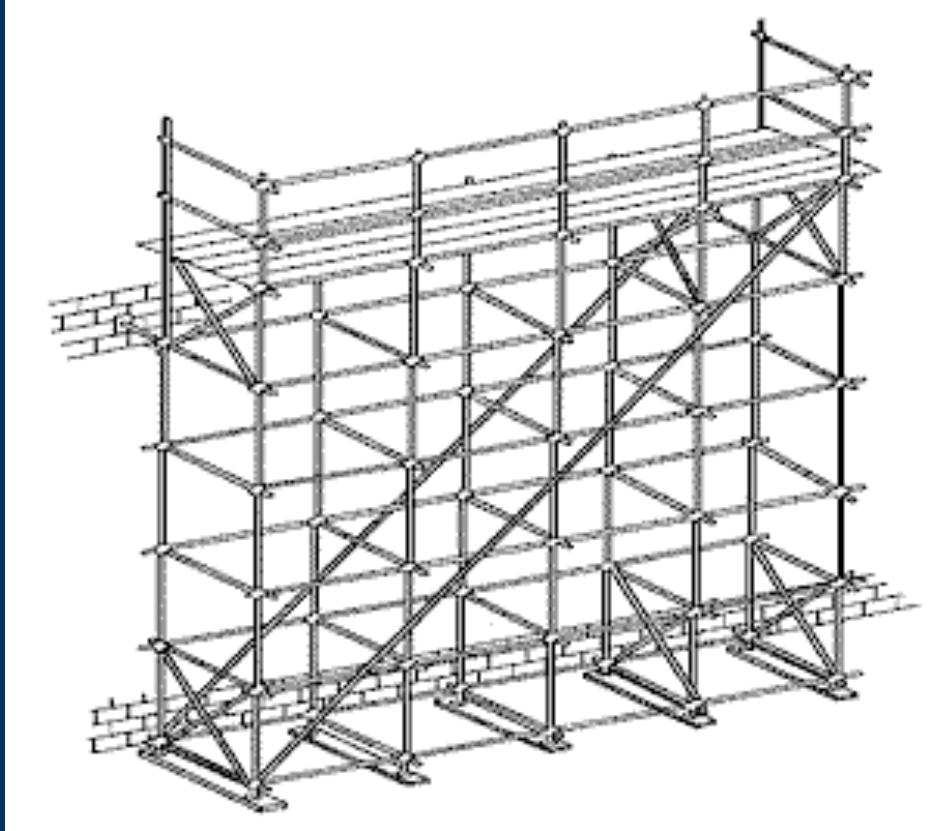
Subpart L: Scaffolds



The side rails of ordinary ladders are not strong enough to be used as scaffold platforms

Workers could have used a harness or guardrail system along with end rails

Scaffolds: Fall Protection at Heights > 10 feet



At heights greater than 10-feet, the fall-protection requirement for workers on scaffolds compares to the general construction rule of 6 feet or greater.

29CFR1926.451(g)(1)

Scaffold Fall Protection Rule Applies to:

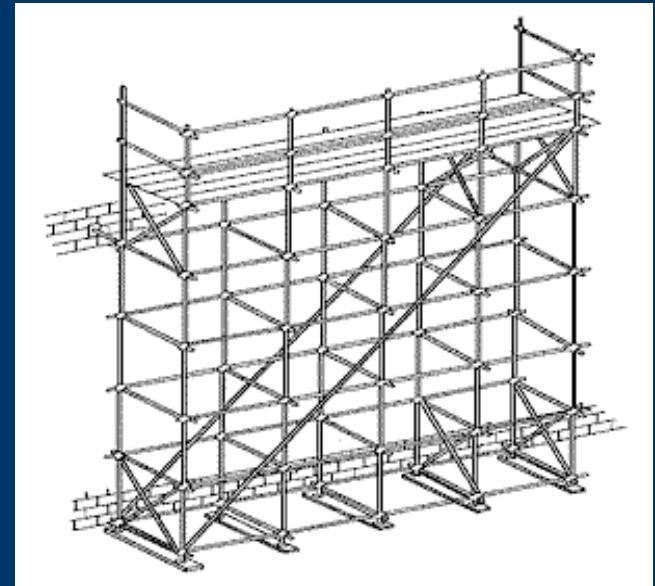
- Tube and coupler scaffolds
- Ladder jack scaffolds
- Pump jack scaffolds
- Chicken ladder



This pump jack scaffold was erected properly with guardrails and roof brackets for support.

Scaffold Fall Protection Options:

- Tube and coupler scaffolds: Guardrails or PFA systems
- Ladder jack scaffolds: PFA systems only
- Pump jack scaffolds: Guardrails or PFA systems
- Chicken ladder: Guardrails, PFA systems or $\frac{3}{4}$ -inch grab line or handhold next to chicken ladder



Tube and coupler scaffolds

Class Exercise

You will need:

A set of photos

Instructions

Course Objectives

By the time you are finished with this class, you should be able to:

1. Know where to find applicable citations within the OSHA fall-protection standard
2. Define the regulatory text
3. Apply fall-protection regulations to jobs

Post-test

Once you complete the test, please complete the evaluation form and Student Information Sheet.

Roofing Industry Fall Protection from A to Z

This material was produced under grant number **SH-26317-SH4** from the Occupational Safety and Health Administration, U.S. Department of Labor. It does not necessarily reflect the views or policies of the U.S. Department of Labor, nor does mention of trade names, commercial products or organizations imply endorsement by the U.S. Government.



Fall Protection In Construction



Presented by Philaposh

Section I

Introduction

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WHAT IS PHILAPOSH ?

- The Philadelphia Area Project on Occupational Safety and Health.
- Founded in 1975.
- Non Profit Organization serving the Tri-State area whose sole mission is to promote safety and health in the workplace.

What Does Philaposh Do?

- Provides research, training and technical assistance for member organizations and individuals;
- Provides training funded by grants from public agencies and private foundations;
- Holds special informational events (i.e. event for 9/11 responders from Delaware Valley);
- Provides information to injured workers and sponsors an annual event on Workers Memorial Day on April 28th.

What is OSHA?

- Occupational Safety and Health Administration
- Federal agency responsible for worker safety and health protection.

What Does OSHA Do?

- Encourages employers and employees to reduce workplace hazards and implement new or improve existing safety and health programs
- Develops and enforces mandatory job safety and health standards
- Maintains a reporting and recordkeeping system to monitor job-related injuries and illnesses
- Provides assistance, training and other support programs to help employers and workers

Has OSHA Made A Difference?

YES!

Since 1970 OSHA has:

- Helped cut the work-related fatality rate in half
- Worked with employers and employees to reduce workplace injuries and illnesses by 40%
- Virtually eliminated brown lung disease in the textile industry, and
- Reduced trenching and excavation fatalities by 35%

The Problem

Each year...

- **Nearly 6,000 workplace fatalities**
- **60,000 deaths from workplace-related illnesses**
- **5.7 million non-fatal workplace injuries**
- **Injuries alone cost U.S. businesses over \$125 billion**

Why Do We Need a
Fall Protection
Training Program
Specifically for
Residential Construction?

Myth:

Roofers on residential projects don't
get hurt

Fact:

Roof edge falls account for half of all
roofing-related fall deaths.

Myth:

A worker must fall a long distance to be killed.

Fact:

Half of construction falls resulting in death are from a height of 21 feet or less.

Myth:

Older, more experienced workers
don't fall.

Fact:

The average age of residential
construction workers who have
fallen to their deaths is 47.

Myth:

There are not many safe alternatives available for workers to prevent or protect them from a fall.

Fact:

There are many and here are just a few that we will be seeing in the following presentation.

Objectives Of This Training

- Learn to recognize the most common serious fall hazards in construction.
- Learn to recognize other common serious hazards in residential construction.
- Understand the principles and practices of hazard control: The Hierarchy of Controls.
- Learn OSHA requirements for fall protection with special emphasis on roofs, scaffolds, ladders and stairways.
- Understand alternative fall protection procedures in residential construction per Standard 3-0.1A.
- Employer's and Employee's rights & responsibilities under OSHA.

Note: The pictures in the remaining presentation have color coded borders. The color codes are as follows:

Red & Yellow borders – Working Unsafely
Green borders – Working Safely

SECTION II

IDENTIFYING FALL HAZARDS

During each stage of a residential build workers will encounter fall hazards associated with:

- Site preparation and Excavation
- Foundation Work
- Flooring Work
- Framing
- Siding and brick work
- Roof work
- Others

Age: 40 yrs.

Date of Death: 5/21/08

Location: Malvern, PA

Cause of Death: Fell 25 feet from
a roof onto a concrete deck.



Site Preparation and Excavation Work



Site Preparation and Excavation Work



This caution tape does not meet the requirements of a barricade, fence or guardrail system.

Site Preparation and Excavation Work



FOUNDATION WORK

Walking on a foundation wall that is 6 feet above the ground is very dangerous and is not recommended.



