

Understanding Fall Protection

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Date 4/18/2023

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Statistics

2017 OSHA Violations

1. **Fall Protection = 6,072**
2. Hazard Communication = 4,176
3. Scaffolding = 3,288
4. Respiratory Protection = 3,079
5. Lockout/Tagout = 2,877
9. Fall Protection Training = 1,523 (NEW)

2018 OSHA Violations

1. **Fall Protection = 5,899**
2. Scaffolding = 3,059
3. Hazard Communication = 4,176
4. Ladders = 2,480
5. Lockout/Tagout = 2,384
9. Fall Protection Training = 1,539

2014 OSHA Violations

1. **Fall Protection = 7,515**
2. Hazard Communication = 6,148
3. Scaffolding = 4,968
4. Respiratory Protection = 3,147
5. Powered Indus. Truck = 3,147

2015 OSHA Violations

1. **Fall Protection = 6,721**
2. Hazard Communication = 5,192
3. Scaffolding = 4,295
4. Respiratory Protection = 3,305
5. Lockout/Tagout = 3,002

2016 OSHA Violations

1. **Fall Protection = 6,906**
2. Hazard Communication = 5,665
3. Scaffolding = 3,900
4. Respiratory Protection = 3,573
5. Lockout/Tagout = 3,406

2022 OSHA Violations

1. **Fall Protection = 5,980 (1926.501)**
2. Hazard Communication = 2,682(1910.1200)
3. Respiratory Protection = 2,471(1910.134)
4. Ladders= 2,430(1926.1053)
5. Scaffolding = 2,285(1926.451)
7. Fall Protection Training = 1,778(1926.503)

2019 OSHA Violations

1. **Fall Protection = 6,010 (+111)**
2. Hazard Communication = 3,671
3. Scaffolding = 2,813
4. Lockout/Tagout = 2,606
5. Respiratory Protection = 3,079
8. Fall Protection Training=1,773(+234)

2021 OSHA Violations

1. **Fall Protection = 5,295**
2. Respiratory Protection = 2,527
3. Ladders= 2,026
4. Scaffolding = 1,948
5. Hazard Communication = 1,947
7. Fall Protection Training = 1,666

2020 OSHA Violations

1. **Fall Protection = 5424**
2. Hazard Communication = 3,199
3. Respiratory Protection = 2,649
4. Scaffolding = 2,129
5. Ladders = 3,079
8. Fall Protection Training = 1,621

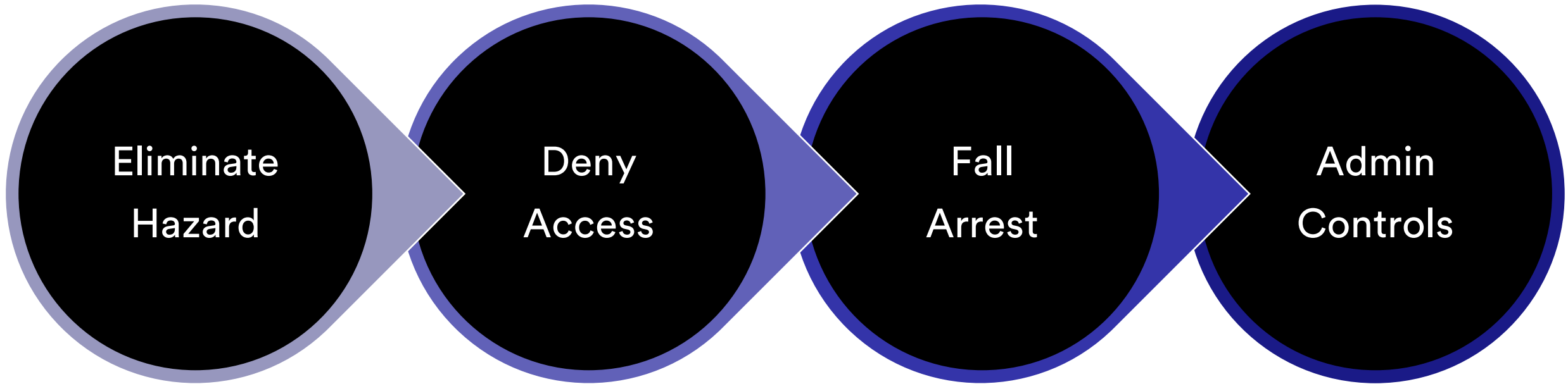
UNDERSTANDING THE CONCERN

How many falls from height are Reported in the work place each year?

