

Fall Protection

29 CFR 1926.502(d)

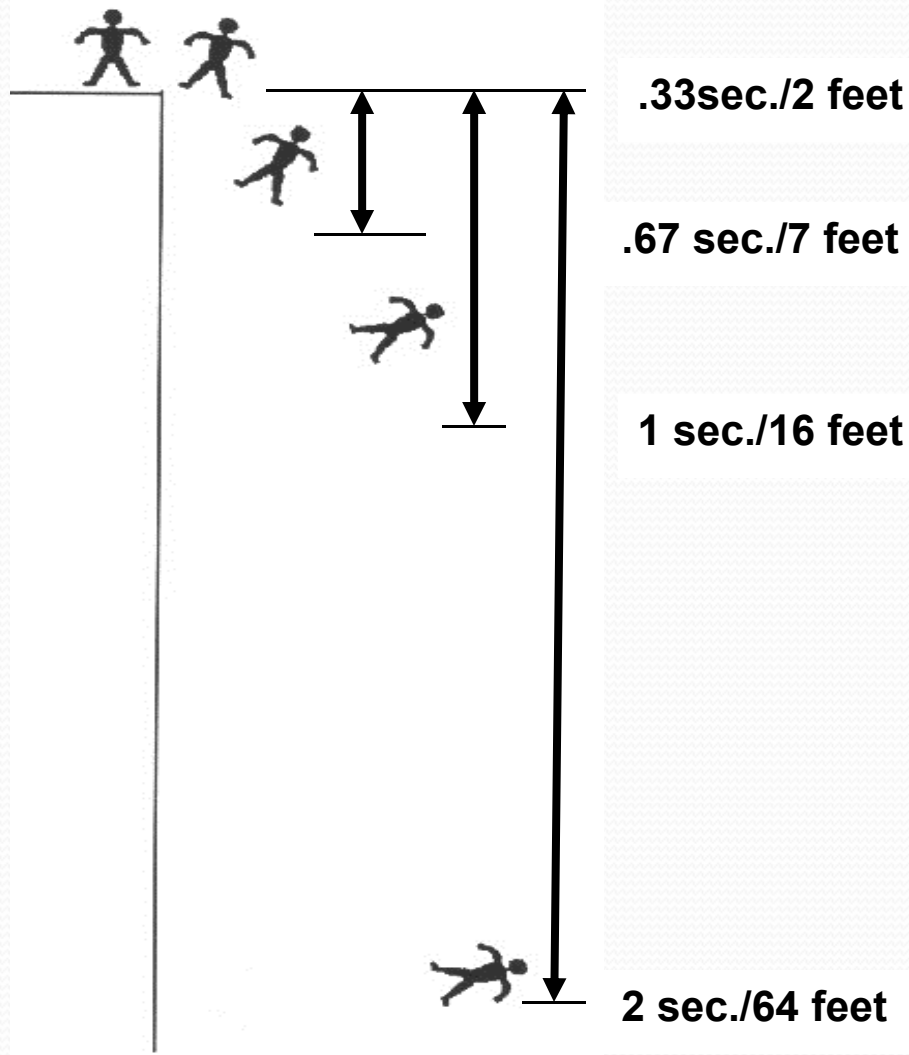
SCWI-8715-0003

**John Lindsay
JACOBS Safety**



"You weren't listening. I said, 'Don't fall.'"

Anatomy of a Fall



- It takes most people about 1/3 of a second to become aware.
- It takes another 1/3 of a second for the body to react.
- A body can fall up to 7 feet in 2/3 of a second.