FOUNDATION WORK

1. Worker standing on top step of step ladder which is not permitted.
2. Scaffold does not have guardrails installed.

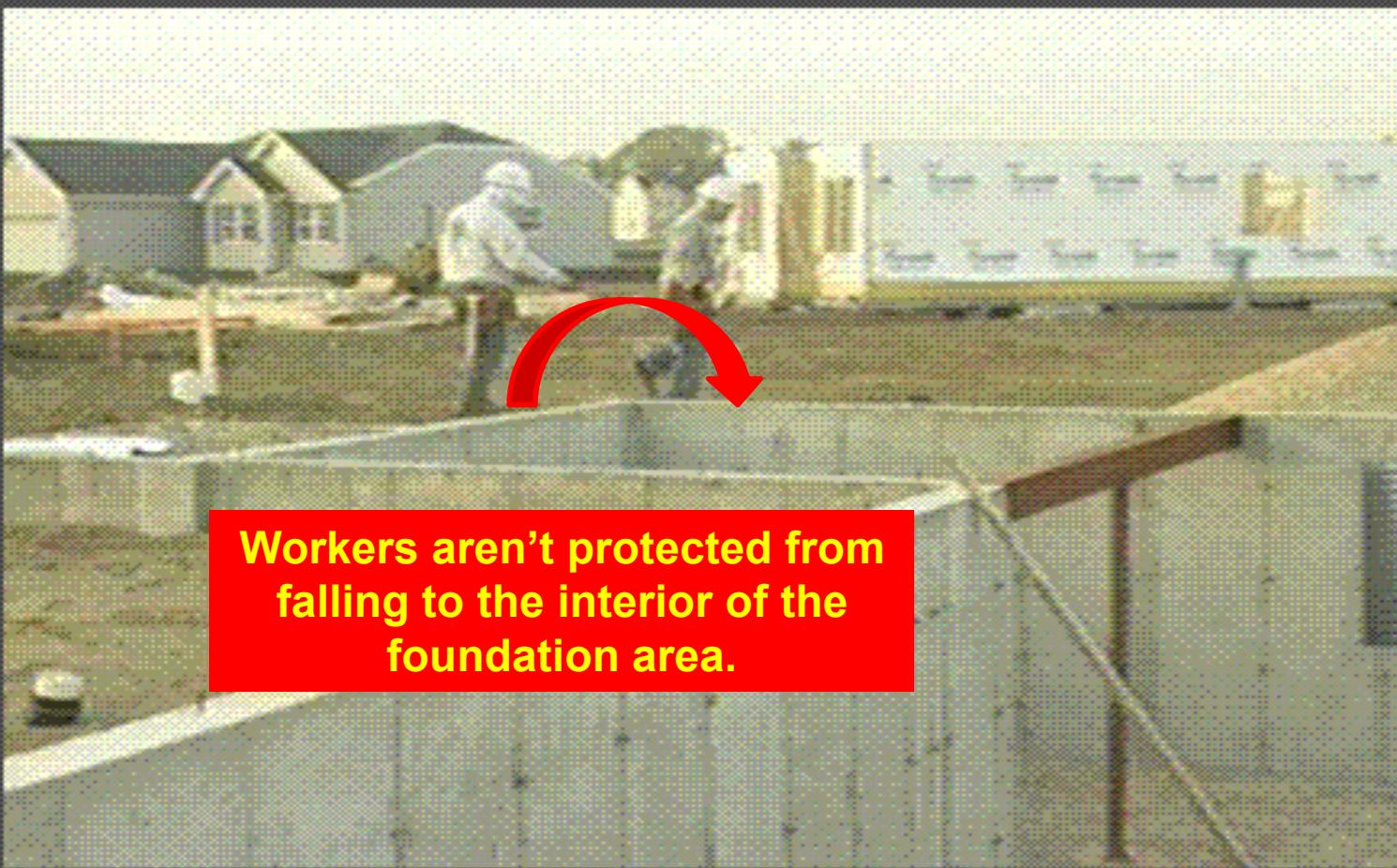


FOUNDATION WORK

Worker on top of formwork is exposed to a fall hazard.

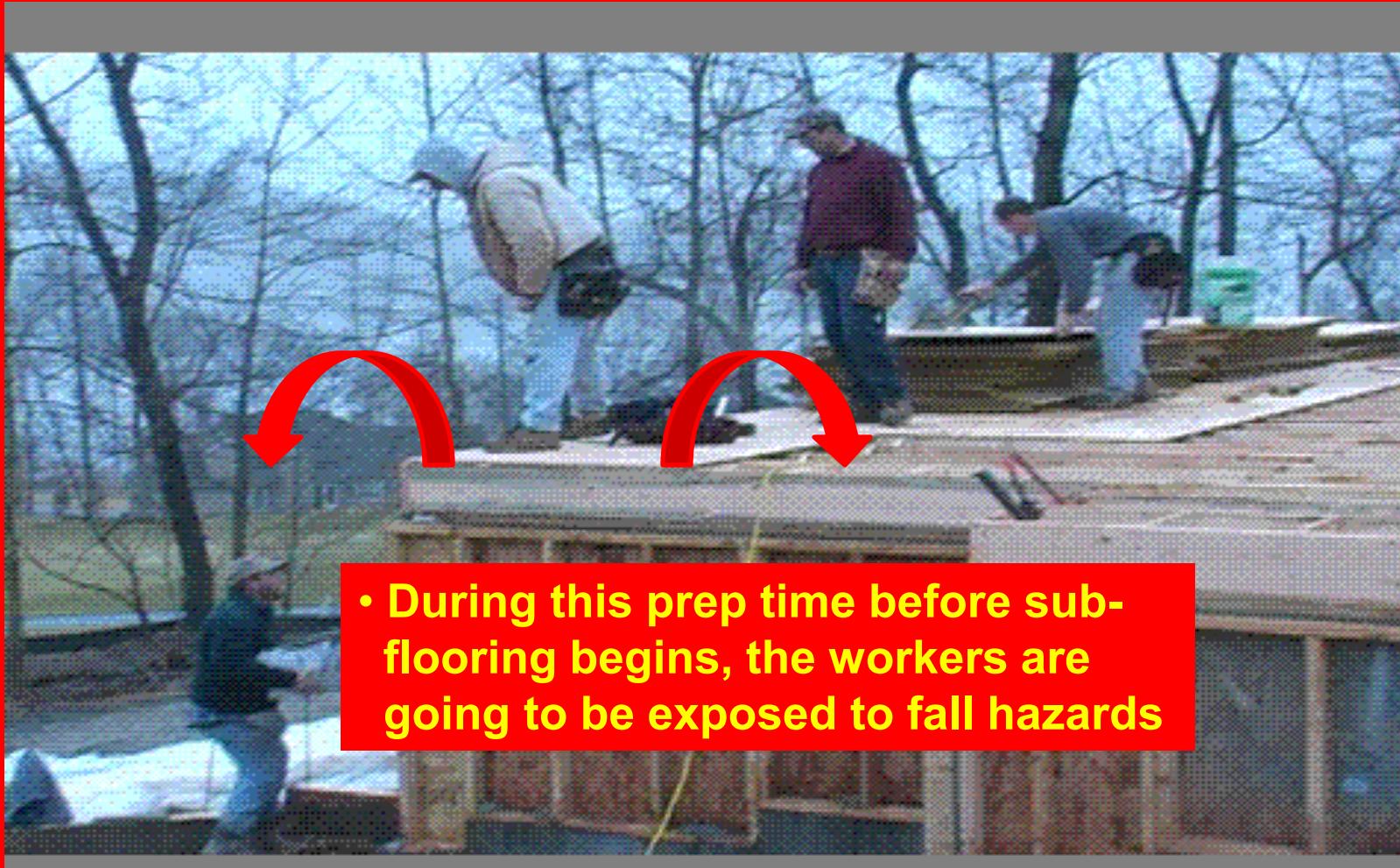


FOUNDATION WORK



Workers aren't protected from falling to the interior of the foundation area.

FLOORING



- During this prep time before sub-flooring begins, the workers are going to be exposed to fall hazards

FLOORING



FLOORING



“BALANCE BEAM”



1. Plank too narrow and missing cleats.
2. Guardrails are required because walking surface is higher than 6 feet.
3. Hose causes a trip hazard.

Examples of Fall Hazards During Framing Work



FRAMING



FRAMING



Guardrails should be installed to protect workers near window or wall openings.



Framing Work



**Workers are exposed to a fall hazard.
Should have a guardrail system**

FRAMING



Placing a ladder in front of a door opening where there is a fall hazard is not fall protection.

NO FALL PROTECTION



- Should have guardrails.

NO FALL PROTECTION



FRAMING



FRAMING INTERIOR HAZARDS



Age: 41 yrs

Date of Death: 12/31/08

Location: New Jersey

Cause of Death: Fell from 1st floor 14 feet to the ground with equipment he was trying to position on edge.



Siding and Brick Work



SIDING AND BRICK WORK



SIDING AND BRICK WORK



- Ladderjack scaffolding...Height limitation 20 feet
- No guardrail or personal fall arrest system.

SIDING AND BRICK WORK



SIDING AND BRICK WORK



Ladder's side rails must be supported to stabilize the ladder.

SIDING AND BRICK WORK



Ladder must extend
36 inches (3ft) above
the walking/working
surface.

STUCCO WORK



- Improper access to scaffolds.
- No fall protection for worker on roof.



