SUNBELT® RENTALS

AUTHORIZED PERSON WORKBOOK

V1.0 July 2024

GUARDIAN®
Sunbelt Rentals Training Partner

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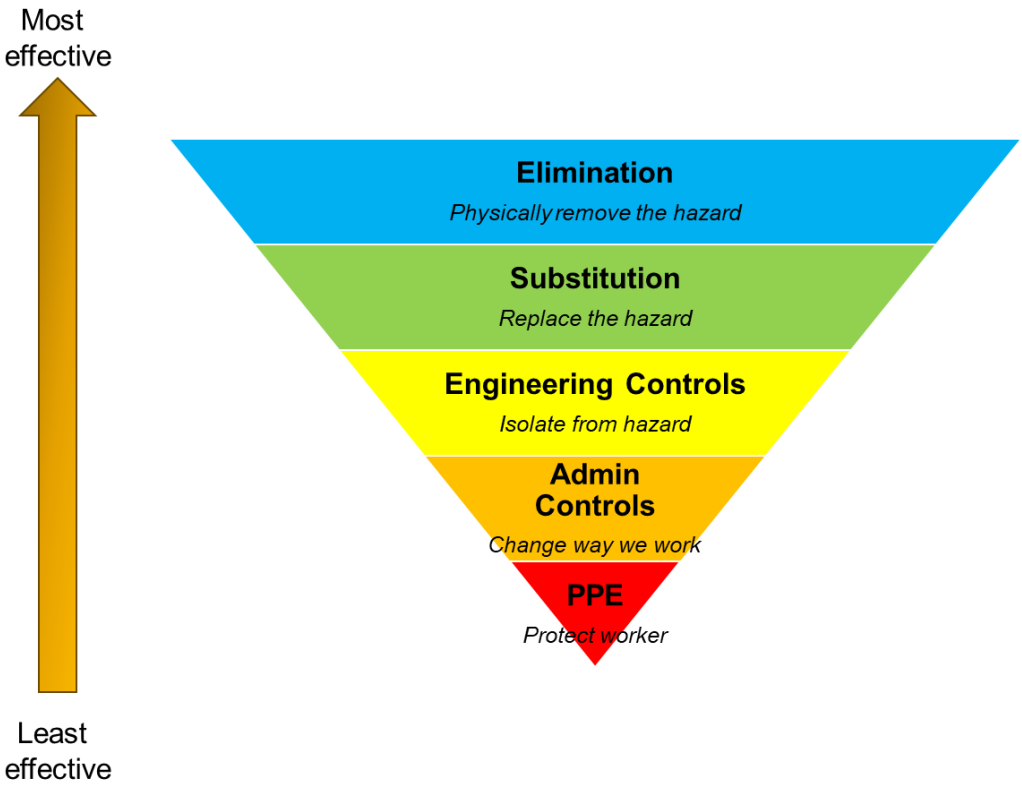
Fall Protection Roles and Responsibilities

	Authorized Person	Competent Person	Qualified Person
Definition	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. *End User/ Worker Exposed to Fall Hazard*	One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, AND who has authorization to take prompt corrective measures to eliminate them. *Supervisor/ Manager of jobsite*	one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project. *Engineer*
Primary responsibilities	Inspecting fall protection equipment prior to each use	• Identifying, eliminating or controlling fall hazards and risks • Comprehensive equipment inspection • Stop work • Select appropriate fall protection equipment • Verify authorized persons are trained	Determining systems and structures meet requirements for fall protection

Hierarchy of Controls



NIOSH: National Institute of Occupational Safety and Health

NOTES

Duty to have Fall Protection

Every employer whose employees may be exposed to fall hazards must provide them with a fall protection system.

OSHA/ANSI thresholds based on industry:

OSHA 1910, General Industry – 4’

OSHA 1926, Construction – 6’

OSHA, Scaffolding – 10’

NOTES

FP Hierarchy of Controls

Can the fall risk be eliminated? If not, then follow FP order of controls…

Safe Place		PPE	
Passive Fall Prevention	**Work Platforms**	**Fall Restraint**	**Fall Arrest**

• Guardrail
• Hole Covers
• Barricades around excavations
	• MEWPs:
	  ○ Aerial lifts/booms
	  ○ Scissor lifts
	• Scaffold w/ integrated fall protection (guardrails, swing gates, etc.)
		A. Anchorage capacity to withstand 4x intended load
		B. Body Harness
		C. Non-Shock or Shock Absorbing Lanyard
			A. Anchor rated for **5000** lbs. capacity
			B. Body Harness
			C. Shock Absorbing Lanyard or SRL(s) / Possibly positioning device(s) for vertical or steep slope surfaces

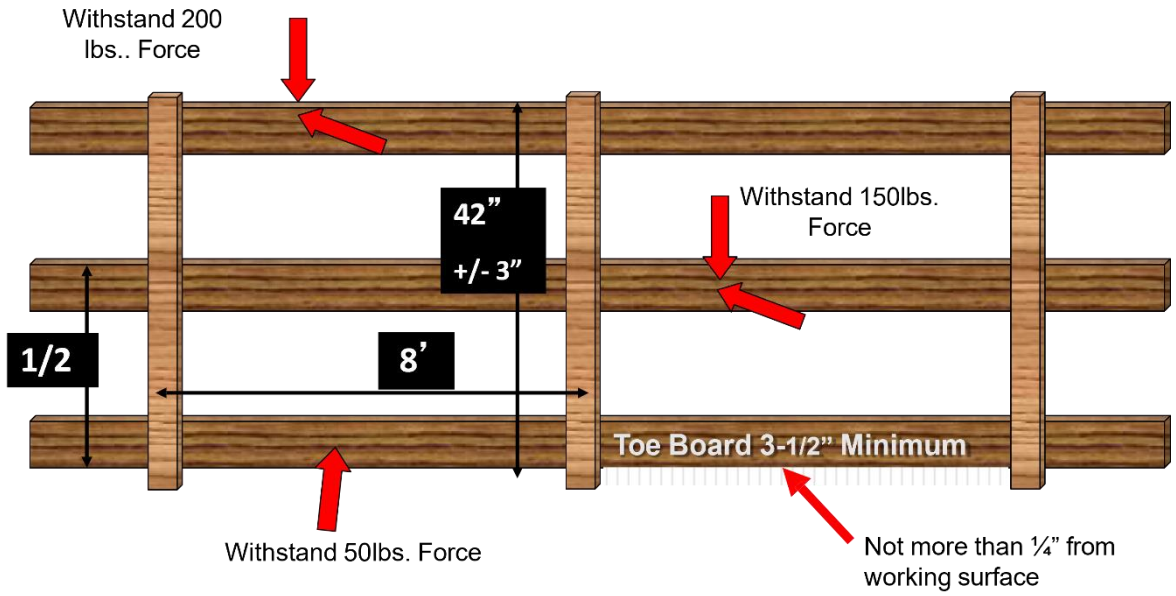
Safest *Little to no training needed*	**Safer** Requires training, technical certifications, *supervision, planning, PPE, potential rescue*	**Safer** *Requires training, supervision, planning & inspection*	**Safe** *Requires training, supervision, planning, fall calculations + Rescue AND Rescue planning*

