



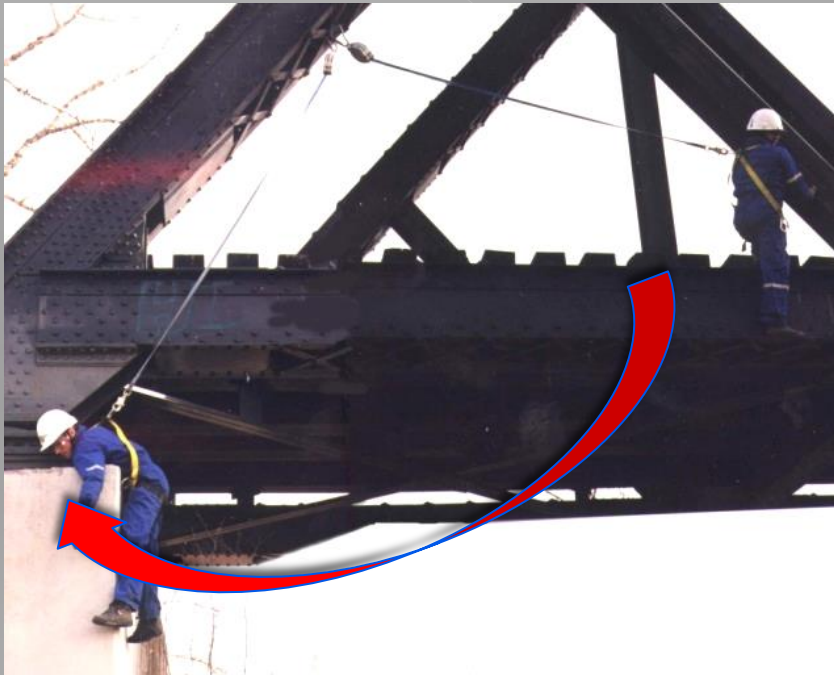
CERTEX

Fall Protection
Competent Person

Fall Considerations

Obstructions

Swing Fall



Fall Clearance

Lanyards

- Measure from anchor point
- Formula – $LL + DD + HH + C = RD$
 - LL= Lanyard Length
 - DD= Deceleration Distance
 - HH= Height of Suspended Worker (Including Harness Stretch)
 - C= Safety Factor
 - RD= Required fall clearance
- Conservative calculation



Fall Clearance

This formula works regardless of where the anchorage point is located-overhead, shoulder level, or foot level.

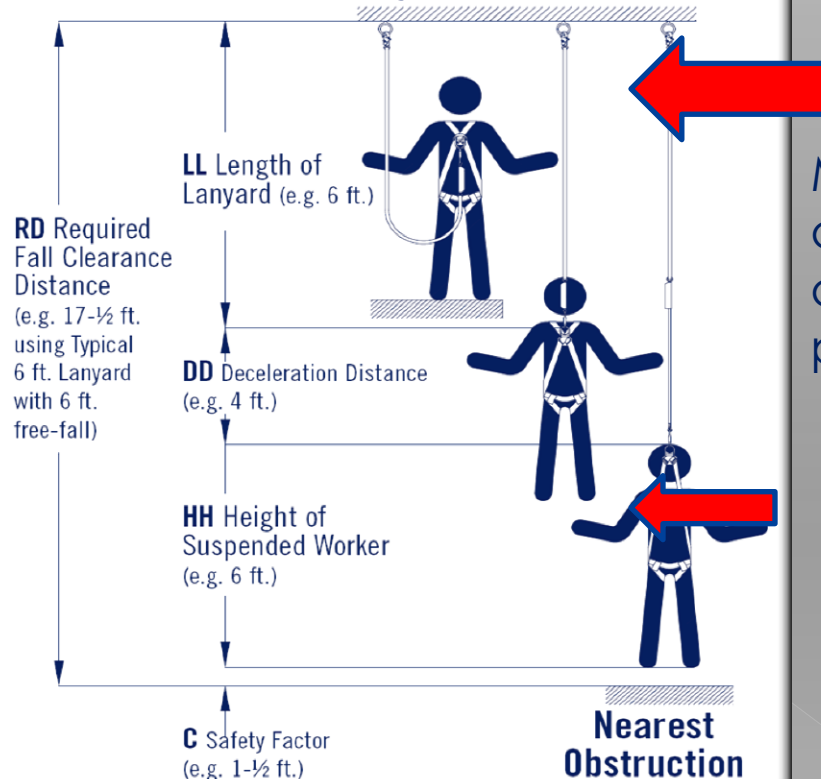
Deceleration is maximum amount per lanyard