SIDING AND BRICK WORK



Planking or platforms must be inspected before use to ensure they are in good condition and free of any damage or defects

OTHER FALL HAZARDS

There is no
guardrail on the
landing and no
guardrail or
handrail on the
stairway



OTHER FALL HAZARDS



Age: 45 yrs

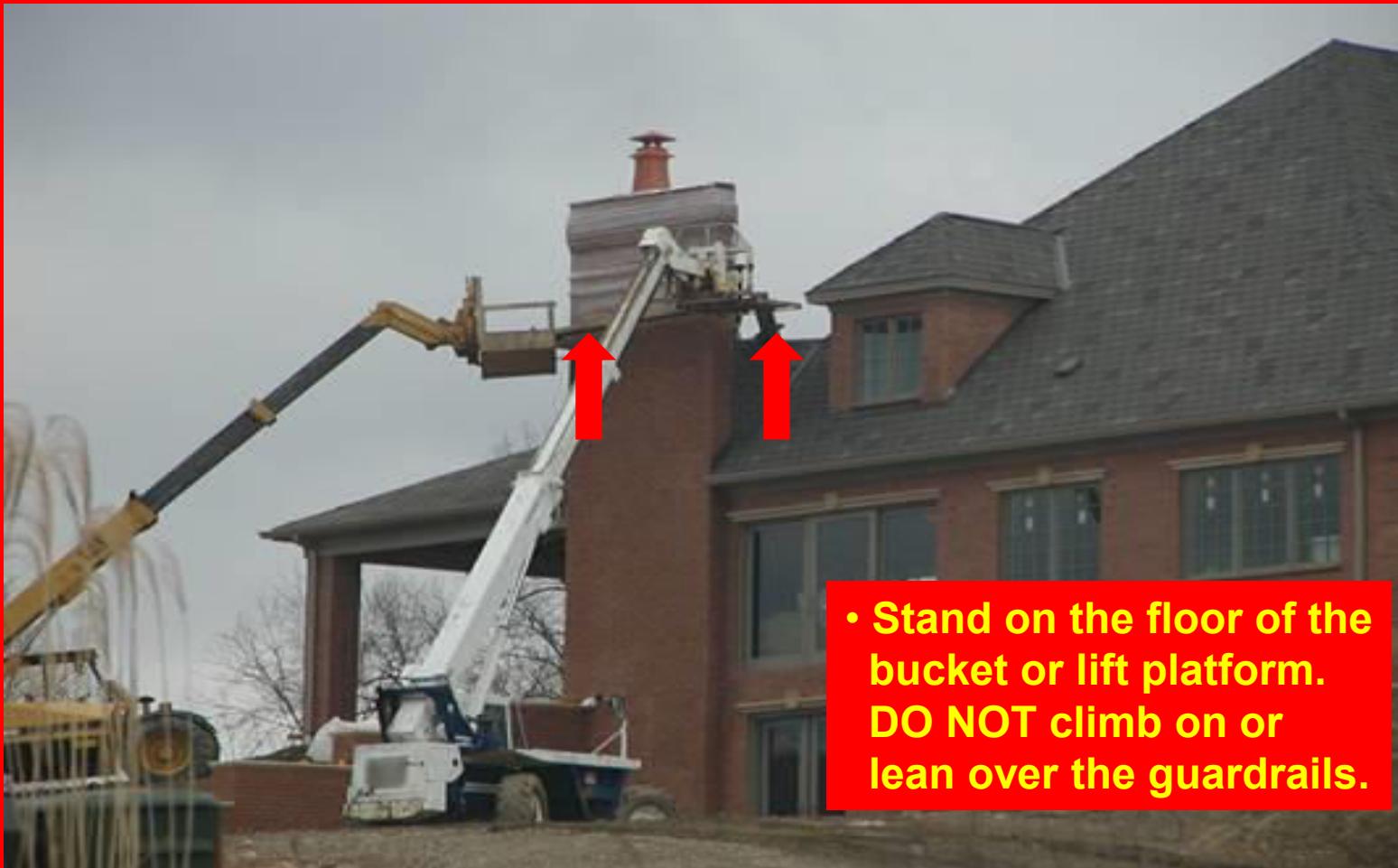
Date of Death: 3/29/07

Location: Butler, PA

Cause of Death: Fell from second
floor balcony



OTHER FALL HAZARDS



- Stand on the floor of the bucket or lift platform.
DO NOT climb on or
lean over the guardrails.

OTHER FALL HAZARDS

DO NOT drive with aerial lift platform elevated.



OTHER FALL HAZARDS



Age: 56 yrs

Date of Death: 11/25/08

Location: Hoboken, NJ

Cause of Death: Fell from
scissor lift while installing
panels.



Section III

IDENTIFYING FALL HAZARDS DURING ROOFING WORK

**Working on a roof is one of the most dangerous residential building tasks.
Nearly half of all residential construction deaths result from falls.**

Age: 47 yrs

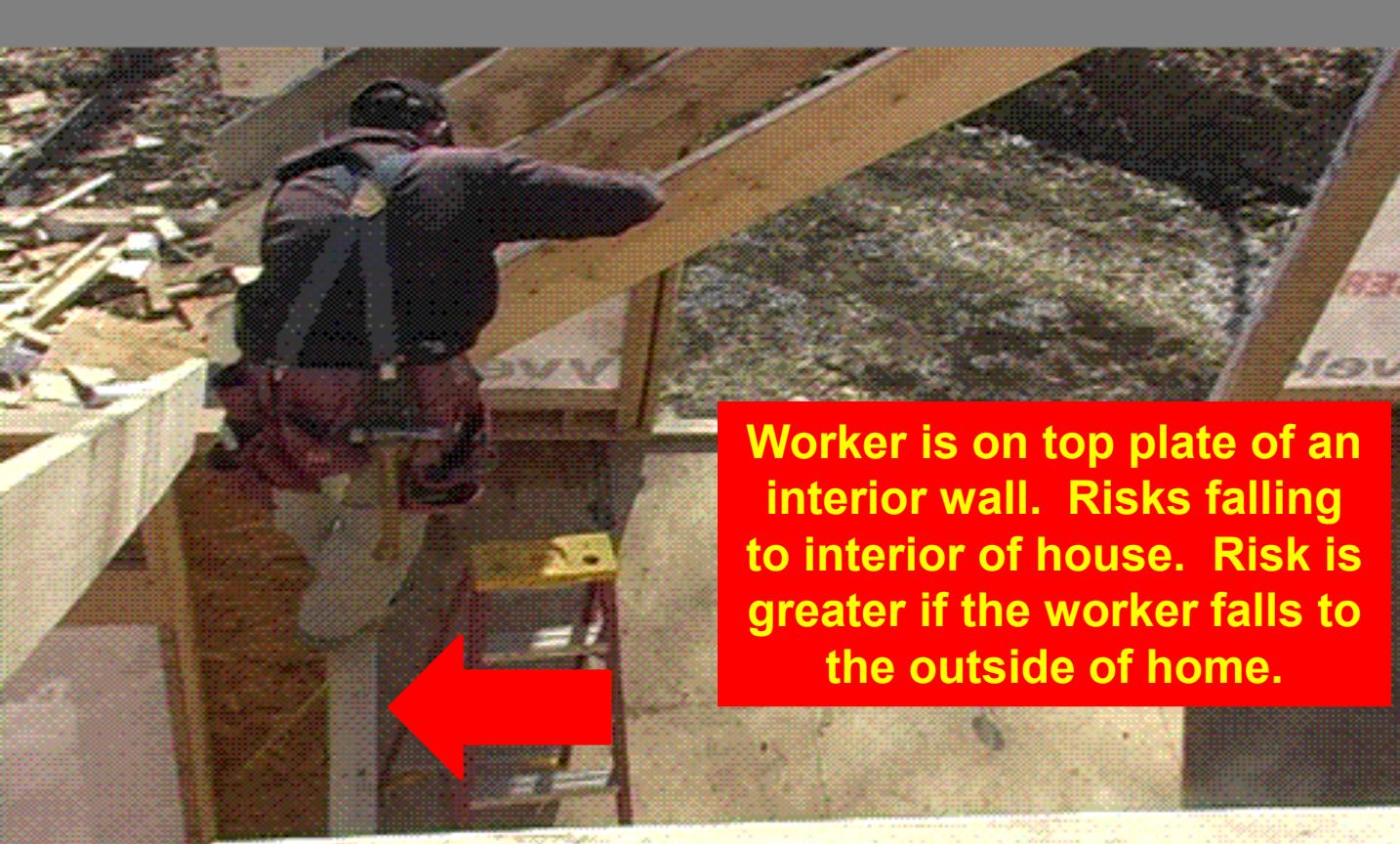
Date of Death: 6/20/08

Location: Connellsville, PA

Cause of Death: Fell
approximately 22 feet
from the roof.