Planning for Fall Protection

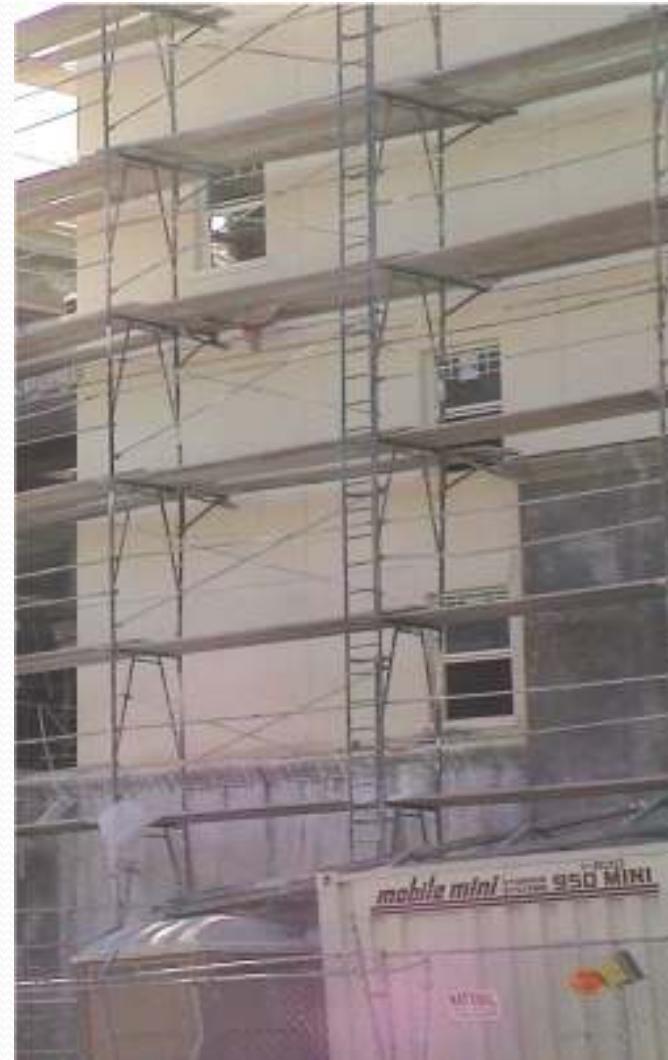
- Best practice dictates that fall protection becomes an integral part of the work planning process, from constructability, to systems installation, to use and maintenance
- The workplace cannot be truly safe unless fall protection is incorporated into every phase of the process
- Planning will keep workers safe and minimize fall exposures

Controlling Fall Exposures

- General industry regulations (paraphrased)
 - Every open-sided floor, platform, wall opening, or hole 4 feet or more above adjacent floor or ground level shall be guarded by a standard railing, or the equivalent, on all open sides except where there is entrance to a ramp, stairway, or fixed ladder.
- Construction industry regulations (paraphrased)
 - Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side, edge, or hole 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.

When Is Fall Protection Required?

- Fall **protection** is required for scaffolding over 6' in height. OSHA allows up to 10' but the SSC rule is 6'.
- If guardrails are not present, 100% tie-off is required.



When Is Fall Protection Required?

- Fall **protection** is required for vertical ladders without cages over 24'



Walking & Working Surfaces

- Hazards with working/walking surfaces
 - Open-sided floors
 - Holes
 - Leading edges



Open Sided Floors

- Guardrails
- Restraint Devices



Holes

- Secured
- Identified
- Covers or Guardrails



Controlling Fall Exposures

- **SCWI-8715-0003**

SSC Requirements

Fall Protection conforming to OSHA 29 CFR 1910.23 *Guarding floor and wall openings and holes*, shall be provided to the maximum extent possible. It is NASA SSC policy that whenever possible, guardrails/stairway railings will be provided and used. When guarding is not possible, alternate methods of employee protection shall be utilized to include: Personal fall arrest systems, fall restraint systems, positioning device systems, or safety net systems.

SSC has a 100% Fall Protection Program. Employees shall be provided fall protection whenever they are placed into situations outside of secured work areas protected by finished or temporary guardrails and the potential fall exposure is greater than that addressed in applicable OSHA General Industry or Construction standards.



Personal Fall Arrest System

Unprotected sides and edges

Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is 4 feet (6 feet in construction areas) 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.