Year	Fall Injuries	Fall Fatalities
2018	52,510	615
2019	48,040	711
2020	49,250	645
2021	NA	680

Source: U.S. Bureau of Labor Statistics, U.S. Department of Labor

Hierarchy of Fall Protection



Fall Restraint vs Fall Arrest



Challenge Question

Based on your own impressions, approximately how far and how fast do you think you would free fall in two seconds?

Distance



20 ft



50 ft



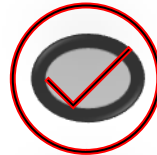
15 mph



35 mph



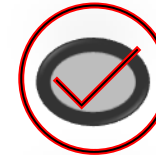
30 ft



65 ft



26 mph



44 mph

29 CFR 1910 General Industry WWSR

29 CFR 1910 General Industry

On November 17, 2016, OSHA published its final rule on Walking and Working Surfaces.

The 513 page copy from the *Federal Register* can be downloaded at:

<https://www.federalregister.gov/documents/2016/11/18/2016-24557/walking-working-surfaces-and-personal-protective-equipment-fall-protection-systems>

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Regulatory Update

Regulation Summary: Walking-Working Surfaces and Personal Protective Equipment (Fall Protection Systems); OSHA's Final Rule

December, 2016

General Industry 29 CFR 1910

On November 17, 2016, OSHA published its final rule on Walking and Working Surfaces. The 513 page copy from the *Federal Register* can be downloaded at:
<https://www.federalregister.gov/documents/2016/11/18/2016-24557/walking-working-surfaces-and-personal-protective-equipment-fall-protection-systems>

Who and what does the final rule cover?

The final rule applies to all general industry workplaces and covers all walking-working surfaces, which include horizontal and vertical surfaces such as floors, stairs, roofs, ladders, ramps, scaffolds and elevated walkways. The final rule also has provisions affecting fall protection systems.

The final rule covers a wide variety of general industry entities, including building management services, utilities, warehousing, retail, window cleaning, chimney sweeping and outdoor advertising. It does not change construction or agricultural standards.

Summary:

OSHA is revising and updating its general industry standards on walking-working surfaces to prevent and reduce workplace slips, trips, and falls, as well as other injuries and fatalities associated with walking-working surface hazards. The final rule includes revised and new provisions addressing, for example, fixed ladders, rope descent systems, fall protection systems and criteria including personal fall protection systems, and training on fall hazards and fall protection systems. In addition, the final rule adds requirements on the design, performance, and use of personal fall protection systems.

The final rule increases consistency between the general industry and construction standards, which will make compliance easier for employers who conduct operations in both industry sectors. Similarly, the final rule updates requirements to reflect advances in technology and to make them consistent with more recent OSHA standards and national consensus standards. OSHA has also reorganized the requirements and incorporated plain language in order to make

Training

OSHA 1910.30(a)(2):

“The employer must ensure that each employee is trained by a **qualified person.**”

OSHA 1926.503(a)(2):

“The employer shall ensure that each employee has been trained, as necessary, by a **competent person**”



OSHA Definitions

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.

Competent Person

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.

Qualified Person

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.

What does “Qualified” Mean?

In Construction:

OSHA 29 CFR 1926.32(m) states: "Qualified" means 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.**

In General Industry:

OSHA 1910.140(b) states: *Qualified* describes a person who, by possession of a recognized degree, certificate, or professional standing, **or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.**

OSHA uses the word **“OR”** when defining the credentials of a Qualified Person -

“... a recognized degree, certificate, **OR** professional standing,
OR... extensive knowledge, training, and experience...”.

1910.30 Training requirements.

Fall hazards. (1) Before any employee is exposed to a fall hazard, the employer must provide training for each employee who uses personal fall protection systems or who is required to be trained as specified elsewhere in this subpart. Employers must ensure employees are trained in the requirements of this paragraph on or before May 17, 2017.