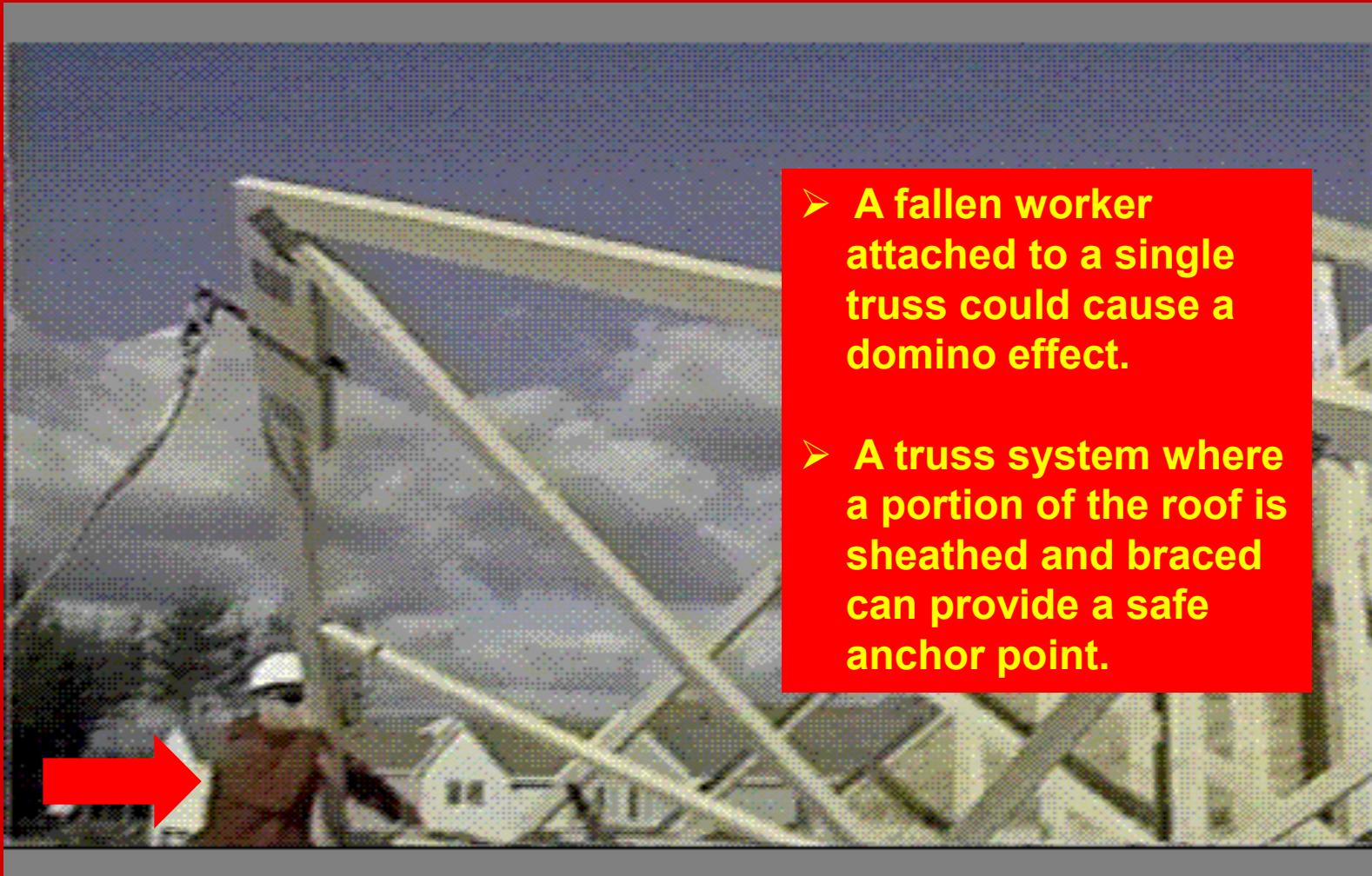


ROOFING WORK: STICK FRAMING



Worker is on top plate of an interior wall. Risks falling to interior of house. Risk is greater if the worker falls to the outside of home.

ROOFING WORK

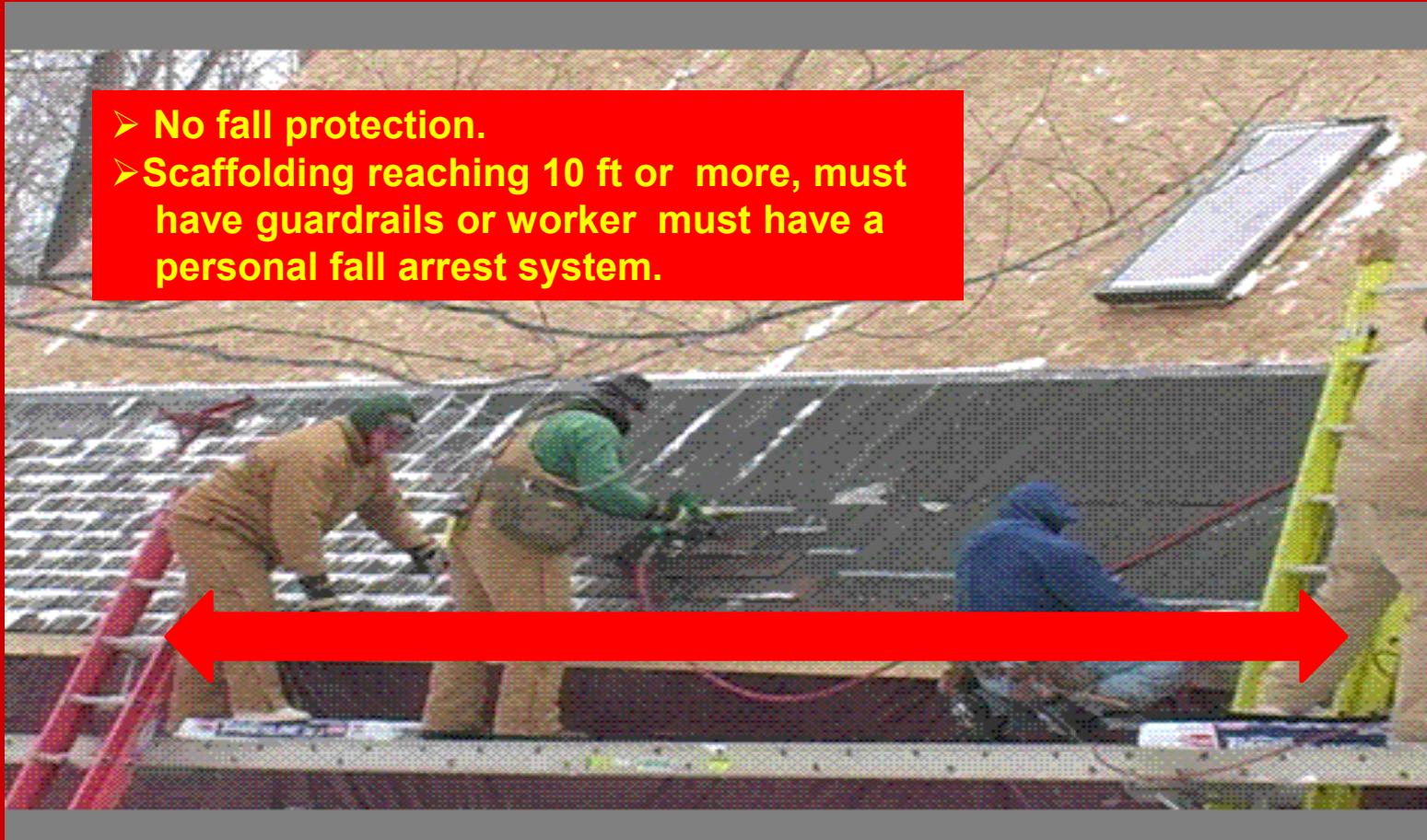


- A fallen worker attached to a single truss could cause a domino effect.
- A truss system where a portion of the roof is sheathed and braced can provide a safe anchor point.

Roofing Work: Poured Roofs



ROOFING WORK: WEATHERPROOFING



ROOFING WORK: WEATHERPROOFING



Age: 58 yrs.

Date of Death: 9/23/08

Location: Wilmington, DE

Cause of Death: Fell 30 feet through a skylight.



Questions to ask

- ❑ What's the composition of the roof material?
- ❑ How will you get on the roof?
- ❑ Do you need to handle heavy materials?
- ❑ How close to the roof edge will you be working?
- ❑ How steep is the roof?

SUMMARY

- Each worker who is working near a *leading edge* 6 feet or more above lower levels must be protected by guardrail systems, safety net systems or personal fall arrest systems.

- *Leading edge* - The edge of a floor, roof, or formwork for a floor or other walking/working surface that changes as more floor, roof, decking or formwork sections are placed, formed, or constructed.

Fall Protection In Construction



Presented by Philaposh

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SECTION IV

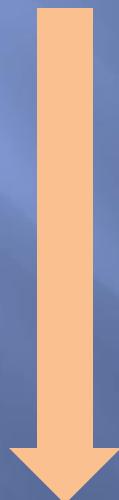
Principles and Practices of Hazard Control

Hierarchy of Hazard Controls

The less human effort for fall protection, the more effective the fall protection.