$$LL + DD + HH + C = RD$$

$$6' + 4' + 6' + 1.5' = 17.5'$$

CALCULATING YOUR FALL DISTANCE

Measured From Rigid Anchor Point



Measurement uses anchorage point as the starting point

D ring slide and harness stretch included in Height of worker

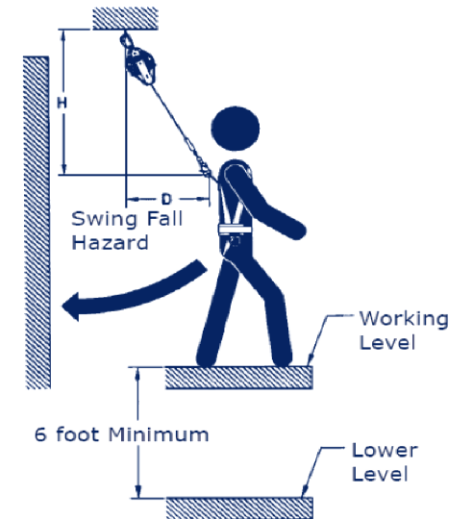
$$RD = LL + DD + HH + C$$

- 1) Add 1 ft. to **DD** for free-fall over 6 ft. up to 12 ft. or for person over 310 lbs. up to 420 lbs. with 6 ft. max. free-fall for ANSI & OSHA compliant lanyards.
- 2) Add 1.7 ft. to **DD** for Canadian CSA Z259.11-05 (E6) compliant lanyard.
- 3) D-ring slide and harness stretch factors are built into **HH** and **C**.
- 4) **DD** shown in e.g. assumes maximum allowable amounts.
- 5) See User Instruction Manual for additional information.

Fall Clearance

- Self Retracting Devices (SRD's) (Class B)
 - **Measured from working surface**
 - Most SRD's use 6 ft. as the required fall clearance distance
 - $RD = TFD + HS + C = 3.5' + 1' + 1.5' = 6'$

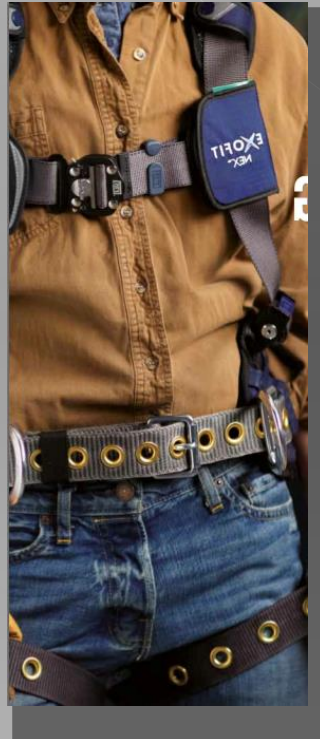
Swing falls will add to required clearance. As you swing below anchor point, you get closer to the level below. PENDELUM



NOTE: The 6 foot minimum assumes the fall occurs from a standing position and the SRL is located overhead. If the worker is kneeling or crouching near an edge when the fall occurs, and additional 3 foot clearance is needed. If the worker is not directly below the SRL, additional clearance is needed.

Components of a Fall Arrest System

BODY SUPPORT



DESCENT/RESCUE



CONNECTORS

ANCHORS



Body Support



FORCES TO THE BODY

$$2200 \text{ lbs} - 2400 \text{ lbs} = ??$$

INTERNAL INJURIES

Forces on the Body



DONNING A HARNESS



THE PROPER METHOD

Fall Protection & Rescue Harness Donning Instructions

Step 1

Getting Started

Hold harness by back D-ring which is held in place by a D-ring pad, make certain straps are not twisted.



Step 2

Shoulder Straps

Slip harness over arms and onto shoulders. Make certain all straps are not tangled and hang freely. Shoulder straps should be kept vertical, not pulled into center of body.



Step 3

Leg Straps

Grab dark blue leg straps and connect to buckles attached to yellow straps on each hip (see photos below for your specific buckle type). Pass excess strap through loop keepers. Leg straps should fit snugly.



Step 4

Chest Strap

Attach chest strap by passing male buckle through female buckle (see buckle type photo below for further details). Strap should be six inches below top of shoulders. Pass excess strap through loop keeper.



Step 5

Adjust harness to fit snugly.

Shoulders

To tighten, pull up on free ends of straps as shown, to loosen, push down on parachute adjuster buckle frame. Straps should be adjusted to same length.

Chest Strap

To tighten, pull free end of strap, to loosen, push on strap from free end through adjuster buckle and take up slack by pulling on adjuster buckle. To position, slide keeper up or down shoulder strap.



Leg Straps

See photos below for your type of leg adjuster buckle.

Back D-ring

Center between shoulder blades, slide D-ring and pad up or down along the webbing to position.