(2) The employer must ensure that each employee is trained by a qualified person.

(3) The employer must train each employee in at least the following topics: (i) The nature of the fall hazards in the work area and how to recognize them; (ii) The procedures to be followed to minimize those hazards; (iii) The correct procedures for installing, inspecting, operating, maintaining, and disassembling the personal fall protection systems that the employee uses; and (iv) The correct use of personal fall protection systems and equipment specified in paragraph (a)(1) of this section, including, but not limited to, proper hook-up, anchoring, and tie-off techniques, and methods of equipment inspection and storage, as specified by the manufacturer

(b) Equipment hazards. (1) The employer must train each employee on or before May 17, 2017 in the proper care, inspection, storage, and use of equipment covered by this subpart before an employee uses the equipment.

(2) The employer must train each employee who uses a dockboard to properly place and secure it to prevent unintentional movement.

(3) The employer must train each employee who uses a rope descent system in proper rigging and use of the equipment in accordance with §1910.27. (4) The employer must train each employee who uses a designated area in the proper setup and use of the area. (c) Retraining. The employer must retrain an employee when the employer has reason to believe the employee does not have the understanding and skill required by paragraphs (a) and (b) of this section. Situations requiring retraining include, but are not limited to, the following:

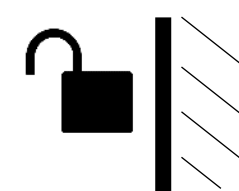
(1) When changes in the workplace render previous training obsolete or inadequate; (2) When changes in the types of fall protection systems or equipment to be used render previous training obsolete or inadequate; or (3) When inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee no longer has the requisite understanding or skill necessary to use equipment or perform the job safely. (d) Training must be understandable. The employer must provide information and training to each employee in a manner that the employee understands.

Key pillars of Active Fall Protection: the ABC's

Worker at
height

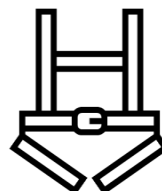


To protect
from falls



Anchorage

+



Body support

+



Connectors

A

Anchorage

are a secure point of attachment. Anchorage connectors vary by industry, job, type of installation and structure. They must be able to support the intended loads and provide a sufficient factor of safety for fall arrest.

B

Body support

harnesses distribute fall forces over the upper thighs, pelvis, chest and shoulders. They provide a connection point on the worker for the personal fall arrest system.

C

Connectors

such as shock-absorbing lanyards or self-retracting lifelines connect a worker's harness to the anchorage.

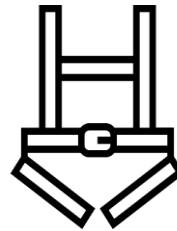


But don't forget about D

Worker at
height



To protect
from falls



Body support

+



+



Anchorage

In case
you DO
fall...



To rescue
the fallen worker

D

Descent and rescue

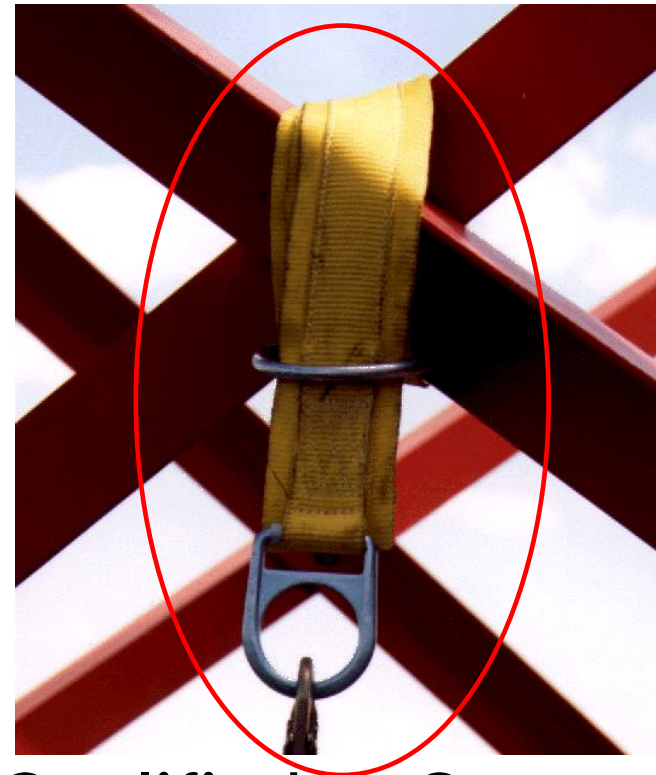
devices are used to raise or lower a fallen injured worker to safety or retrieve him from a confined space.