Fall Protection Hierarchy

- Elimination
- Prevention (Guardrails, etc.)
- Fall Restraint (Harness and “leash”)
- Fall Arrest (PFAS)



Fall Protection Hierarchy

Elimination

Eliminate the hazardous work practice



Fall Protection Hierarchy

Prevention

A system which prevents a person from falling to a lower level.

Example: Railings



Fall Protection Hierarchy

Fall Restraint

A system that will allow the worker to approach a fall hazard and work but will not allow the worker to fall to a lower level.

Fall Restraint At Work



Fall Protection Hierarchy

Fall Arrest System

- A system designed to stop someone after a fall has begun.



Personal Fall Arrest Systems

Devices & Equipment Used in PFAS





PFAS

- A Personal Fall Arrest System (PFAS) must include the following components:
 - Anchor point (5,000 lbs per person or minimum safety factor of two per person)
 - Body Harness
 - Connectors
 - Rescue

Aerial Work Platform Anchorages

- Use the manufacturer's designated anchorage points.
Never use guardrails as anchorage points.



PFAS Devices & Equipment

- **Body Harness**



Harness Fitting

**Chest strap tightened
at mid chest**

**Proper snugness
shoulder to hips**

**Leg straps snug but
not binding**



**“D” ring between
shoulder blades**

**Butt strap
supports the load**



- Harnesses must be sized for the worker.

PFAS Devices & Equipment

- **Connecting Devices**





PFAS Devices & Equipment

Connecting Devices

- There are two primary types of connecting devices:
- Lanyards
- Fall Limiters (Self-Retracting Lifelines)



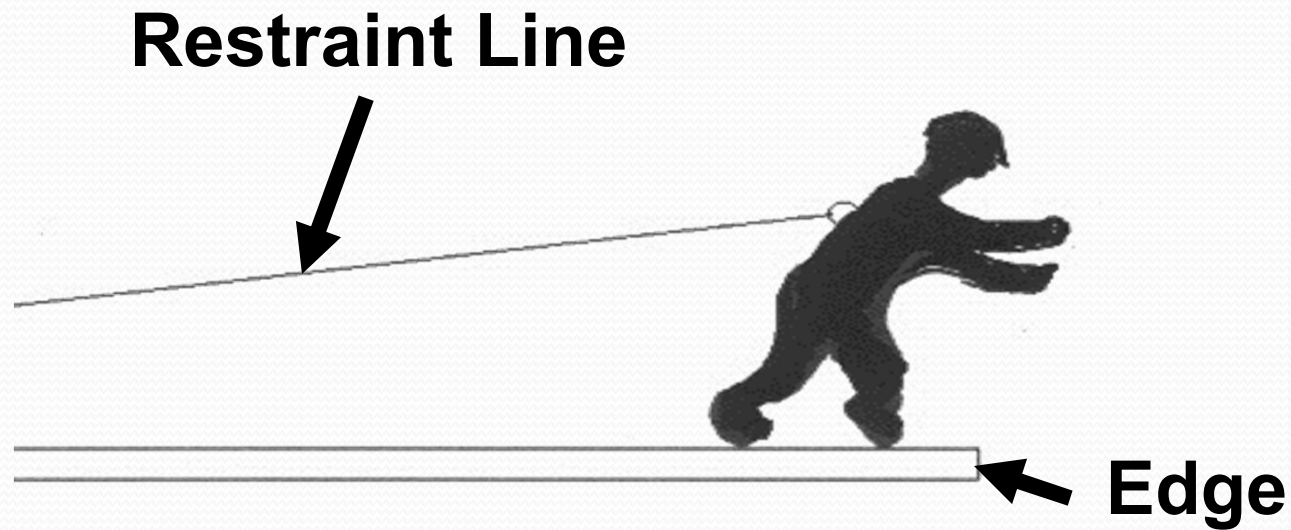
PFAS Devices & Equipment

- Fall limiters (yo-yo's) are self-retracting life lines
 - Operate in a similar manner as a seatbelt
 - They limit falls to two feet or less

Fall Restraint Devices

- Provide access but prevent the fall
- Anchorage requirement at least twice expected force, usually at least 400 lbs. per individual attached
- Useful for work on roofs
- Should be installed and used under the supervision of a Competent Person

Fall Restraint



- Fall restraint assumes the employee cannot reach the edge, they are basically on a short leash.
- If the employee can fall over the edge, then a personal fall arrest system must be used.