EFFECTIVENESS

Most Effective



HUMAN EFFORT

Least Effort



- Eliminate
- Engineered
- Training
- PPE

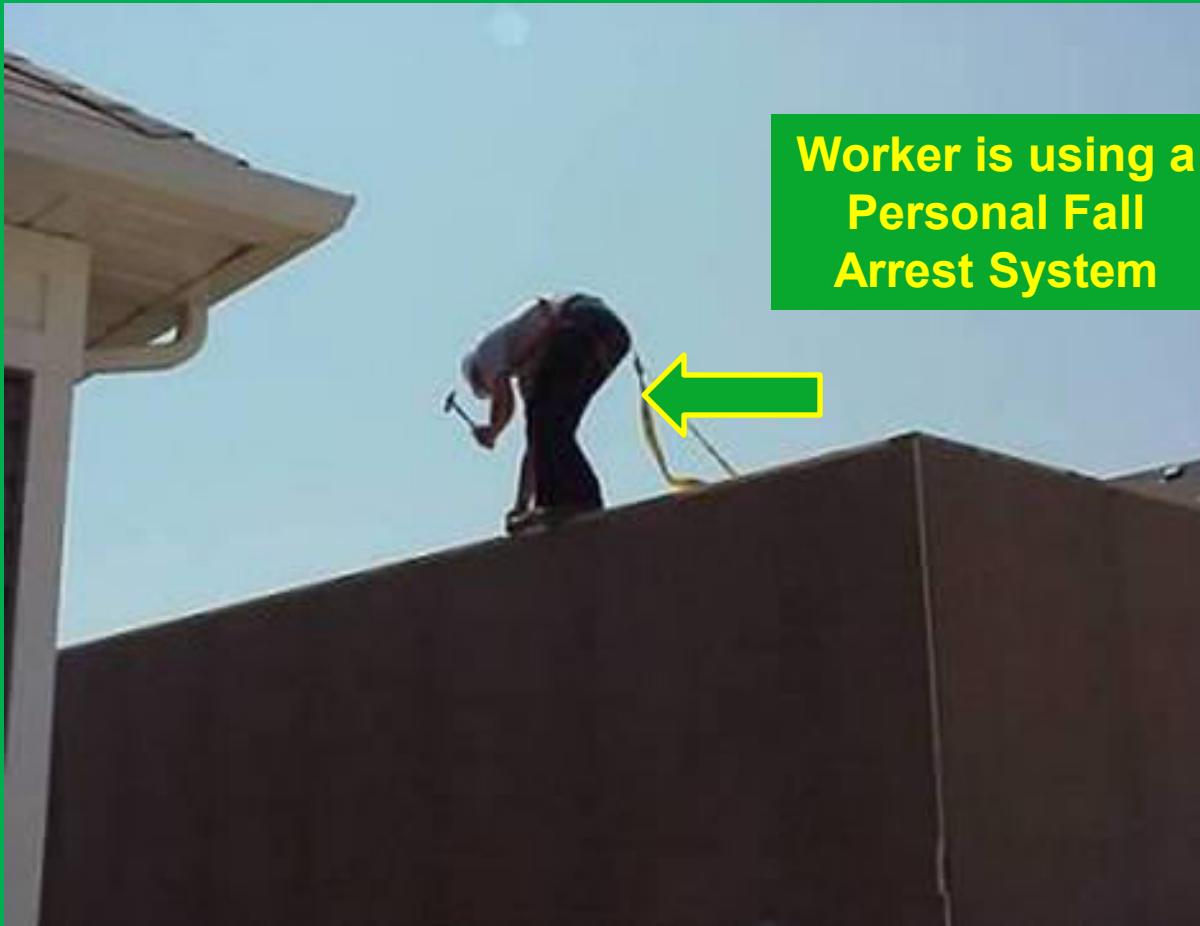
Least Effective

Most Effort

METHODS TO CONTROL FALL HAZARDS

WORKING SAFELY

Personal Fall Arrest System



**Worker is using a
Personal Fall
Arrest System**

Retractable Lanyards



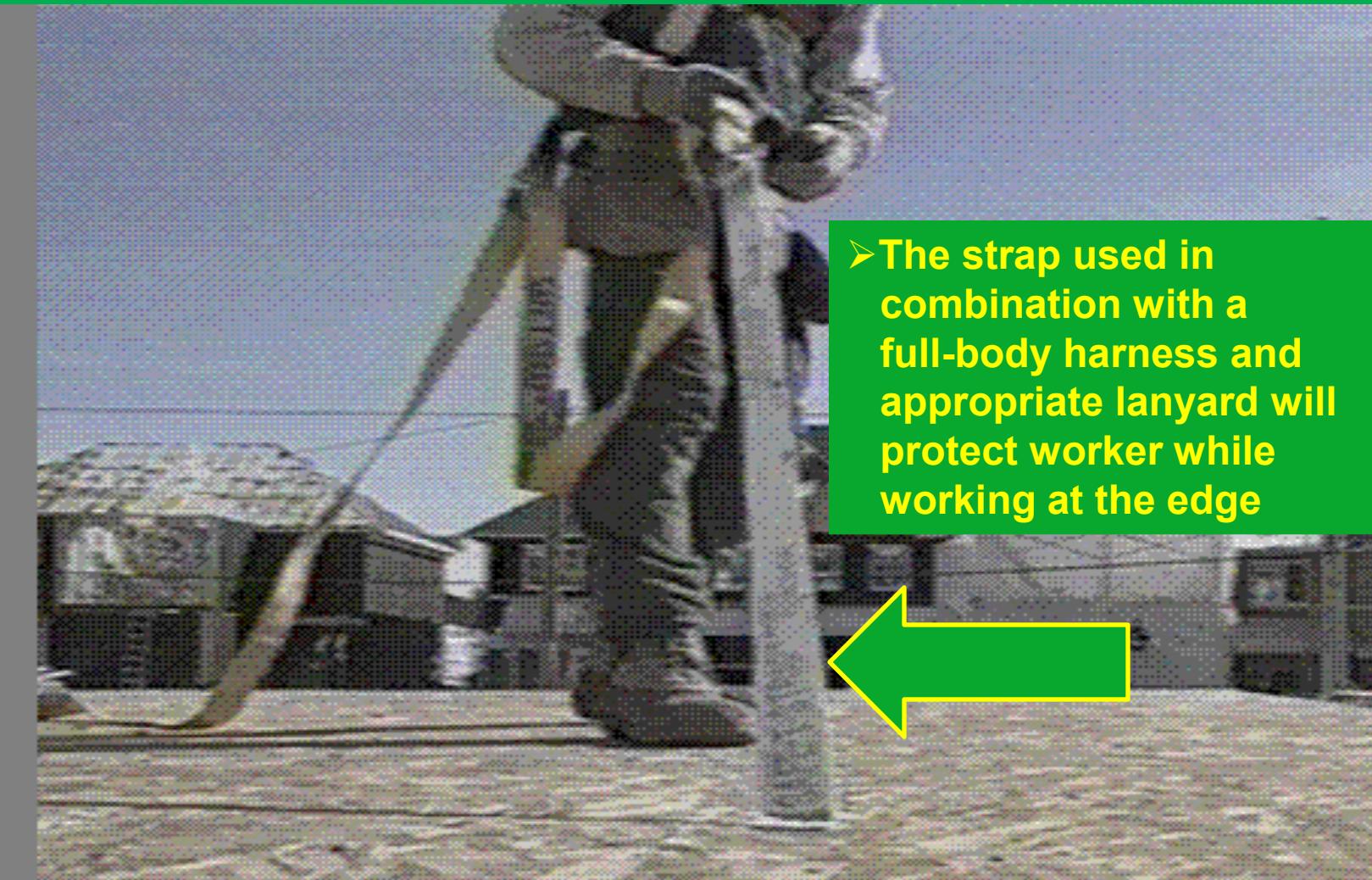
Personal Fall Arrest System

- System used to arrest (stop) your fall
- Consists of anchor, full body harness & lanyard



WORKING SAFELY

Personal Fall Arrest System



➤ The strap used in combination with a full-body harness and appropriate lanyard will protect worker while working at the edge



WORKING SAFELY

Personal Fall Arrest System



Two things to look for with a fall arrest system:

1. You don't have a swing fall hazard
2. It arrests your fall

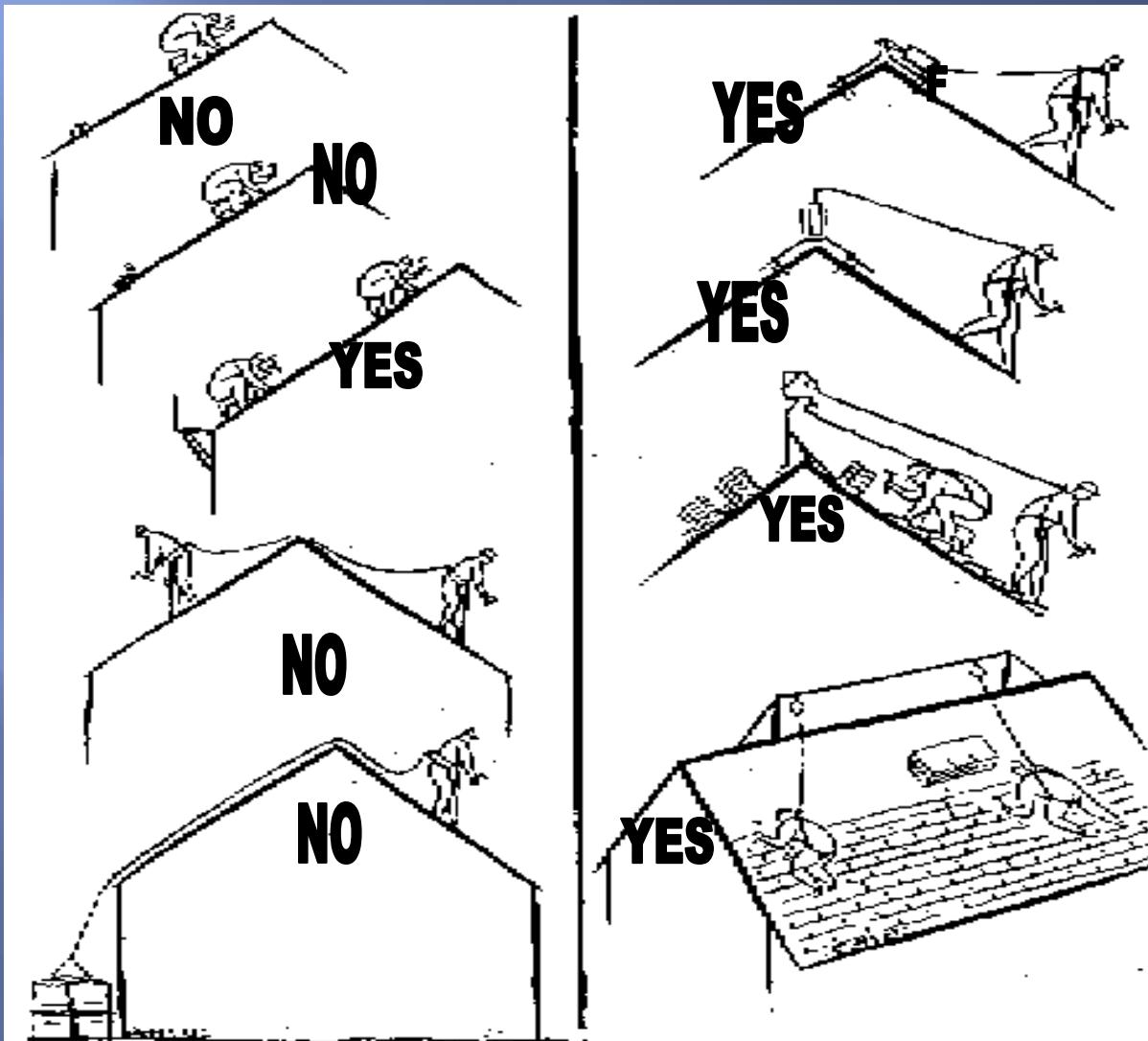
WORKING SAFELY

Personal Arrest System



- Anchor point can be quickly installed to an interior rafter with nails.
- It can be cut & removed quickly .