Anchors



Anchors: “A secure point of attachment for lifelines, lanyards or deceleration devices.” – OSHA

Your choice of anchor depends on the type of work being done.



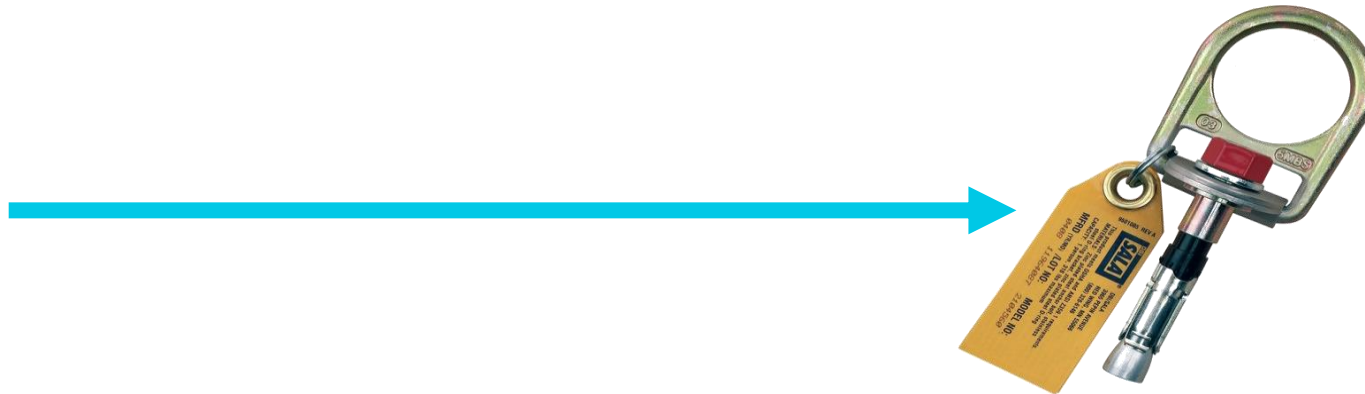
Anchors must be inspected by a Qualified or Competent Person!

Anchorage vs Anchorage Connector

Anchorage



Anchorage Connector



Anchorage Classes

Non-Certified



Requires **5000 lbs**

Certified (Engineered)



2 to 1 safety factor
2 X the MAF (Except HLL)