NOTES

Guardrails

OSHA 1926.500(b) defines guardrails as being permanent, temporary, purchased or hand-built where:

- Railing is free of rough/sharp edges
- Steel/plastic banding, not allowed for mid or top rails
- Top rail can withstand 200lbs of force
- Mid rail can withstand 150lbs of force
- Toe boards withstand 50lbs of force, 3 ½" minimum and not more than ¼" from working surface
- The guardrail is at least 42"H +/- 3"
- Stanchions are no further than 8' apart

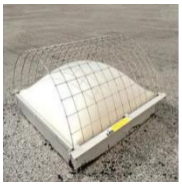
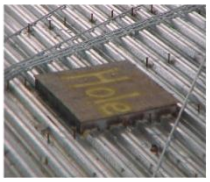


Hole Covers

OSHA 1926.502(i) defines hole covers:

- MUST be color-coded or marked with the words HOLE or COVER.
- MUST be strong enough to support twice the max intended load.
- MUST be secure to prevent displacement from wind, equipment, or workers.
- MUST protect against tripping/ falling in, and objects dropping through.

A floor hole is a gap or void at least 2 inches in its least dimension

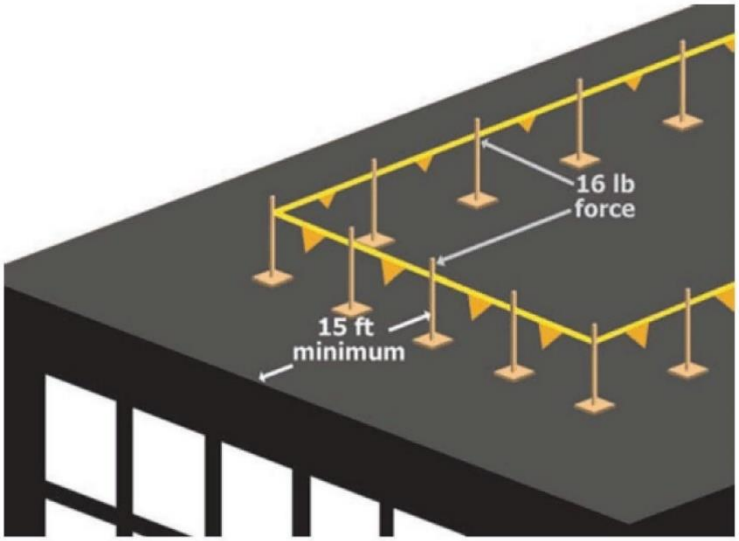

Warning Lines

OSHA 1926.502(f) defines warning lines as being temporary and can be purchased/ hand-built.

A barrier erected on a roof to warn employees that they are approaching an unprotected roof side or edge, and which designates an area in which roofing work may take place without the use of guardrail, body belt, or safety net systems to protect employees in the area.

Warning Line Systems MUST:

- Be made of wire, rope, or chain that can support 500 pounds
- Have high visibility flagging at 6’ intervals
- Have stanchion posts must support 16 pounds



Designated area

A distinct portion of a walking-working surface delineated by a Warning Line in which employees may perform work without additional fall protection.

If mechanical equipment **is being used** in a warning line system, the warning line **MUST be no less than 10’** from the unprotected side or edge.

If mechanical equipment **is <u>not</u> being used** in a warning line system, the warning line **MUST be no less than 6’** from the unprotected side or edge.

NOTES

Travel Restraint & Work Positioning

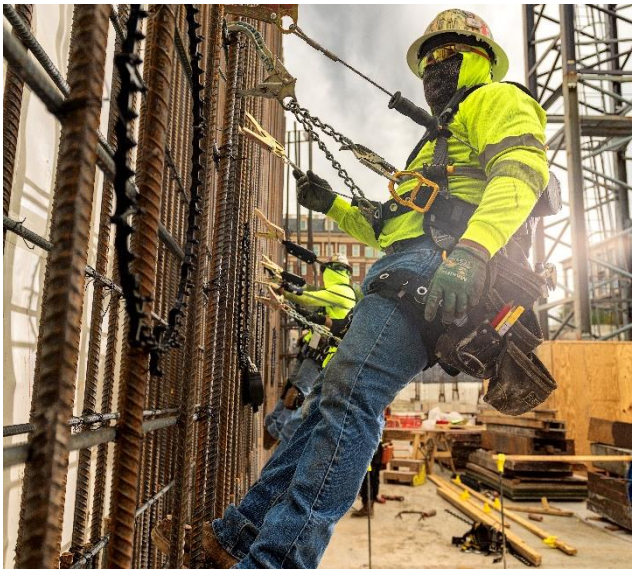
OSHA addresses work positioning and travel restraint systems in 1926.502(e)

- Positioning/ restraint systems are a temporary solution, which must be purchased new and unused.
- Body belts may be used for positioning (up to applicable trigger height) and restraint only.
- Body belts outlawed for fall arrest since 1998
- Max freefall for positioning belts is 2’ (24”)

Work Positioning systems must consist of:

- Full body harness for arrest applications, or a body belt for restraint applications; in conjunction with a positioning device.
- One of the following:
  - Positioning rope lanyard
  - Non-shock-absorbing lanyard
  - Positioning chain assembly
- Anchor points rated at 3000 pounds

When used correctly, a work positioning system allows for both workers’ hands to be free, while still providing fall protection.