A properly donned and adjusted full body harness will effectively distribute impact forces throughout your body and provide appropriate support during suspension and rescue following a fall.

NEW STYLE HARNESSES



Connectors



Connectors include:

- Lanyards
- Snap-hooks
- Carabiners
- Self Retracting Devices aka SRL'
- Ladder Climbing Systems
- Vertical Lifelines
- Horizontal Lifelines
- Rope grabs

OSHA says... [1926.502(e)(5)]: Connecting assemblies shall have a minimum tensile strength of 5,000 lbs. (22 kN)."

Hardware



Snaphooks



Carabiners

Must be double acting, auto-locking (ANSI), rated for 5000 lbs.

AND REMEMBER, you cannot connect a SNAPHOOK to a CARABINER!!

Snap Hook Carabiners & Carabiners



ANSI Z359
on Body

3600LBS
on Gate

Gate Strength

3600 LBS

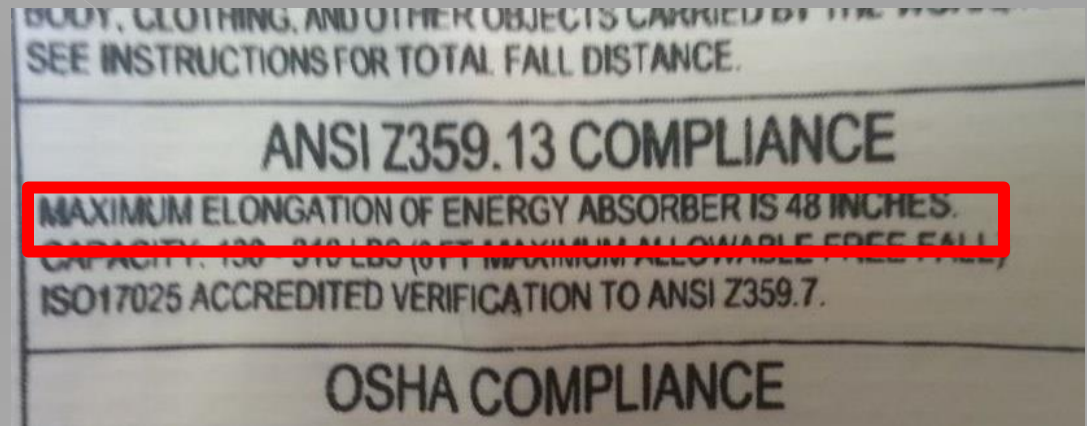
5000 LBS

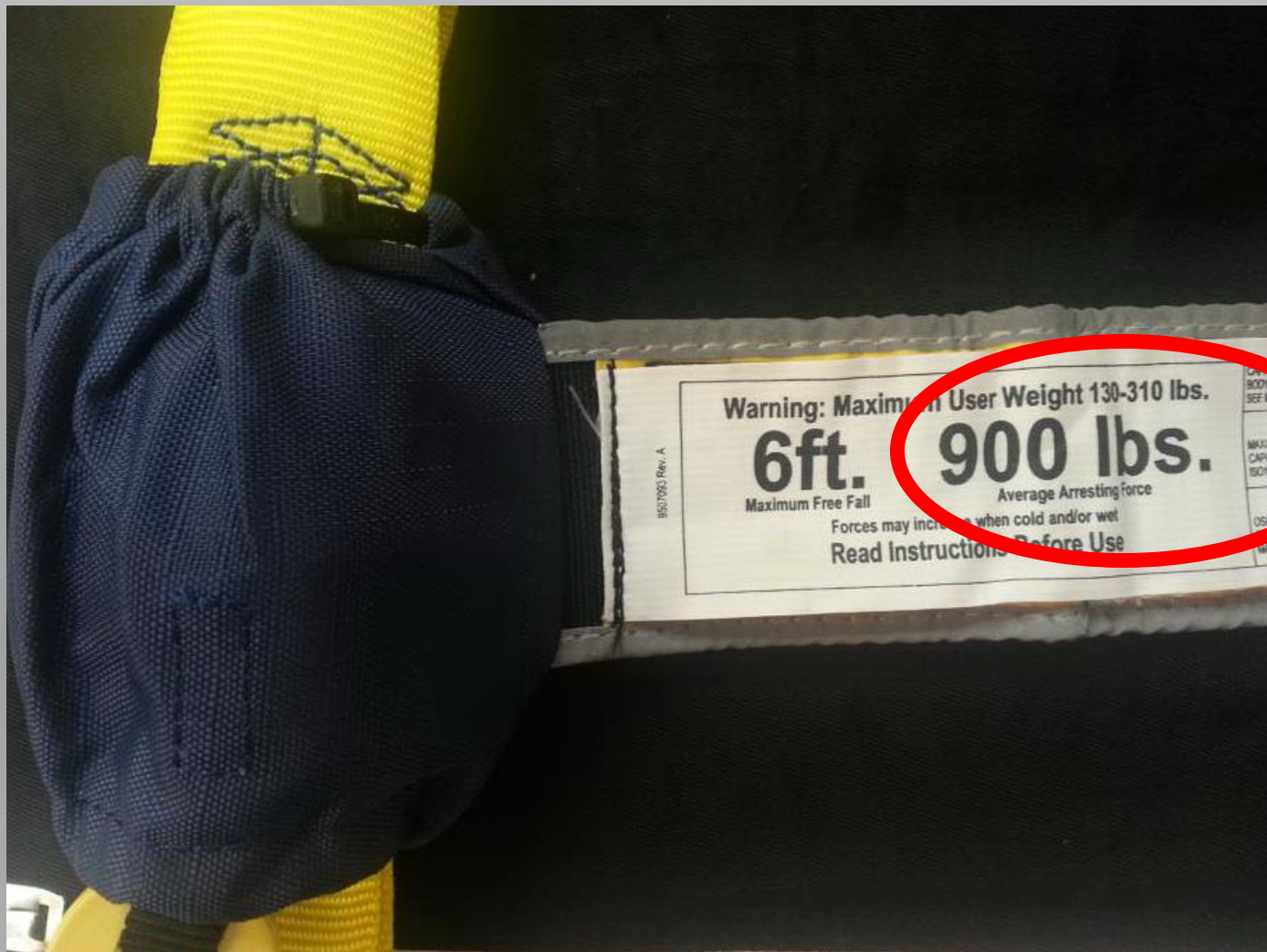


3600 LBS or 5000 LBS

Lanyards

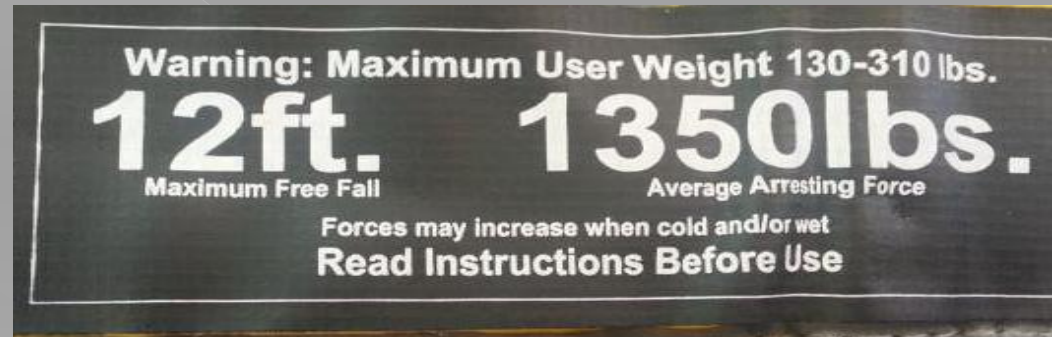
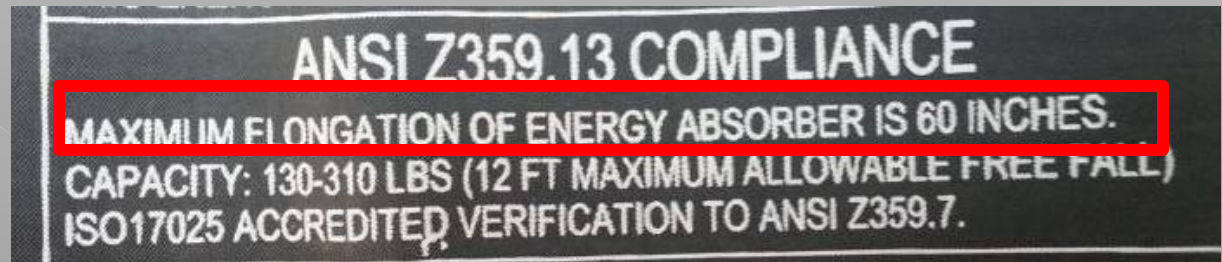
Max deceleration distance
130 lbs – 310 lbs = **48" (4')**