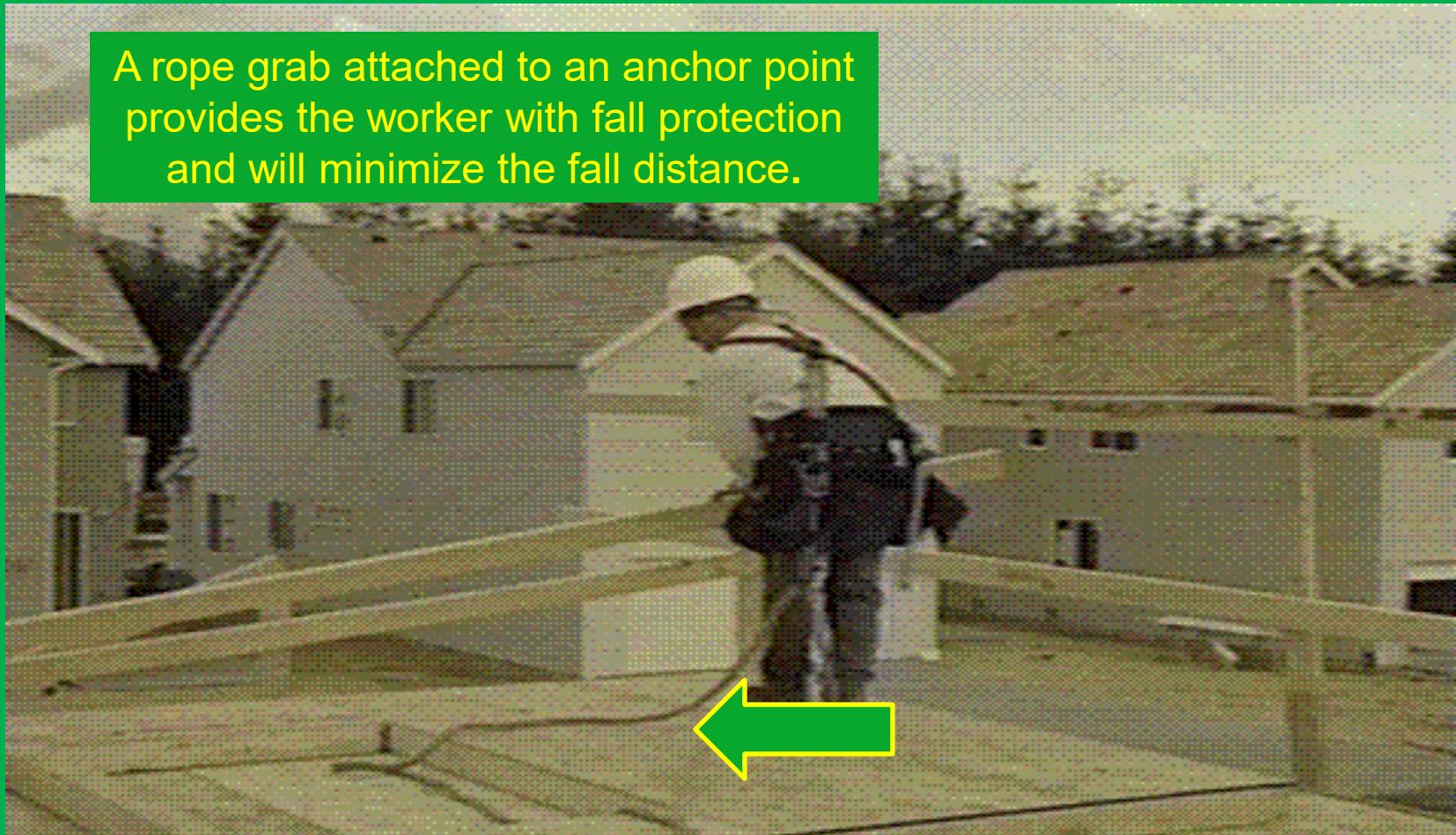
Roofing Fall Protection Techniques



WORKING SAFELY

Guardrail

A rope grab attached to an anchor point provides the worker with fall protection and will minimize the fall distance.



WORKING SAFELY

Guardrail

**Guardrail system with standard
2 x 4's for the rails and specially
designed adjustable brackets
for the posts.**



WORKING SAFELY

Guardrail



➤ This system is typically set-up at or near the roof edge.

WORKING SAFELY

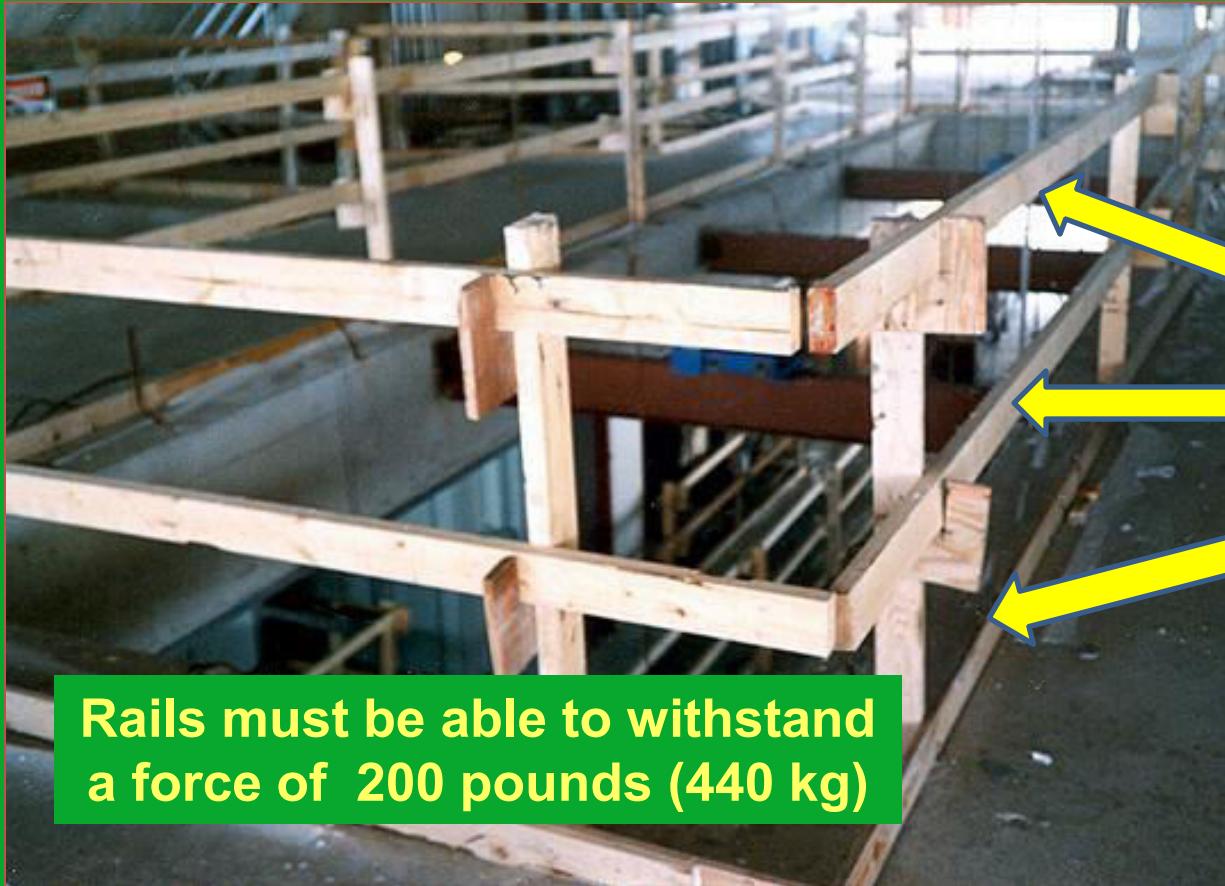
Guardrail



Large opening in floors are common fall hazards. A simple solution is to install a guardrail system.