NOTES

Fall Arrest

Fall Arrest is the least preferred method of personal fall protection.

Fall Arrest equipment arrests and suspends the worker after a fall has occurred.

OSHA 1926.502 addresses fall arrest.

- Arrest anchors include certified and non-certified
- Certified anchors rated for 3600 pounds or have a 2:1 safety factor
- Non-certified anchors must be rated for 5000 pounds
- Anchors must be identified by the competent person

A Personal Fall Arrest System (PFAS) must consist of:

- A full body harness
- One/ combo of connecting device(s):
    - Shock-absorbing lanyard
    - Self-Retracting Lifeline (SRL)
    - HLLs
    - VLLs
- Certified/ non-certified anchor point

Worker Weight Ranges:

- 130-310 Standard
- 311-420 Heavy Duty (HD)

Freefall limited to 6’ or less.

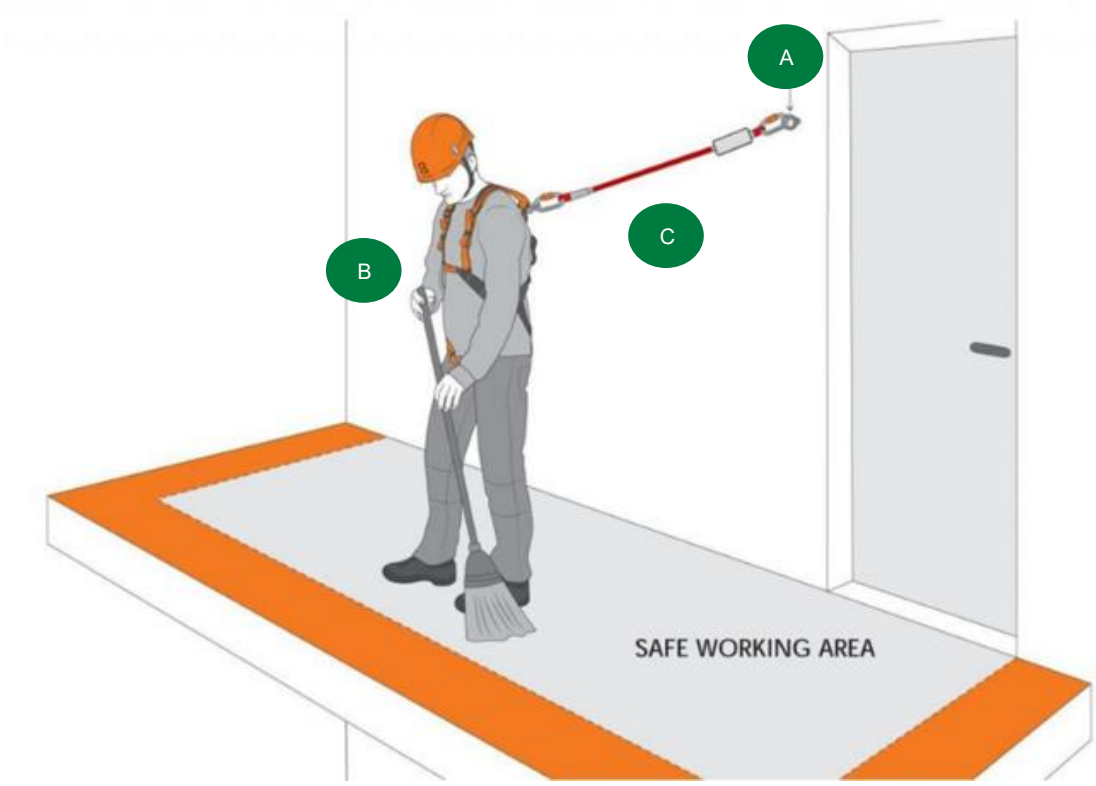
Max Arresting Force (MAF) cannot exceed 1800 lbs.

HD workers must use HD-rated equipment (Big Boss).

NOTES

ABCD’s of Fall Protection

Anchorage connector	Secure point of attachment for the fall arrest system
Body support	Harness worn by the worker that provides a connection point to the worker
Connecting device	Device that connects the worker’s body support to the anchorage connector
Dropped object prevention	Equipment that prevents objects, materials, tools, and equipment from falling from an elevated work position
Education & training	Training of employees who work at heights is required and better prepares them to handle hazards



Connectors

Connectors **<u>are not the same</u>** as a connecting device. Connectors are hooks at the end of connecting devices such as snap hooks, carabiners, scaffolding hooks, or rebar hooks of various types.

- Made of aluminum, pressed or formed steel
- Smooth and free of rough/sharp edges
- 3600lb rated gate, both frontal and side loading
- Sized to be compatible with the member in which they are connected to prevent unintentional disengagement
- Self-closing and self-locking
- Minimum tensile strength of 5000lbs

Unless designed for such use by the manufacturer, avoid tying them:

- Directly to webbing, rope, or wire rope
- To Each other
- To a dee-ring to which another snap hook or other connector is attached
- To a horizontal lifeline
- To any object which is incompatibly shaped or dimensioned

Forced rollout potential

Carabiners can be weakened by up to 75% if gate is open

NOTES

Body Support

Full body harnesses/ body belt(s) provide a connection point on the worker.

NOTES

Connecting Devices

Self-Retracting Lifelines (SRLs)

Also known as “yo-yo’s”, retractables, SRD, inertial reel, block

Max arresting force: 1800lbs

Class 1

- Shall be used **only on overhead anchorages**
- Subjected to a **maximum free fall**: **2 feet (610mm) or less**

Class 2

- intended for applications wherein overhead anchorages may not be available or feasible and which may, in practical application, be subjected to a free fall of no more than 6 feet (1.8m) over an edge.
- Designed for **anchorage above, at, or up to 5 feet below the dorsal D-ring** of the user and **rated for use during leading-edge work.**

Types

SRL - a self-retracting device in the form of a mechanical fall arrester, featuring a locking mechanism and energy management system to arrest the fall of and limit the forces imparted to the user.

SRL-P (Personal) - a self-retracting device designed such that it is compact enough and approved by the manufacturer to be worn by the user on a full-body harness to be used as a fall arrest connector, or alternatively mounted to an anchorage. These devices may, in some cases, be available in a dual configuration for the purpose of 100% tie-off.