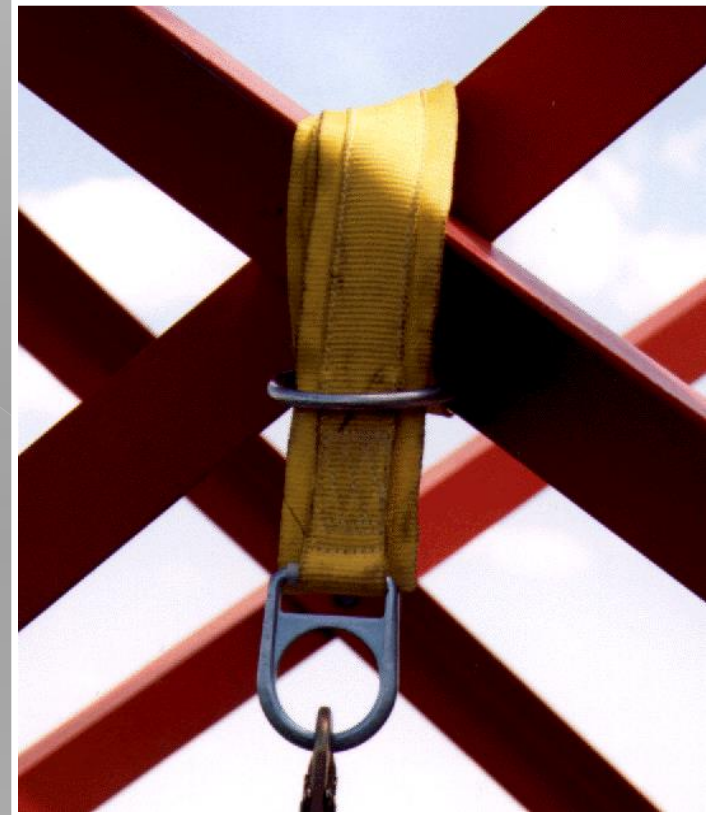
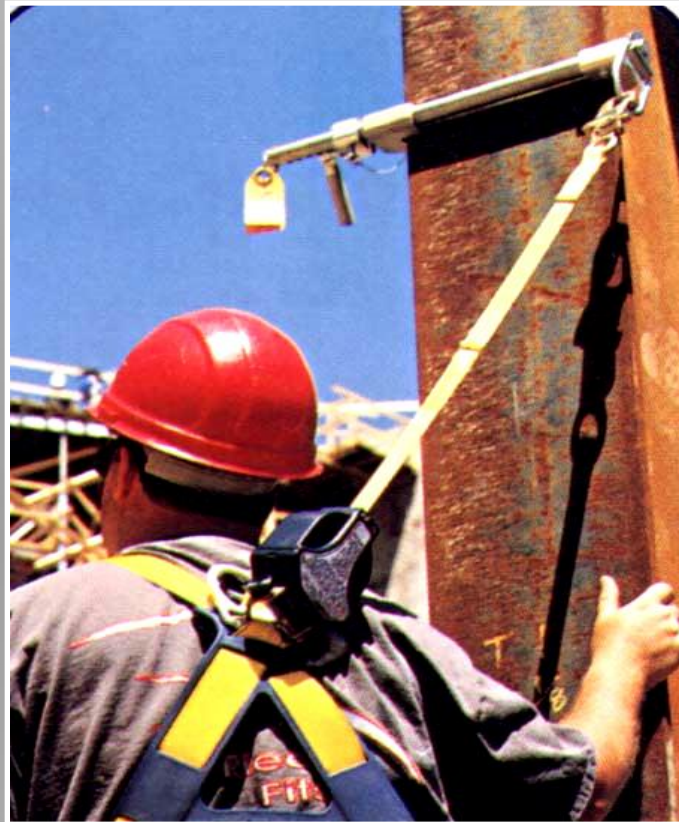
Dual Purpose Lanyard

310 lbs - 420 lbs = **60" (5')** Must be used above Dorsal "D" Ring



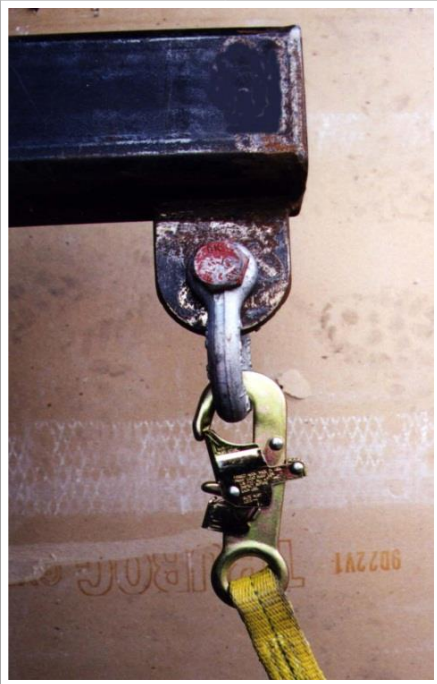
130 lbs – 310 lbs = **60" (5')** For Tie-off between
Dorsal "D" Ring and Tie-off at your Feet

ANCHORAGES



Anchorage Classes

Certified (Engineered)