WORKING SAFELY

Guardrail



WORKING SAFELY

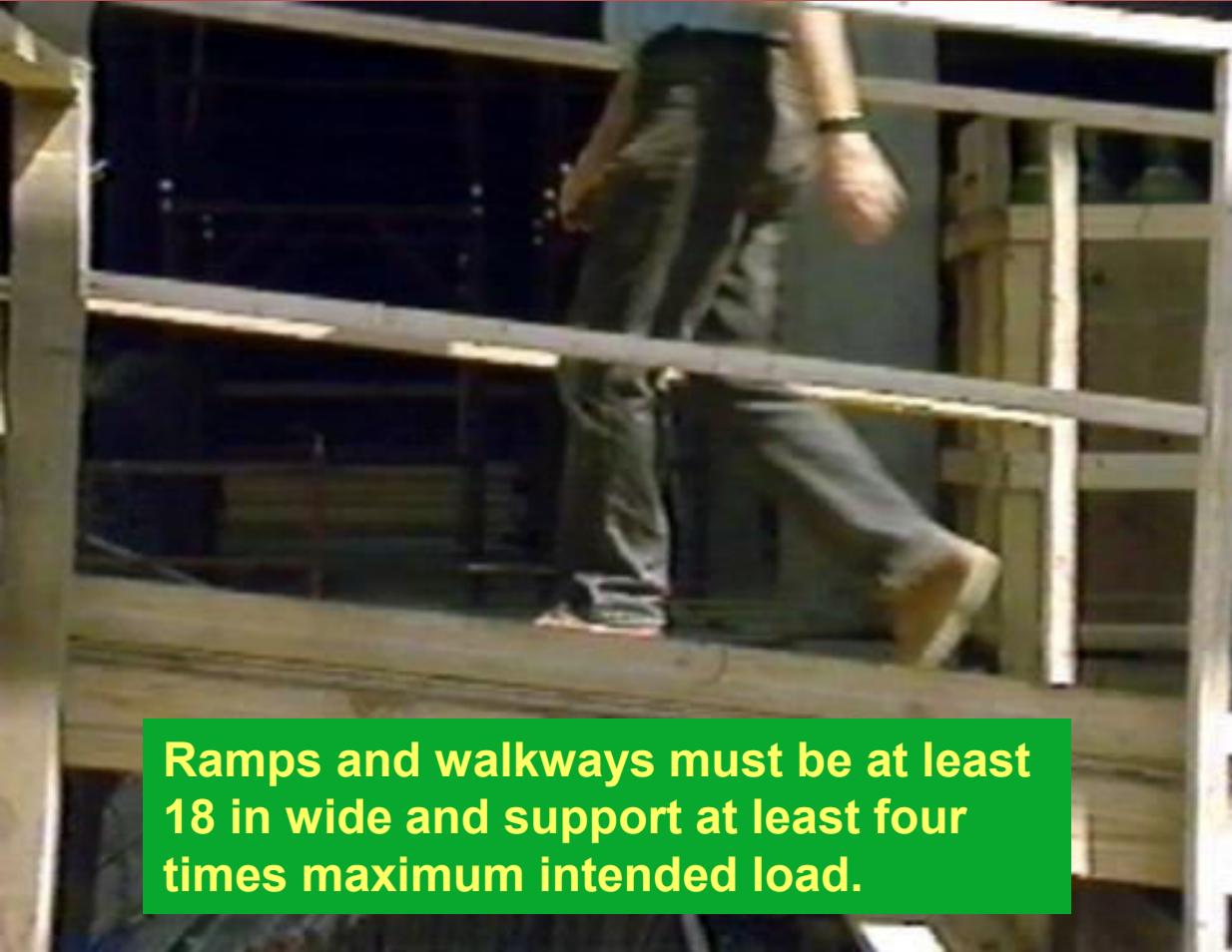
Hole Covers



- Material used for hole covers must be able to support twice the maximum load and should include the weights of the worker, tools materials and equipment.
- Must be fastened down
- Must be marked with the word “HOLE or COVER”

WORKING SAFELY

Ramps & Walkways



Ramps and walkways must be at least 18 in wide and support at least four times maximum intended load.

WORKING SAFELY

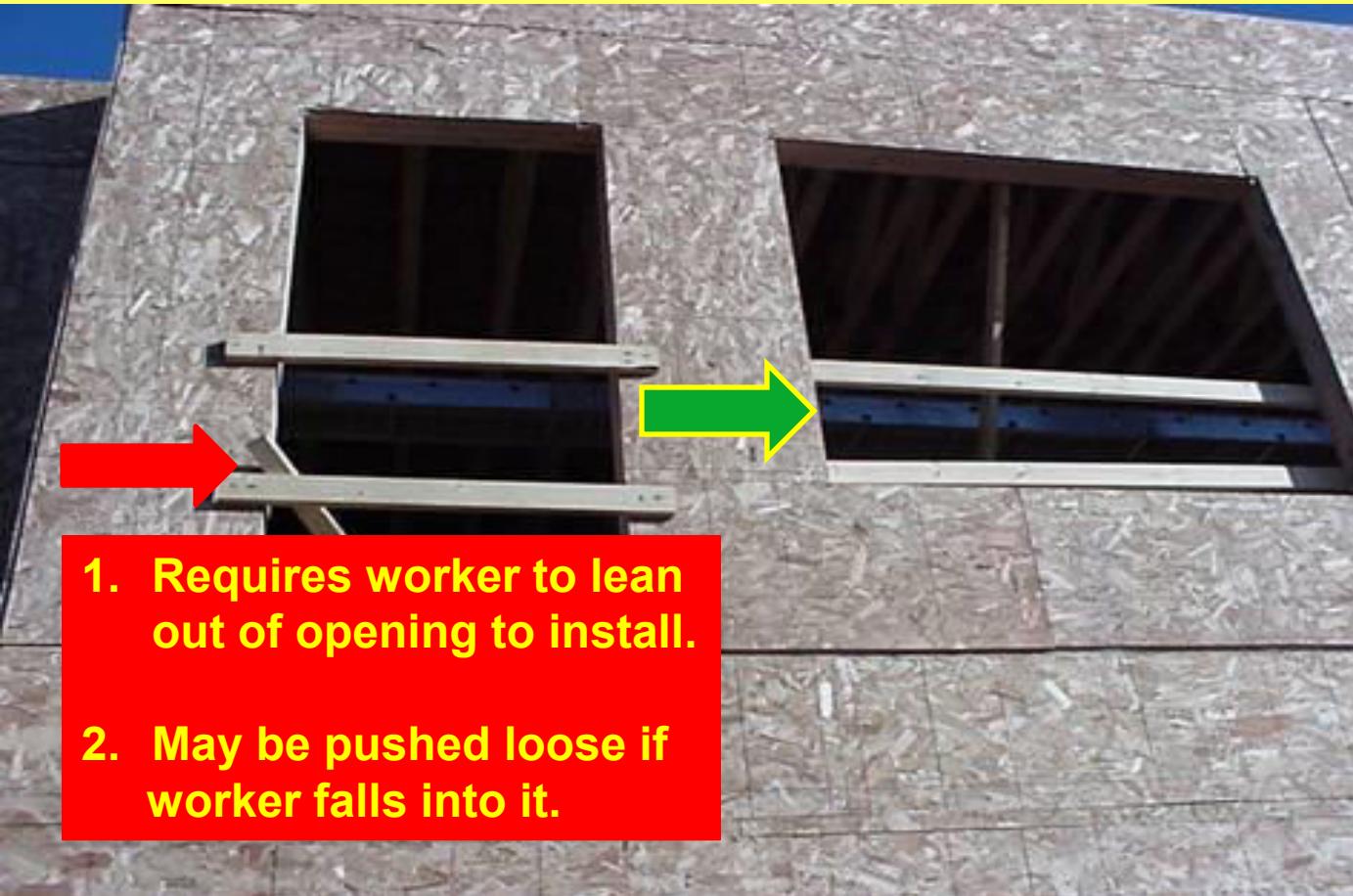
Guardrail



Another safe alternative is to pre-install guardrails on window and door openings prior to raising the wall sections.

WORKING SAFELY

Guardrail



WORKING SAFELY

Aerial Lifts



➤ **Safe alternative that can be used during roofing work.**

WORKING SAFELY

Aerial Lifts

- Wear appropriate Fall Protection (lanyard & harness)
- Tie off to an anchorage point built into the aerial lift.



GENERAL FALL PROTECTION TRAINING

The employer shall provide training by a competent person to each worker who might be exposed to fall hazards.

Competent Person - Someone who understands the standard and has the authority to implement the plan. This person may be your supervisor

Qualified Person - someone that is knowledgeable and has expertise..

GENERAL FALL PROTECTION TRAINING

The training shall include:

- Nature of fall hazards and how to recognize these hazards;
- Correct procedures for erecting and maintaining , disassembling and inspecting fall protection systems to be used.

- Role of each employee in safety monitoring system and in fall protection plans;
- Use and operation of guardrail systems, personal fall arrest systems, safety net systems, safety monitoring systems, controlled access zones and other protection to be used;
- Limitations on use of mechanical equipment during roofing work on low-sloped roofs;
- Correct handling and storage of equipment and materials and erection for overhead protection;
- The standards contained in this subpart

Retraining is required when there are:

1. Changes in the types of fall protection systems or equipment.
2. Changes in the workplace render previous training obsolete
3. When an employee shows deficiencies in work involving previous training.

Certification of Training

Employer must maintain written certification records for training.

Section V

Understanding OSHA's Scaffold Safety Standards

Age: 47 yrs

Date of Death: 5/29/08

Location: Malvern, PA

Cause of Death: Fell from a
mobile scaffold.





- Any elevated working surface must comply with OSHA scaffold standard.
- Keep area clean of scrap and combustibles.



- **Avoid unsafe scaffold use:**
 - missing planks
 - no ladder access
 - no safety guardrail at top
 - no PPE
 - cluttered work area



- Planks should overlap 6"
No more than 18"
- Should not use two ladders

Age: 55

Date of Death: 2/28/08

Location: Hazlet, NJ

Cause of Death: Fell
from a scissor lift.





- Scaffold must have a base plate and a mud sill.
- Stacked bricks are not an appropriate surface.
- Trip hazards.



- Use correctly built scaffold, fully planked and with guardrails around each working level.
- Do not pile heavy materials on scaffolding so that they sag.
- Plank boards may not deflect or sag more than 1/60 of span.



- Never work on an unsafe platform.
- Protect building entrances from overhead hazards.



- This homemade platform is less than 6 feet high, but falls may still cause injury.
- Trip hazards on work surface.



- This worker needs PPE, including safety glasses.
- Do not use unsafe improvised work platforms.



**Unsafe surface for use
of stilts.**



- Make sure all scaffold parts are in place and used correctly.
- Never climb on cross-braces.



- Use a safe work platform that is big enough for the task.
- Wear correct PPE and keep work area clean.



Complies with OSHA but
should have guardrails.

SUMMARY

- Scaffolds can be no more than 14" from the work surface
 - Except for plaster's scaffolds—18"
 - And outriggers 3"

If more space, guardrails required

ACCESS TO SCAFFOLDS

- Ladders must be used if first step is 24" or more
- Brick mason's frames not acceptable to climb
- Maximum spacing between rungs $16 \frac{3}{4}"$
- Minimum rung length 8"
- Uniformly spaced
- No climbing X-bracing

PLANKING

- Planks must extend 6" over support
- Overlaps must be 12"
 - 6" each side of support
- Split planks must be removed
- Only scaffold grade lumber intended for scaffold planks can be used

FALL PROTECTION

- Fall protection required at 10'
 - Guardrails with midrails, toe boards, or
 - Personal Fall Arrest
 - X-bracing can be toprail or midrail, but not both
 - 38-48" for toprail
 - 20-30" for midrail
 - Ends of brace 48" or less

TRAINING

- Employer shall provide training by a qualified person to each worker who works while on a scaffold on the following topics:
 - Hazard recognition and procedures to control or minimize these hazards.
 - Electrical hazards, fall hazards & fall object hazards.