SRL-R (Rescue) - an SRL that includes an integral means for assisted rescue via raising or lowering the rescue subject. Some SRL-Rs may alternatively feature a mechanism which facilitates the controlled descent of the fallen user.

Leading edge

NOTES

Lanyards

Most lanyards will have a maximum rating of 310lbs (including tools & equipment). Workers 311-420lbs MUST use Big Boss (HD) gear. HD workers (311-420lbs) must **NEVER** tie-off at foot level.

Max free fall: 6’ (or 12’ w/ HD lanyard)

Max arresting force: 1800lbs

Max deceleration distances:

- Standard – 4’ (48”)
- HD – 5’ (60)
- OSHA – 3.5’ (42”)

Types:

- Shock absorbing
  - Internal shock packs vs. external shock packs
- Non-shock absorbing

NOTES

Anchorage Connectors

Not to be confused with Anchors or structures that the anchorage connector attaches to

Must be rated to withstand 5000lbs/force per person in a fall arrest scenario

Commercial Anchorage Connectors

Residential Anchorage Connectors

Rope Grabs & Lifelines

ABCD =PFAS, Restraint or Positioning

Horizontal Lifelines (HLLs)

OSHA 1926.502(d)(8) states that horizontal lifelines shall be designed, installed, and used, under the supervision of a…***qualified person***, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

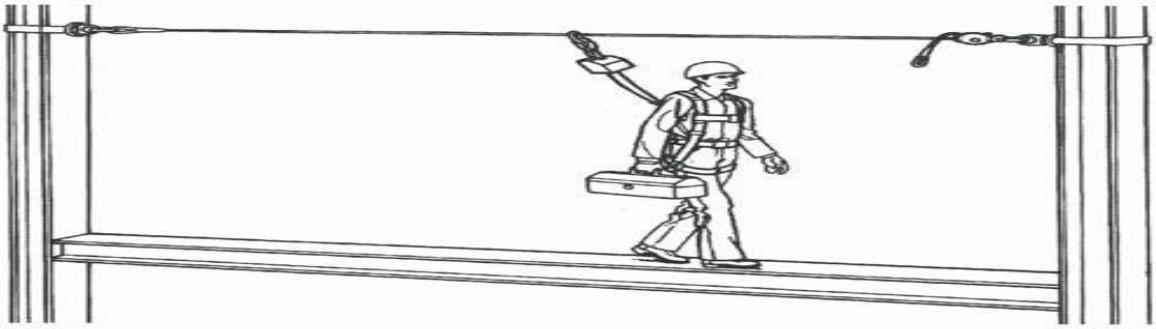
More complex than “just” a horizontal line, the HLL is an anchor that requires:

- At least two (2) appropriate and properly installed anchors on a suitable substrate (wood, metal, concrete)
- A line, typically kermantle or inox cabling

These three parts constitute ***one anchor point*** for a worker:

- 2 persons max for fall arrest
- 4 persons max for fall restraint

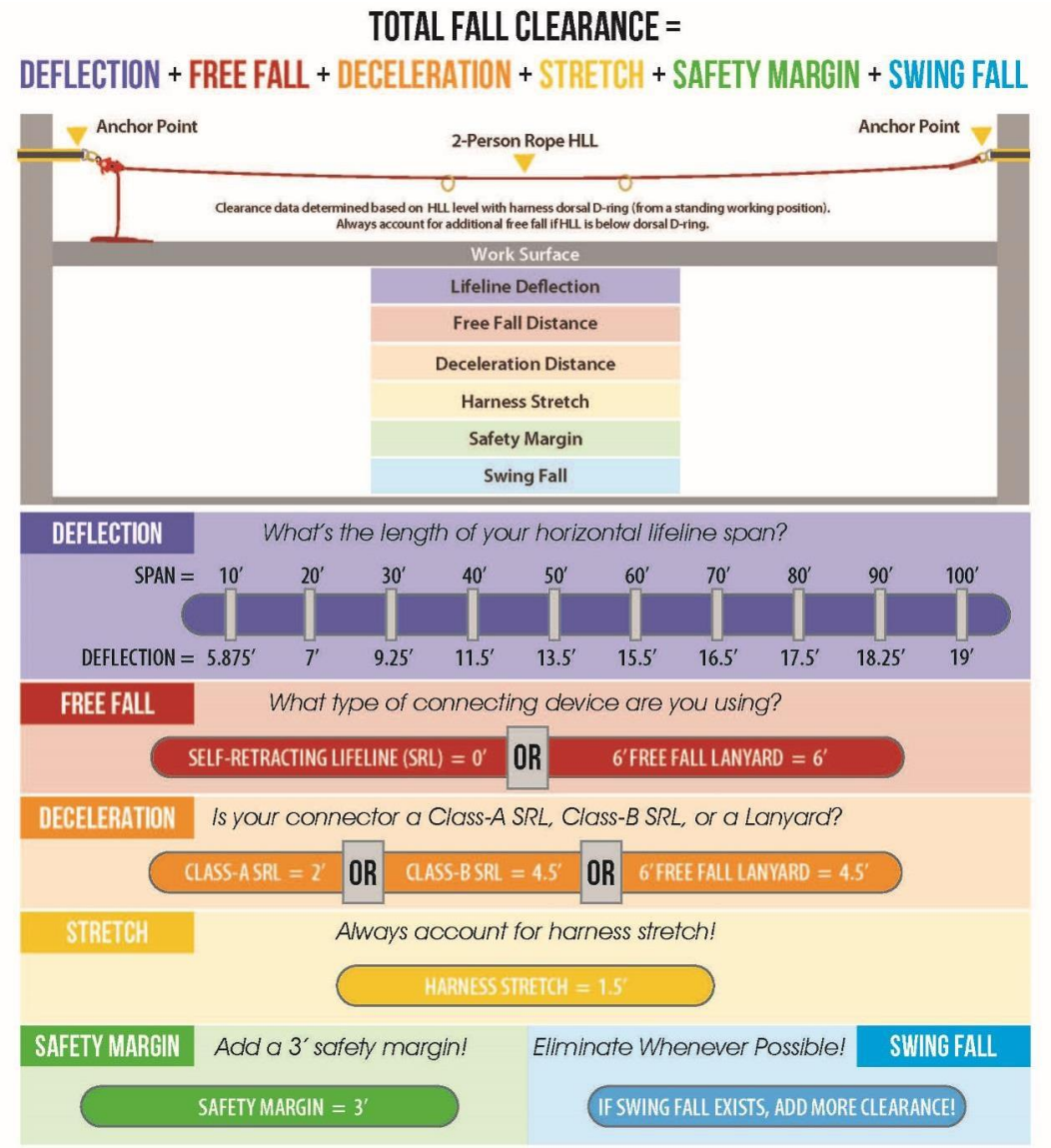
Important notes to consider:



- The longer the HLL, the more stretch, which must be factored into fall clearance calculations (more sag = less clearance)
    - Long HLL’s use intermediates to reduce sagging
- HLL’s are an engineered product that should be certified by an engineer (structural/mechanical/technical/thermodynamic) before use
- Testing needs to be done on HLL’s before they are to be used

NOTES

Two (2) Person Rope HLL Fall Clearance Calculation



Fall Calculations

1. Start by determining the distance from one walking/ working surface to the next lower level
2. Then add:
    a. The length of the lanyard freefall (MUST be 6’ or less), if applicable
    b. Deceleration distance of the gear to be used (4’ Shock Abs. Lanyard)
    c. Height of the harness dorsal d-ring (generally 5’)
    d. Harness stretch (1.5’).
    e. Safety factor (requires 3’)

	Max Free Fall	Max Deceleration Distance
6’ Shock-absorbing Lanyard	6’	4’ (48”)
6’ HD Shock-absorbing Lanyard	12’	5’ (60”)
Class 1 SRL	0’	42”
Class 2 SRL	0’	42” when anchored at or above dorsal dee-ring or 54” when below dorsal dee-ring

SRL’s arrest in Inches, Lanyards arrest in Feet

IMPORTANT:

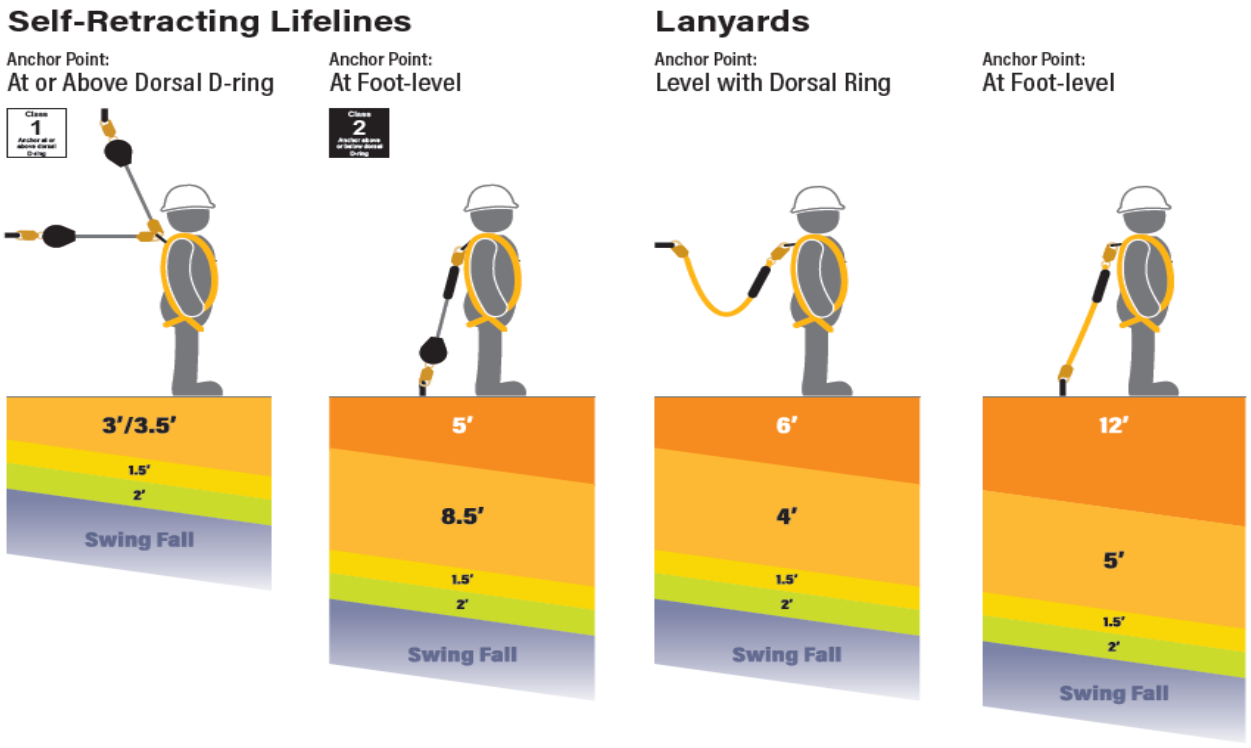
- 19.5’ Required to use a standard 6’ shock-absorbing lanyard
- 20.5’ Required to use a HD 6’ shock-absorbing lanyard
- Work-at-height tasks 20’ or less in height, requires the use of an SRL instead of a lanyard.

RESOURCES:

Fall Clearance Calculator: https://guardianfall.com/digital-resources/fall-clearance-calculator

NOTES

Always refer to manufacturer's instructions for fall clearance



Swing Falls

Swing falls may occur when a worker using fall protection is not working directly under their anchor point attachment. If a worker falls, the FP system may cause the worker to swing as it pulls the fallen worker to the anchor point location.

ANSI Z359.6-2007

5.3 Swing Falls. In fall arrest systems, anchorages shall be located directly above worker(s) to eliminate swing falls, wherever it is reasonably practical to do so. Where it is not reasonably practical to prevent swing falls, the swing drop distance shall not exceed 4 ft.