Use of Restraint Cables

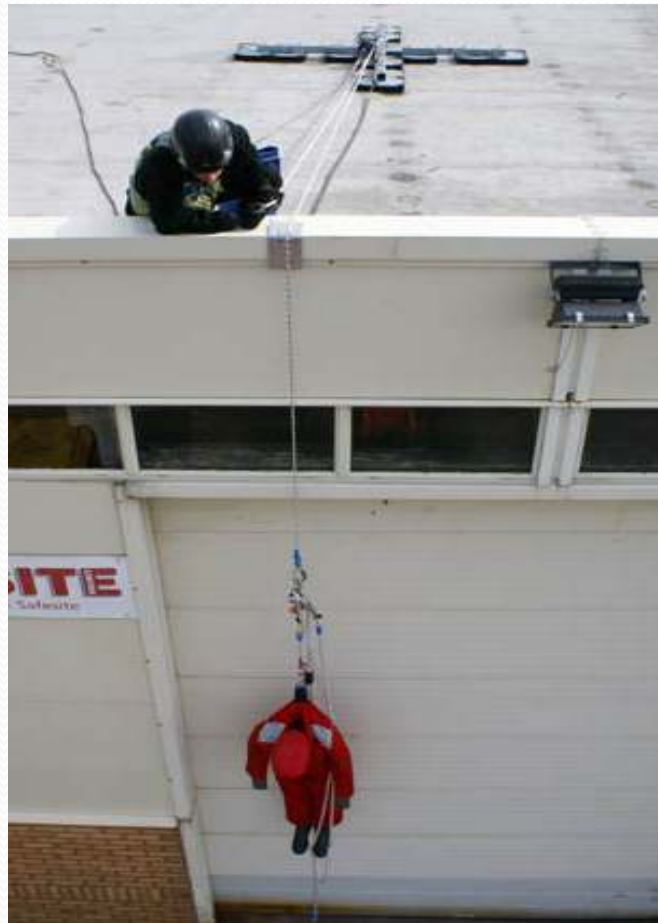
Example of restraint cables used during deck anchoring.



RESTRAINT CABLE

PFAS Devices & Equipment

- **Rescue Plan**



Planning For A Rescue

- Whenever working with the potential of hanging by a harness, a rescue plan must be in effect.
- A written Hazard Analysis must be done and employees must be trained on the plan.





PFAS Devices & Equipment

Rescue Plan

- Personnel working at heights must have a rescue plan.
 - Know how to contact Emergency Responders
 - **911 from a landline phone**
 - **(228) 688-3636 from a cell**
- The buddy system (i.e. at least two persons on site)
- All components of the personal fall arrest system must be removed from service once it has experienced a shock-load from a fall.



Personal Fall Arrest System

Inspection

- Equipment used for personal fall arrest must be inspected by the user prior to each use and at least twice annually by a competent person



General Rule of Thumb

Defective equipment must be removed
from service

**When in doubt,
tag it out!**

Personal Fall Arrest System

Donning PFAS

- Proper donning and fit of the harness is important. A harness that does not fit snugly can result in injury during a fall, such as abrasions or contusions.
- A harness that has not been properly donned can result in the inability to achieve a sitting position while awaiting rescue.