TRAINING

- Correct procedures for dealing with electrical hazards and for erecting, maintaining and disassembling fall protection systems and falling object protection systems being used;
- In the standards of Subpart L;
- Proper use of the scaffold and proper handling of materials on the scaffold;
- Maximum intended load and the load-carrying capacities of the scaffolds used.

Training requirements standard 1926.454

TRAINING

- ❑ Employees involved in erecting, disassembling, moving, operating, repairing, inspecting and maintaining a scaffold must be trained by a competent person.

Training requirements standard 1926.454

- Retraining is required in at least the following situations:
 - Changes at worksite present new hazards;
 - Changes in the types of scaffolds, fall protection, and falling object projection or other equipment
 - When an employee shows deficiencies in work involving previous scaffolding training.

Working Safely

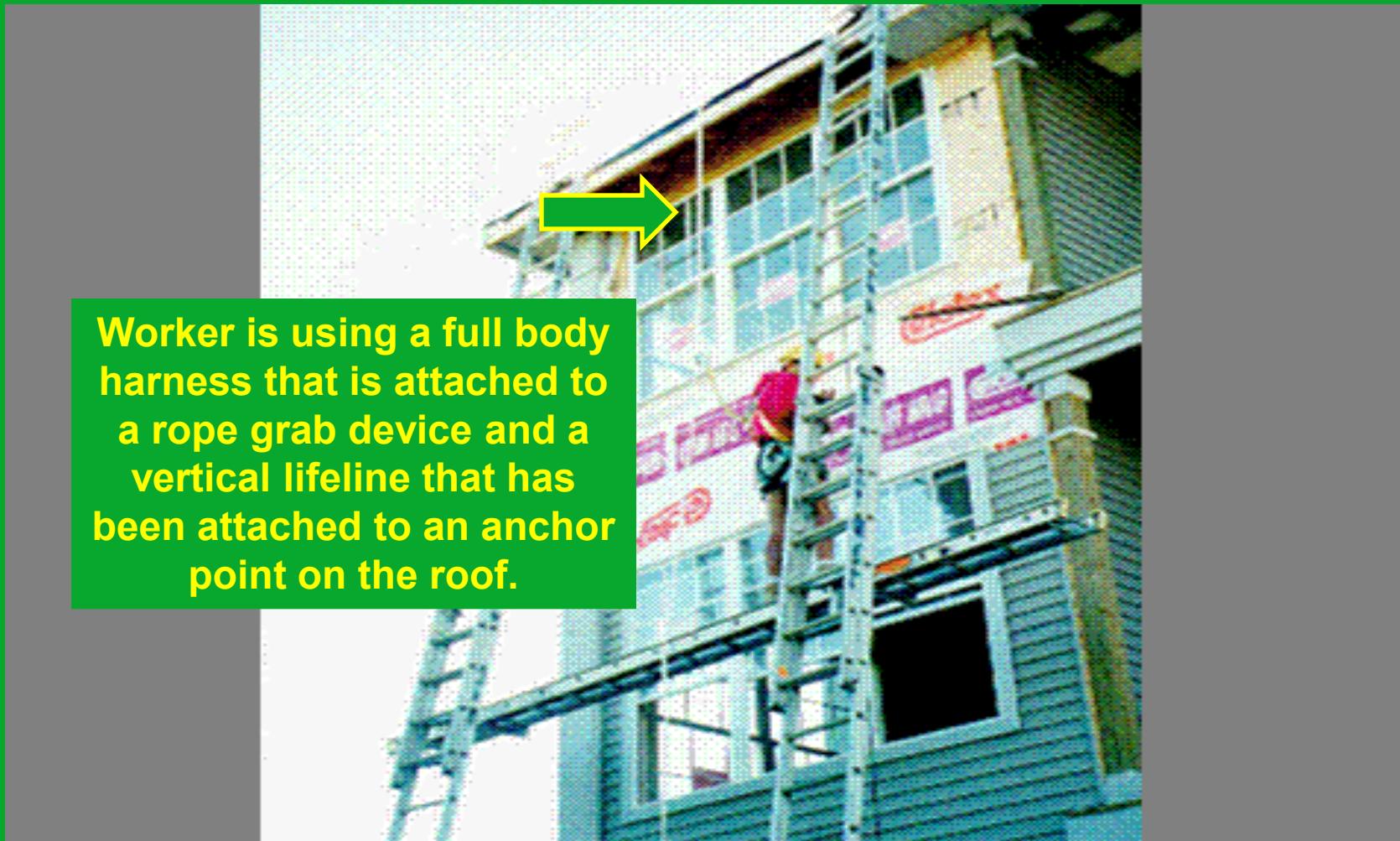


**Worker is standing on
a top-plate scaffold to
install roof sheathing.**

Working Safely



Working Safely



Worker is using a full body harness that is attached to a rope grab device and a vertical lifeline that has been attached to an anchor point on the roof.

Working Safely



Planking is complete between the uprights with no more than 1 inch gaps between the planks.

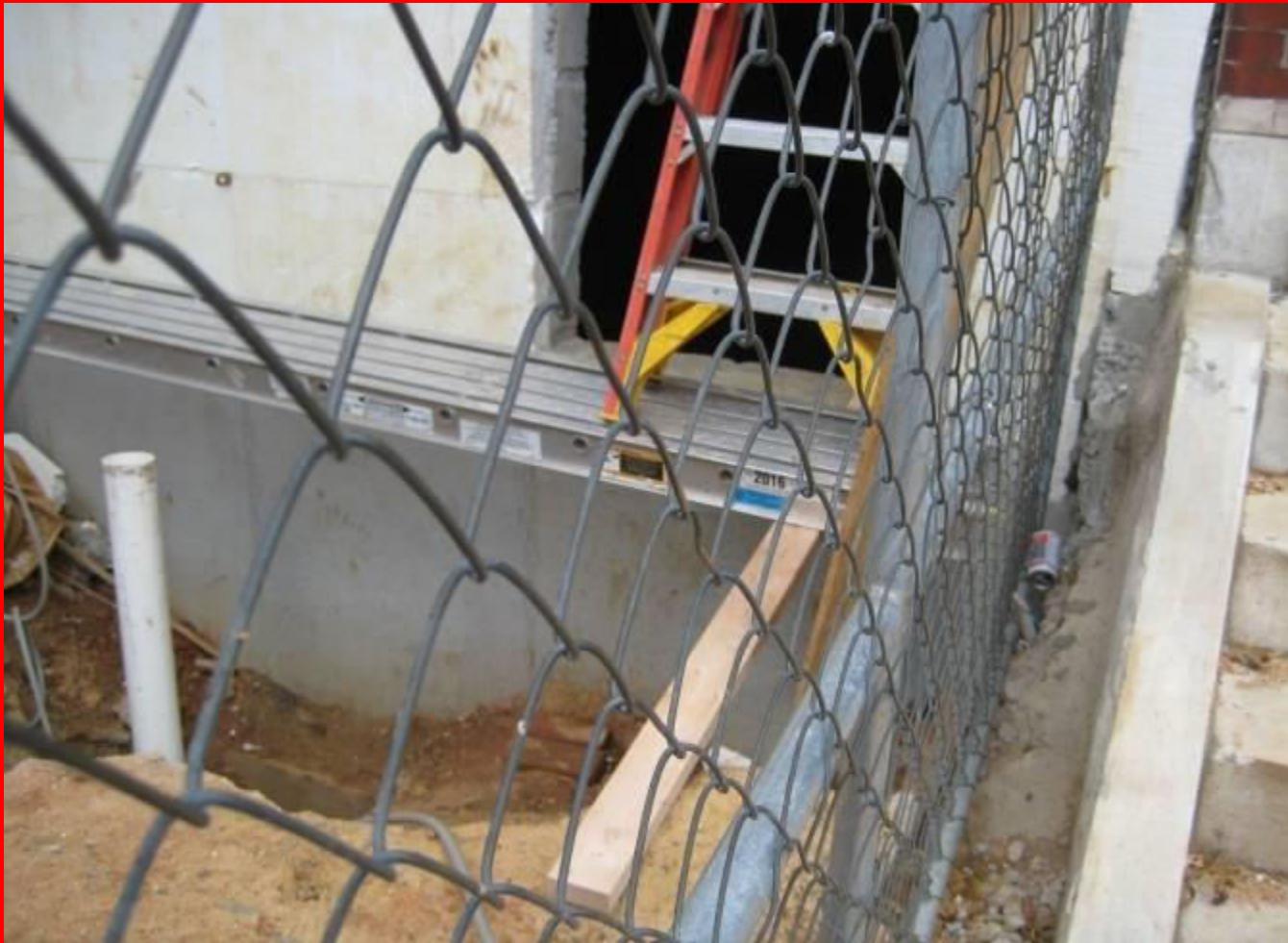
Section VI

Understanding OSHA's

Ladder & Stairway Safety Standards



Put ladder on a stable base before using it. This is not a stable base.



This is not a stable base.



Should not climb ladders while carrying supplies, tools, etc.

Maintain 3-point contact.



- Use a tall enough ladder and move it to face the work.
- To protect from nails, wear safety glasses, work shoes, and pants.
- Move air hose or source to prevent tripping.



- Use ladders, platforms, and fall protection correctly; be properly trained to do so.
- If a loaded nail gun is dropped, it can hit or nail someone below.



- Remove trash.
- Keep all sections of an extension ladder together.
- Extend the ladder at least 3 feet above the roof edge.



- Use tools and materials safely.
- This material is a trip hazard and is not heavy enough to support the ladder.



- Tie off and extend ladder correctly.
- Use 3-point contact, fall protection, and correct PPE.
- Carry sharp objects in a safe way (note blade in back pants).



- Use correct PPE when painting.
- Face self and ladder toward the work.
- Don't stand on cabinet top edges.