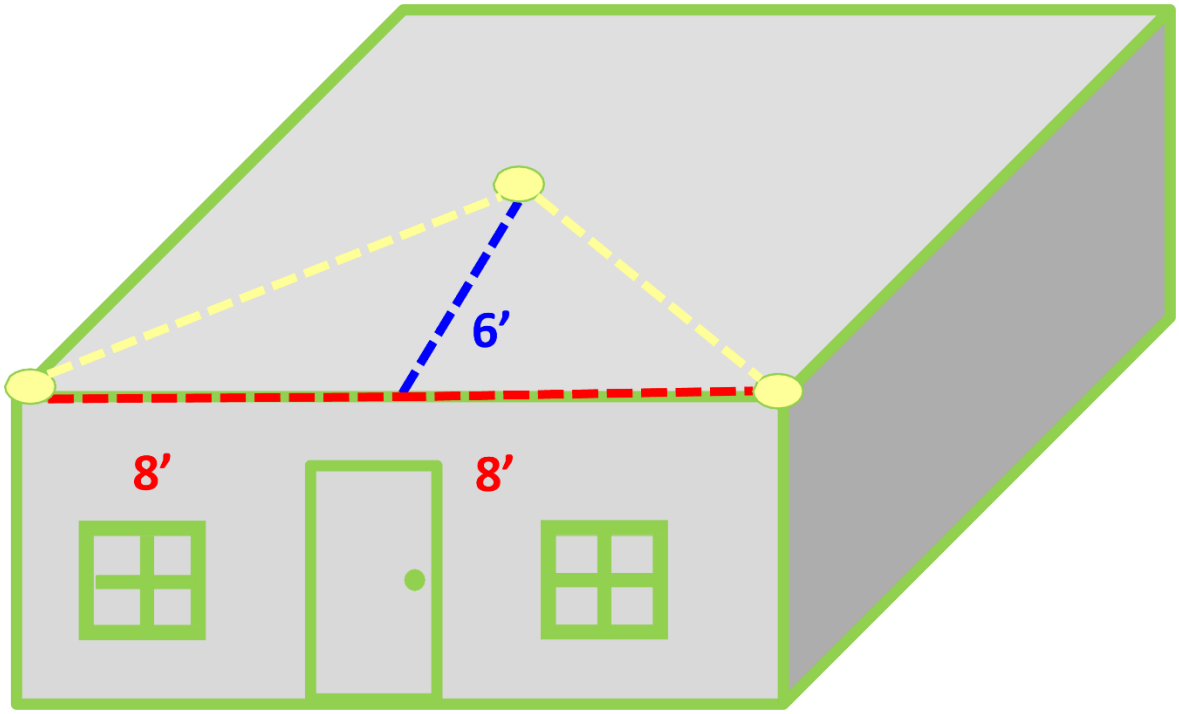
Single anchor points

The Competent Person is responsible for identifying swing fall calculations prior to starting work.

Distance from Leading Edge	Working Distance along Roof Edge	Working Angle from Perpendicular
6’	8’	53°
10’	9’ 9”	45°
15’	11’ 7”	38°
20’	13’ 3”	33°
25’	14’ 8”	30°
30’	16’	28°
35’	17’ 2”	26°

Note: This chart details recommended allowable working zones for swing falls, based on ANSI Z359.6-2007

Note: This drawing shows an example of a safe swing fall area. The CP is responsible for identifying these areas prior to the start of at-heights work.



Donning & Harness Safety

Step 1
Hold harness by dorsal d-ring and conduct visual inspection.

Ensure all buckles are fastened and all straps untangled.

Step 2
Place harness shoulder straps over your shoulders.

Dorsal d-ring must face out.

Step 3
Connect chest strap snug and adjust to mid-chest, approx. 6” from the top of your shoulders.

Step 4
Ensure the flat part of the Dorsal D-ring is positioned at the ***base of your neck*** and centered in-between your shoulder blades.

Step 6
Check sub-pelvic strap is under buttocks.

Step 7
Connect one of your leg straps, ensuring no twisting or tangling in the webbing.
Conduct a flat hand check.
Repeat-other leg.
Re-check sub-pelvic strap position.

Step 8
If your harness has a waist belt, connect and adjust the belt until it is snug.

Step 9
Have a “Buddy” check your fit.

Rest angle after a fall

A loose fitting and low dorsal dee ring placement on a harness will result in a more planar rest angle after a fall, which increases the onset of “orthostatic intolerance” (suspension trauma)* or the ability to fall out of the harness while the impact forces are being mitigated (absorbed)

On the contrary, a ***snug fitting*** and ***appropriately placed dorsal dee*** ring will ensure ***a safe rest angle within 30 degrees.***

NOTES

Maintenance & Storage

Maintenance and storage of equipment shall be conducted by the user's organization in accordance with the manufacturer's instructions.

- Unique issues shall be addressed with the manufacturer.
- The manufacturer's instructions shall be retained for reference
- Equipment needing/ scheduled for maintenance shall be tagged as unusable and removed from service
- Heavily soiled, wet, or contaminated equipment should receive proper maintenance prior to storage
- Equipment stored for long periods of time shall be inspected by a Competent Person before use.

	Storage	*Cleaning*
Do	Hang your PPE in a cool dry area, away from: • Heat sources • UV emissions	Use a mild detergent (Dawn), soft sponge and water. Rinse completely and air dry

Don't	• Store with leg straps touching the floor/ground
	• Store under/with chemicals (motor oil, cleaning supplies, lubricants)
	  ○ Consider vapor pressures
	• Store with/near sharp objects
	• Store in places with:
	  ○ Extreme temperatures (hot or cold)
	  ○ Moisture/dampness
	  ○ UV sources/sunlight
		• Use industrial solvents to clean synthetic materials
		• Use excessive heat to dry
		• Dry clean
		• Use pressure washer to clean

NOTES

Inspection

OSHA 1926.502(d)(21) states that personal fall arrest systems shall be inspected prior to each use for:

- wear
- damage
- deterioration

Defective components shall be removed from service

Frequency

ANSI Standards state frequency of inspections shall not exceed one (1) year.

Recommended frequencies:

- Construction – semi-annually
- General Industries – Annually

Two-Level Inspections

1. Pre-use by Authorized Person
2. Annually/Semi-annually by Competent Person

Help identify:

- Oversight or complacency
- Additional need for training/retraining on the equipment
- Need for more suitable, alternative equipment
- Frequency changes for periodic inspection by competent person
- Additional hazards not identified previously

NOTES

3D Inspection Process

All Fall Protection gear comprised of Hard Goods and/or Soft Goods (Harnesses, SRLs, Lanyards, HLLs, Ropes, Anchors, etc.)