Personal Fall Arrest System

- If the harness has been donned properly:
 - It will function as intended in the event of a fall
 - The sub-pelvic strap will be in position so that the knees can be bent and brought up into a sitting position
 - The back D-ring should not move past the nape of the neck
 - The chest strap should not move up to the neck



Personal Fall Arrest System

- **Maintenance**

- Hang and store in a dry, cool place
- Clean with water and mild soap
- Do not leave in direct sunlight for extended periods of time
- Do not expose to chemicals or other harmful products

Personal Fall Arrest System

100% Tie-Off

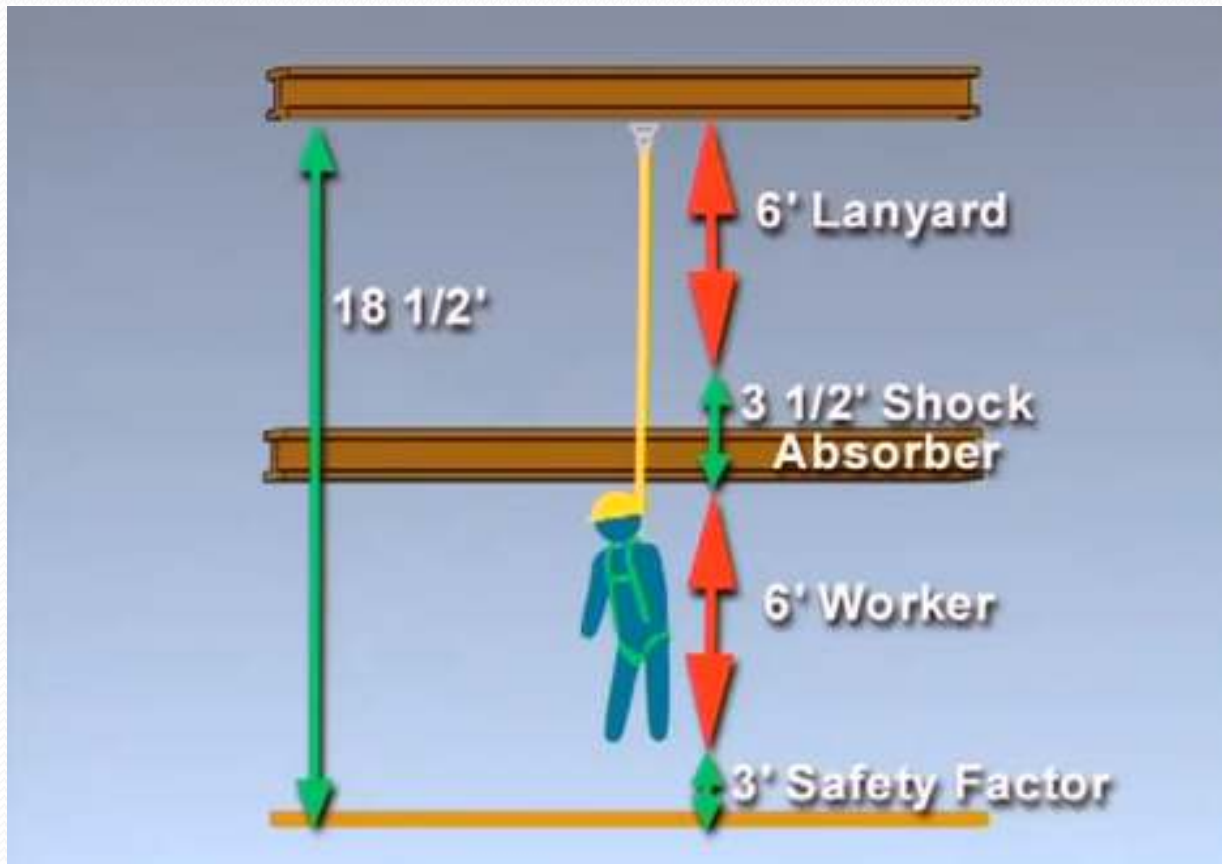
→ *OSHA and NASA both require 100% tie-off when utilizing PFAS's.*

100% Tie-Off requires that PFAS's be anchored at all times while working at heights.

→ *This can mean using a "Y" lanyard to allow movement*

Personal Fall Arrest System

Fall Calculation





Questions?