2 to 1 safety factor
As low as 1800 lbs. for OSHA & ANSI

Non-Certified (Improvised)



Requires 5000 lbs

SPECIALTY ANCHORS



SPECIALTY ANCHORS



Anchorage Connectors



I Beam Clamp



Parapet Anchor

Anchorage Connectors



Portable Anchors

- Steel
- Concrete
- Natural Rock



Anchorage Connectors



Free Standing
Constant Force Posts



Flush Anchors

Anchorage Connectors



Door Jam
Anchor



I Beam Trolleys

Self Retracting Devices



ANSI Z359.1 4-2021

Class 1 and 2: Class 1 devices shall be used only on overhead anchorages and shall be subjected to a maximum free fall of 2 feet (0.6 m) or less. Class 2 devices are intended for applications where an overhead anchorage may not be available or feasible and be subjected to a free fall of no more than 6 feet (1.8 m) over an edge.

New ANSI Sharp Edge Requirements

Adhering to the most stringent safety standard - ANSI Z359.14

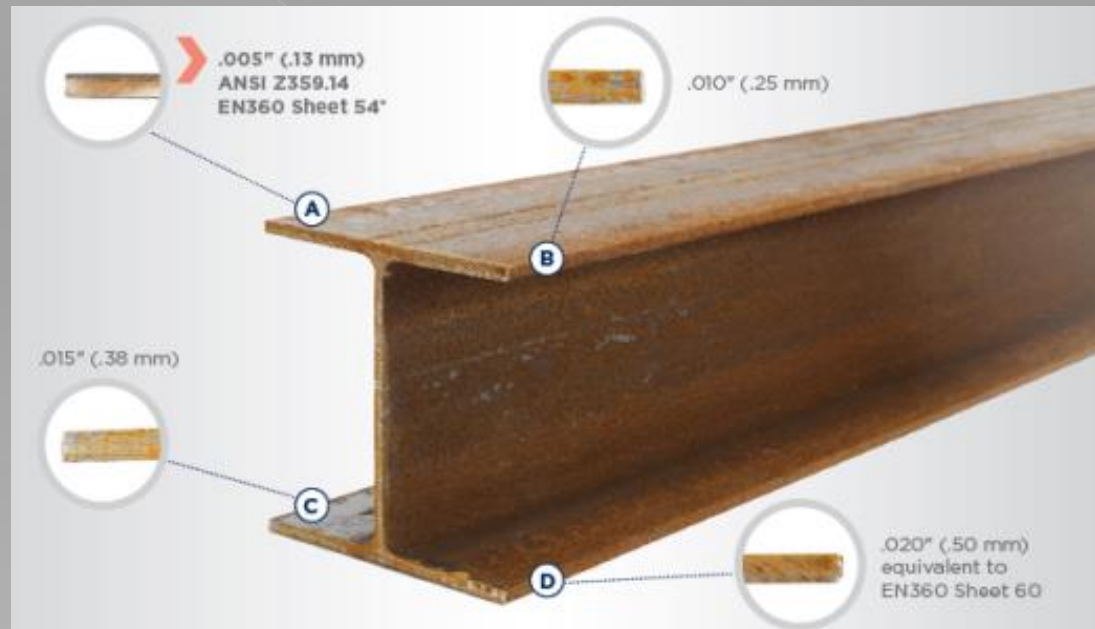
- **Must have an integral shock absorber.**
- **Must be tested to ensure the cable will not cut on an edge that is .005" in thickness.**
- **Must still retract and extend after a fall**
- **Locking function must still work after a fall**
- **Must maintain an average arresting force below 900 lbs. and a peak force below 1800 lbs.**

The Nano-Lok™ edge uses an innovative combination of lifeline material, energy absorption, and harness connection to reduce forces both on the worker and the edge.

SRD - SHARP EDGES

DEFEAT SHARP EDGES EVERY TIME

- Sharp edges are found in many leading edge applications where a traditional lifeline may be cut, shred or snap upon contact.



SRD - FOOT LEVEL TIE-OFF

FORCE

- Products not specifically designed for foot level tie-off can generate forces exceeding 1,800 lbs. (8kN), well beyond accepted safety parameters, in the event of a fall.



- The Nano-Lok™ edge components work together to absorb the energy, limiting the average arresting forces to 900 lbs. (4kN) or less.

SRD - FOOT LEVEL TIE-OFF

- Nano-Lok™ edge is specifically designed for foot level tie-off. Anchoring at your feet may be your only option. Typical equipment is not designed for this application. It may cause...