D eployment	• OSHA 1926.502(d)(19) Personal fall arrest systems and components subjected to impact loading shall be immediately removed from service and shall not be used again for employee protection until inspected and determined by a competent person to be undamaged and suitable for reuse
D ates & tags	• All tags and labels MUST be legible
D amages	• Absence of any elements affecting the equipment form, fit or function • Evidence of defects or damage to hardware elements such as cracks, sharp edges, deformation, corrosion, chemical attack, excessive heating, alteration and excessive wear • Evidence of defects or damage to straps or ropes including fraying, unsplicing, unlaying, kinking, knotting, roping, broken or pulled stitches, excessive elongation, chemical attack, excessive soiling, abrasion, alteration, needed or excessive lubrication, excessive aging and excessive wear • Missing parts

It is the user's obligation to inspect all components prior to each use

Follow the manufacturers inspection instructions

…and NEVER "field repair"

NOTES

Harness Inspection

Impact indicators

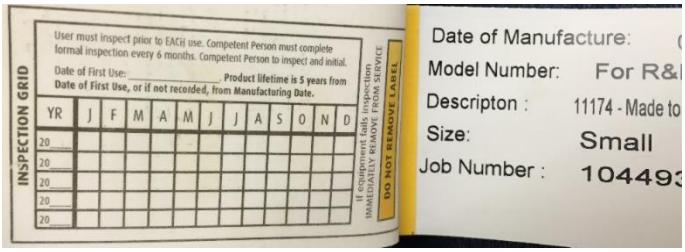
On back of harness (2). All harnesses have them as of 2014 (ANSI Z359.11-2014)

Tags can be easy to remove, **but do not do it!**

Watch out for this!

Labels

Should be present, legible and clean



Hardware

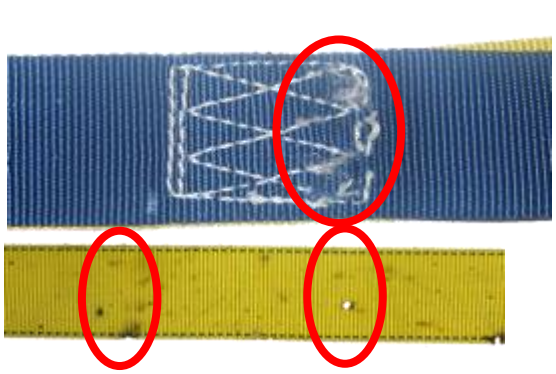
- Buckles
- D-rings
- Dorsal placard (back pad)
- Keepers

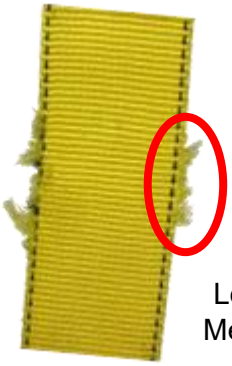
Must not be damaged, broken or distorted, and free from sharp edges, burrs, cracks, worn parts and corrosion.

Webbing/Stitching

- Buckles
- D-rings
- Dorsal placard (back pad)
- Keepers

Some burns on webbing may reveal themselves by discoloring the webbing/rope fibers. The only way to be certain is to feel – run your fingers down the entire webbing/rope fibers.





Stitching shall not be: cut, pulled, broken, or have indication of loading

More than 2 ripped stitches within the same pattern are grounds for rejection

Load Indicators: Grommets, D-ring Pad, Metal Keepers

Lanyard Inspection

Energy Absorber

Inspect energy absorber to determine if it has been activated. There should be no evidence of elongation. Ensure energy absorber cover is secure and not torn or damaged.

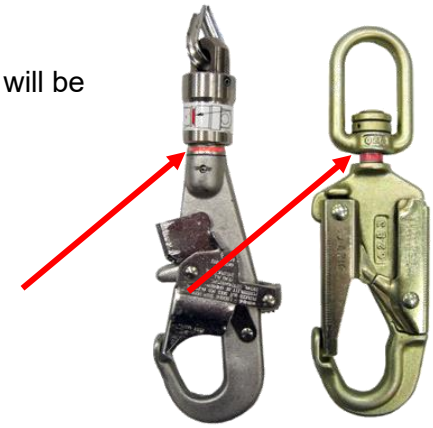
Label

Present and fully legible

SRL Inspection

Load indicators

If SRL has been subjected to load or full arrest, the color band will be exposed.



Hardware

- Bolts
- Swages
- Housing
- Snap Hooks

Labels

Must be present and fully legible

Servicing

- Do not dissemble the SRL
- Do not lubricate any part of the SRL
- All servicing must be done by a manufacturer or Authorized Repair Center (ARC)

Lifeline

- Must fully extend or retract smoothly
- Pull cable with a sharp, quick action to ensure brakes lock up
- No slipping

Web

- Check for absence of cuts, holes, burns, discoloration, impact indication

Cable

- Check for absence of cuts, knicks, broken wires, corrosion, abrasion, bird caging, weld splatter

Anchor Inspection

Inspect all hardware for:

- Signs of damage, rust or corrosion
- Swages for wear of slippage
- Moving components operate freely and secure properly
- Anchorage can support designed/appropriate loads
- Anchor is installed correctly, per manufacturer's instructions
- Attachment/fasteners are suitable and correct
- Anchorage location is easily accessible

NOTES

Ladders

18% of fatal, and 35% of non-fatal falls happen when using ladders. Of those falls, 80% occur at the top of the ladder when transferring to another surface.

Portable Ladders

Portable ladders **DO NOT** require the use of fall protection, but is ***ALWAYS recommended***

- When used to access an upper landing surface, the ladder side rails **must extend at least 3 feet above** the upper landing surface
- Must have a 4:1 pitch. For every 4' up, the ladder is 1' away from the structure.
- Always inspect portable ladders before each use

Fixed Ladders

Fixed ladders **require use of fall protection at heights of 24' or greater!**

Most Recent OSHA Regulations

Final Subpart D Section Requirement	Compliance Date
1910.30(a) and (b) – Deadline by which employers must train employees on fall and equipment hazards	May 17, 2017
1910.27(b)(1) -- Certification of anchorages	November 20, 2017
1910.28(b)(9)(i)(A) – Deadline by which employers must equip existing fixed ladders with cage, well, ladder safety systems, or personal fall arrest system	November 19, 2018
1910.28(b)(9)(i)(B) – Deadline by which employers must begin equipping new fixed ladders with a ladder safety system or personal fall arrest system	November 19, 2018
1910.28(b)(9)(i)(D) – Deadline by which all fixed ladders must be equipped with a ladder safety system or personal fall arrest system.	November 18, 2036

NOTES

Ladder Safety Systems

- Max. # of User: 1
- Min. Breaking Strength: 5,000 lbs.
- User Capacity: 310 lbs.
- Installation: Permanent
- Guide Types: Wire Rope or Rail
- Device:
    - No longer than 9”
    - Must ascend and descend itself

NOTES

Rescue

OSHA 1926.502(d)20: 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.