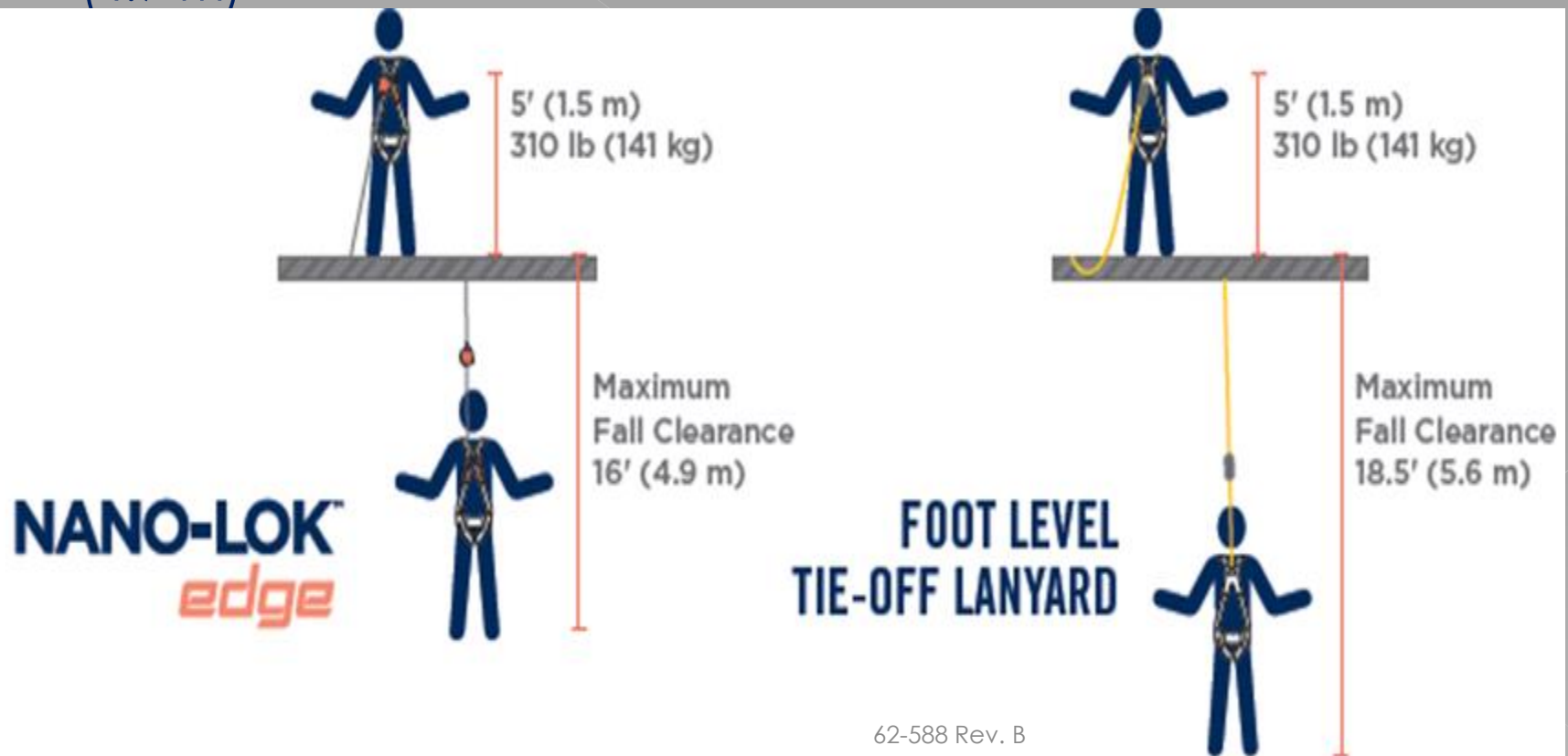
- Trip hazards
- Dangerous forces
- Fall clearance issues



SRD - FOOT LEVEL TIE-OFF

FALL CLEARANCE

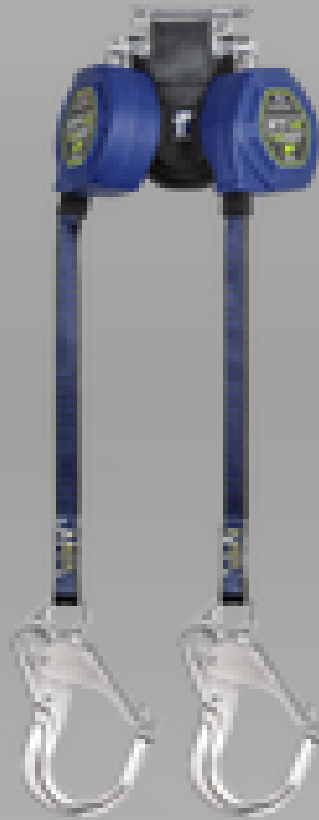
- Traditional foot level tie-off products require fall clearances up to 18.5 ft. (5.6 m).
- The Nano-Lok™ edge requires fall clearances as low as 16' (4.9 m)