“Prompt”

OSHA = as soon as possible

ANSI = contact of suspended worker within 6 minutes or less

Training

- Rescuers shall be trained to select, inspect, use, store and maintain the equipment
- All training shall be conducted by a Competent Trainer.
- Training shall include lecture, demonstration and hands-on practice
- Employees shall be trained in self-rescue or alternate means shall be
- provided for prompt rescue
- A project-specific rescue plan shall be developed
- When equipment solely designed for rescue is available, it shall be identified as such, and kept in a separate location from daily use fall arrest systems

Planning

- Review fall hazard analysis
- Review fall plan, task scope and options
- Plan to fail
- Who will perform the rescue?
- Ensure rescue can be accomplished quickly, if not, stop work!
- Ensure that environment will not compromise the rescue or rescuers
- Is “safe” down or up?
- Ensure rescue team members are safe
- Are professionals needed? How are they notified?
- Plan for victim to get additional medical care after the rescue
- Write a plan
- Train everyone on the plan

NOTES

Orthostatic Intolerance (Suspension Trauma)

Orthostatic intolerance (OI), also referred to as suspension trauma, is an effect which occurs when the human body is held upright without any movement for a period. If the person is strapped into a harness or tied to an upright object, they will eventually suffer the central ischemic response (also known as syncope or fainting). Fainting while remaining vertical increases the risk of death from cerebral hypoxia (lack of oxygen to the brain).

Signs and symptoms of OI include:

Faintness	Sweating	Increased heart rate
Nausea	Paleness	Loss of consciousness
Breathlessness	Hot flashes	Unusually low heart rate / BP
Dizziness	Loss of vision	Skin tone may appear grey in color

Additional contributing factors include:

Age	Improper fit or rigging of equipment
Overall health	Additional time needed for rescue
Additional Injuries	
Heat/Cold stress	

Trauma straps on harnesses help alleviate some of the blood constriction after a fall, however, they cannot completely prevent OI from occurring.

Basics

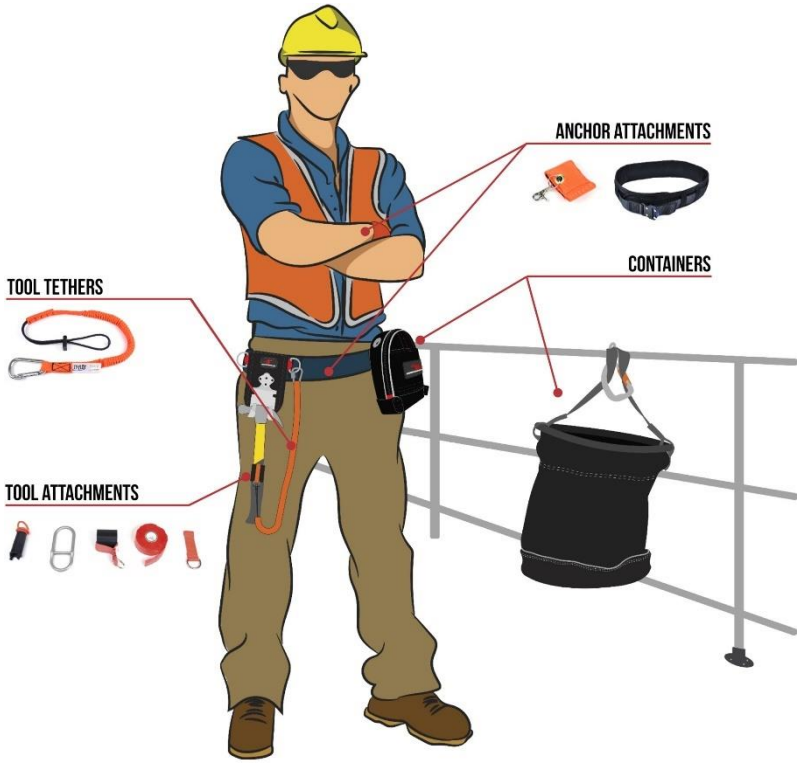
In the event of a fall:

- Always **call 911**, then:
  - Use the buddy system for rescue
  - Gather rescue kit
    - Extension ladder
    - Aerial lift/scissor lift
    - Ladder
    - Pulley kit
  - Perform rescue as described in plan
  - Follow post rescue procedures
    - Treatment of victim
    - Removal of impacted gear

NOTES

Dropped Object Prevention

The prevention of any objects, materials, tools, equipment from an elevated work position.



NOTES

Fall Protection Plans

ANSI Z359.2 Minimum Requirements for a comprehensive managed fall protection program.

Fall protection procedures should be developed based on the results of a fall hazard survey.

- Survey completed by Qualified or Competent Person
- Report prepared for each hazard
- Identifies methods to eliminate or control the hazard

Fall Hazard Survey

Any environmental conditions that may affect the performance of the active fall protection systems must be identified:

- Hot objects, sparks, or flame
- Abrasive surfaces
- Chemicals that may degrade or damage the fall protection equipment (wire rope vs. nylon lanyards)
- UV radiation
- Energized electrical equipment
- Moving equipment, or unguarded gears and drive shafts
- Unstable or uneven work surfaces
- Materials or conditions that may adversely affect the performance of the fall protection system (example: the use of a self-retracting lifeline while working on loose grain or other similar substances)

Rescue Plans

Rescue plans do not necessarily have to be complex, but should at minimum cover:

- Preventing prolonged suspension following the fall
- Identifying signs and symptoms of orthostatic intolerance (suspension trauma)
- Performance of the rescue and the receiving of the victim once rescued