LEADING EDGE CABLE SRL's FOOT LEVEL TIE OFF



LEADING EDGE WEBBING SRL's FOOT LEVEL TIE OFF



Vertical Ladder Systems



Ladder Safety Systems



Horizontal Lifelines

- Pre-Engineered Temporary
- Pre-Engineered Permanent
- Design from Scratch Engineered

Pre-Engineered Temporary Horizontal Lifelines



Cable



Rope



Stanchions

Pre-Engineered Permanent Horizontal Lifelines



Design From Scratch / Engineered



OSHA 1926.502 (d) (8):

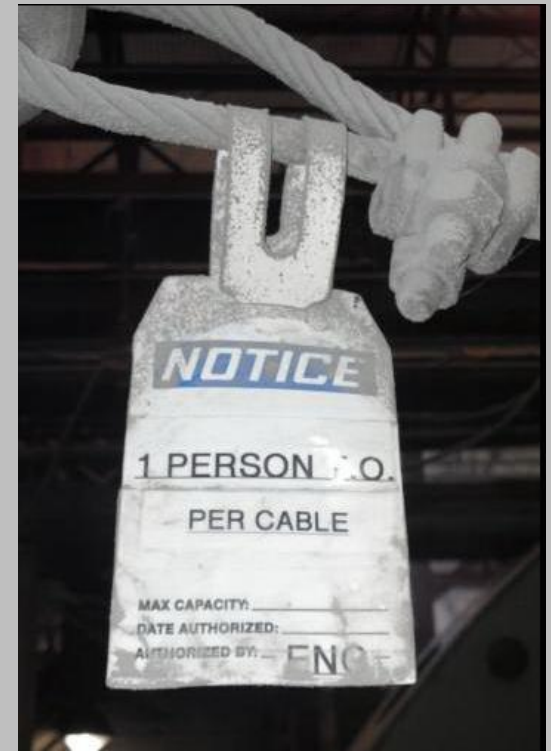
Horizontal lifelines shall be designed, installed, and used, under the supervision of a **QUALIFIED PERSON**, as part of a complete personal fall arrest system, which maintains a safety factor of at least two.

Engineered Horizontal Lifeline Systems Components **Must** have redundant Backup Locking Systems



Engineered Horizontal Lifeline Systems should have signage showing:

- Total number of people allowed on Lifeline
- Users weight limits
- What equipment is to be used**



Horizontal Rigid Rails



Permanent



Portable



Rescue and Escape



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.

Rescue and Escape



Self Rescue
and
Self Evacuation
Manual & Automatic

Rescue and Escape



Confined Space Rescue



Rescue and Escape



Mechanically Aided



**Pick Off
(Last Resort)**

PRD Remote Pole



RESCUE PACK AND POLE





IMG_1067 (1).MOV

PREVENT SUSPENSION TRAUMA EFFECTS

1 Leg Circulation

Relieves the pressure being applied to the arteries and veins around the top of the legs after a fall



2 Heart Circulation

Reduces anxiety and the onset of shock which prevents an increased heart rate



3 Brain Circulation

Recirculates blood flow to the brain reducing the chance of going into cardiac arrest, having brain damage or death



*Suspension
Trauma prevention*

CERTEX

**“Don’t Let
a Fall
Get You Down!”**



Fixed Ladders

OSHA Subpart X, 1926.1053

(a)(6,18) – *Fixed ladders shall be provided with cages, wells, ladder safety devices, or self retracting lifelines when 24' above lower levels.*



(a)(22) – *Ladder safety systems must withstand a 500 lb drop of 18". Shall move without holding the device. Shall activate within 2' and not have a connection longer than 9". Shall have rigid supports at the top and bottom and intermediates 25-40' apart to prevent wind loading.*

Falling Objects

1926.502(j) (In addition to wearing hard hats.)



(j)(2,3) – Toe boards shall be capable of withstanding, without failure, a force of at least 50 pounds and shall be a minimum of 3 1/2 inches high with no greater than a 1/4" gap.

Training - OSHA Subpart M 1926.503



(a)(1) – The employer must provide a training program for each employee who might be exposed to fall hazards. The program shall enable each employee to recognize the hazards of falling and shall train each employee in the procedures to be followed in order to minimize these hazards.

(a)(2)(ii) the employer shall ensure that each employee is trained by a competent person in the correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used.

(b-c) Certification of training must be kept and refresher training done when the workplace changes, new systems used, and/or the worker does not display adequate knowledge of the fall protection systems.







CERTEX

THANK YOU

CERTEX