Important Considerations

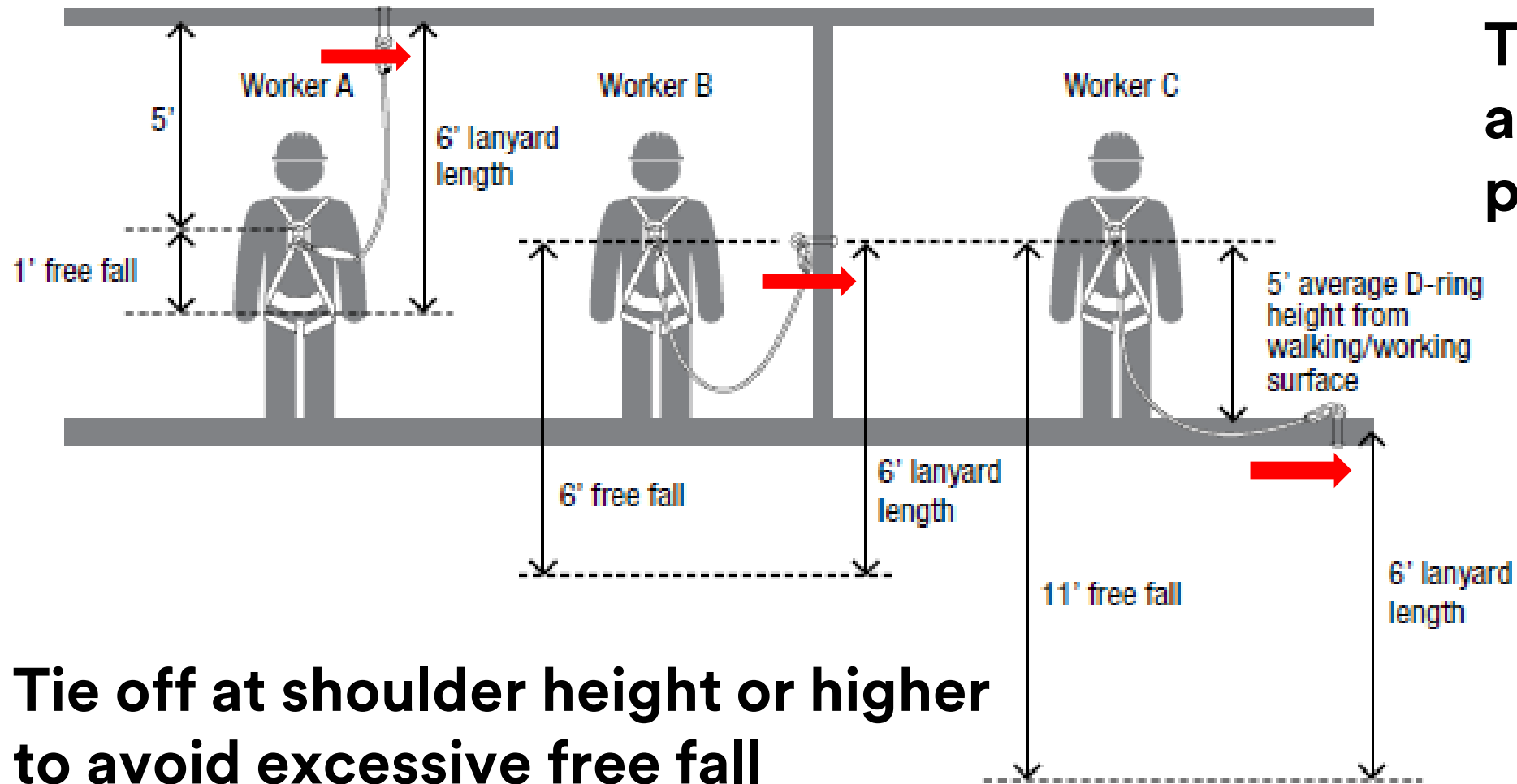
Swing Fall



Obstructions



Important point to remember: Limit Free Fall



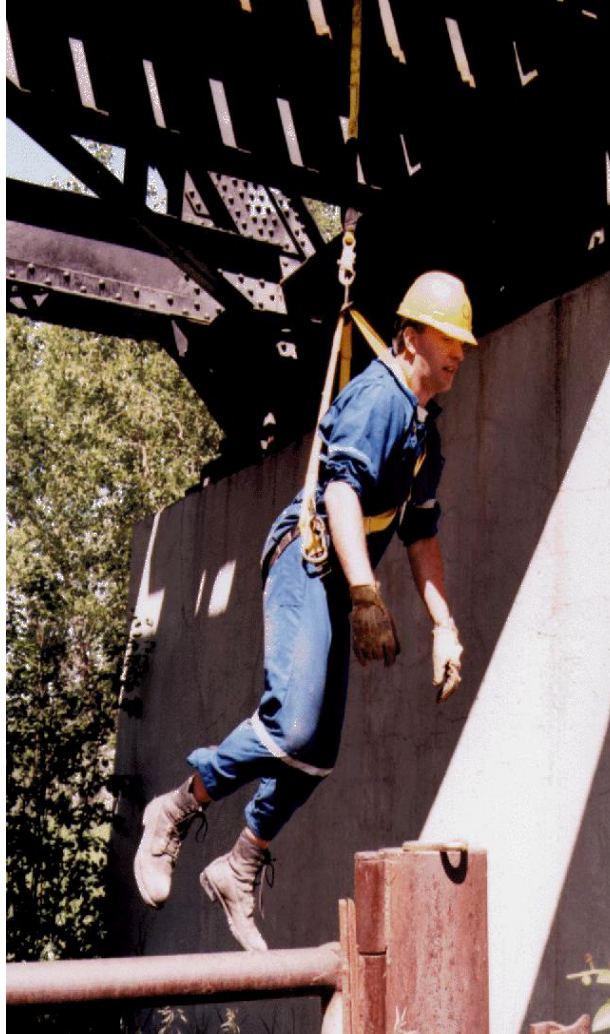
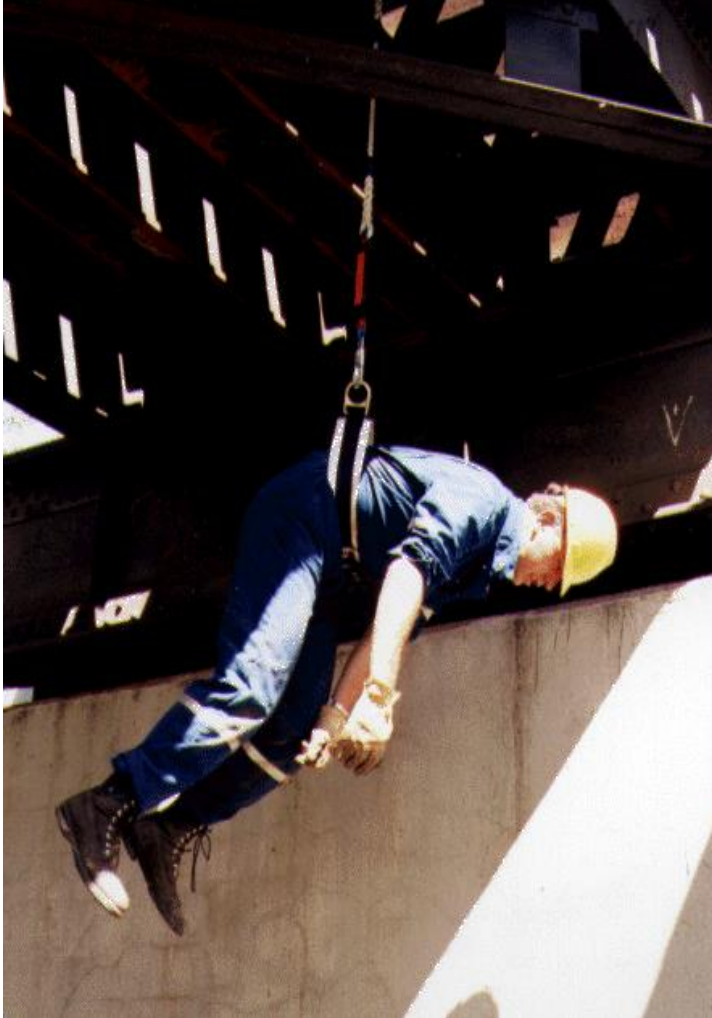
The maximum allowable free fall per OSHA is 6 ft.

OSHA: 1910.140(d)(2)(ii)

Body Support



Body Support Then vs Now



Body Support: Harness

The main purpose of a harness is to safely:

- distribute forces
- support the worker

Desirable Traits:

- Fast and simple adjustments
- Comfortable
- Properly sized



Full-Body Harnesses

Required for fall arrest

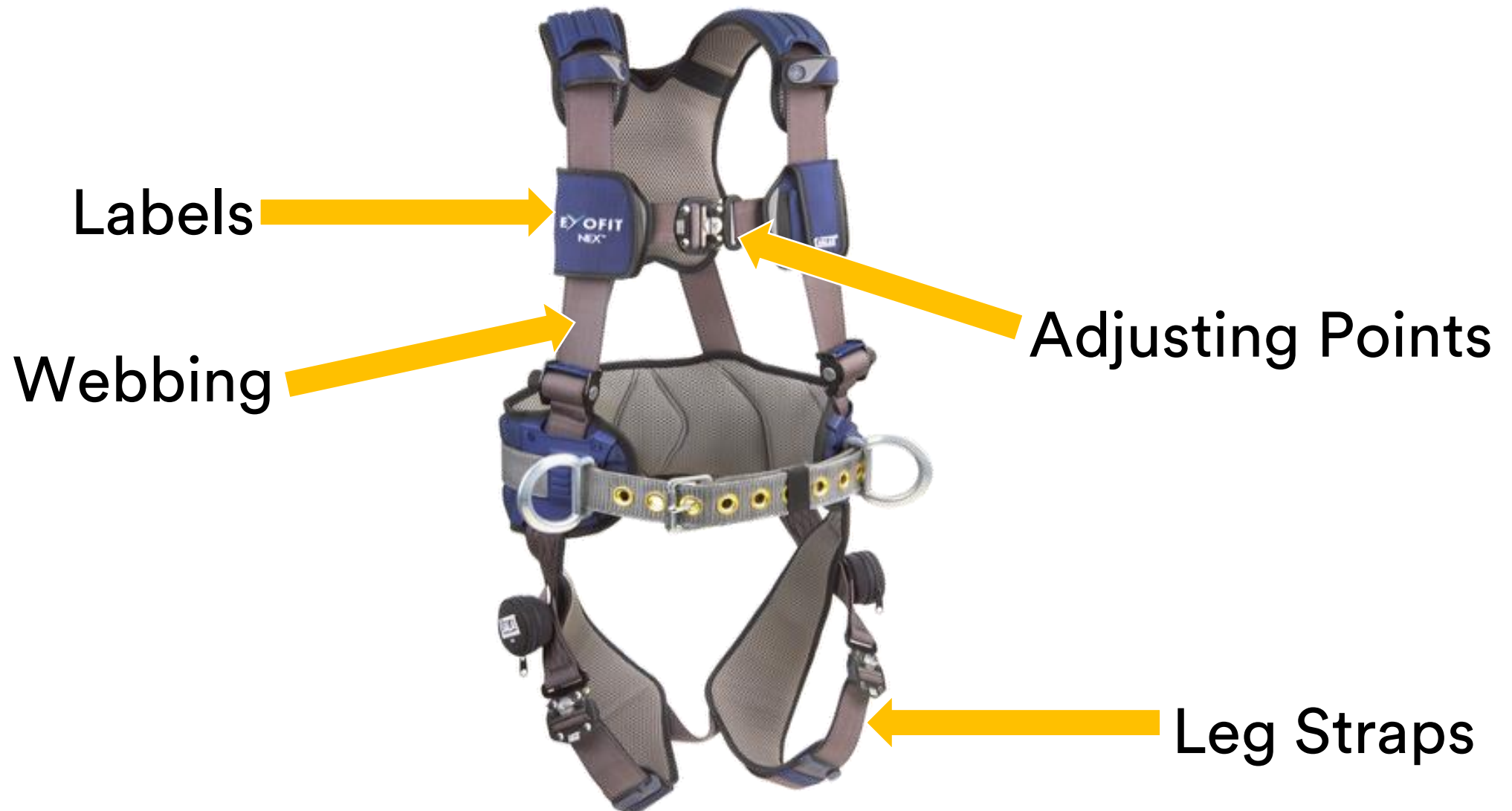
Must have a back D-ring

Must distribute the force throughout the body

Must be inspected before each use and at a minimum of once a year by a competent person



Key Harness Components



Key Harness Components

Back D-ring



Pelvic Support





FALL ARREST



POSITIONING



LADDER CLIMBING



LIMITED ACCESS



SUSPENSION



Harness Inspection

Four key components:

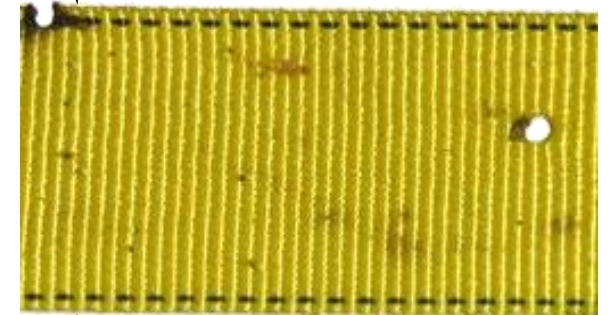
Labels

Stitching



Hardware

Webbing



Donning the harness: untangle, drape on, connect adjust



Connectors



Connectors

Lanyards

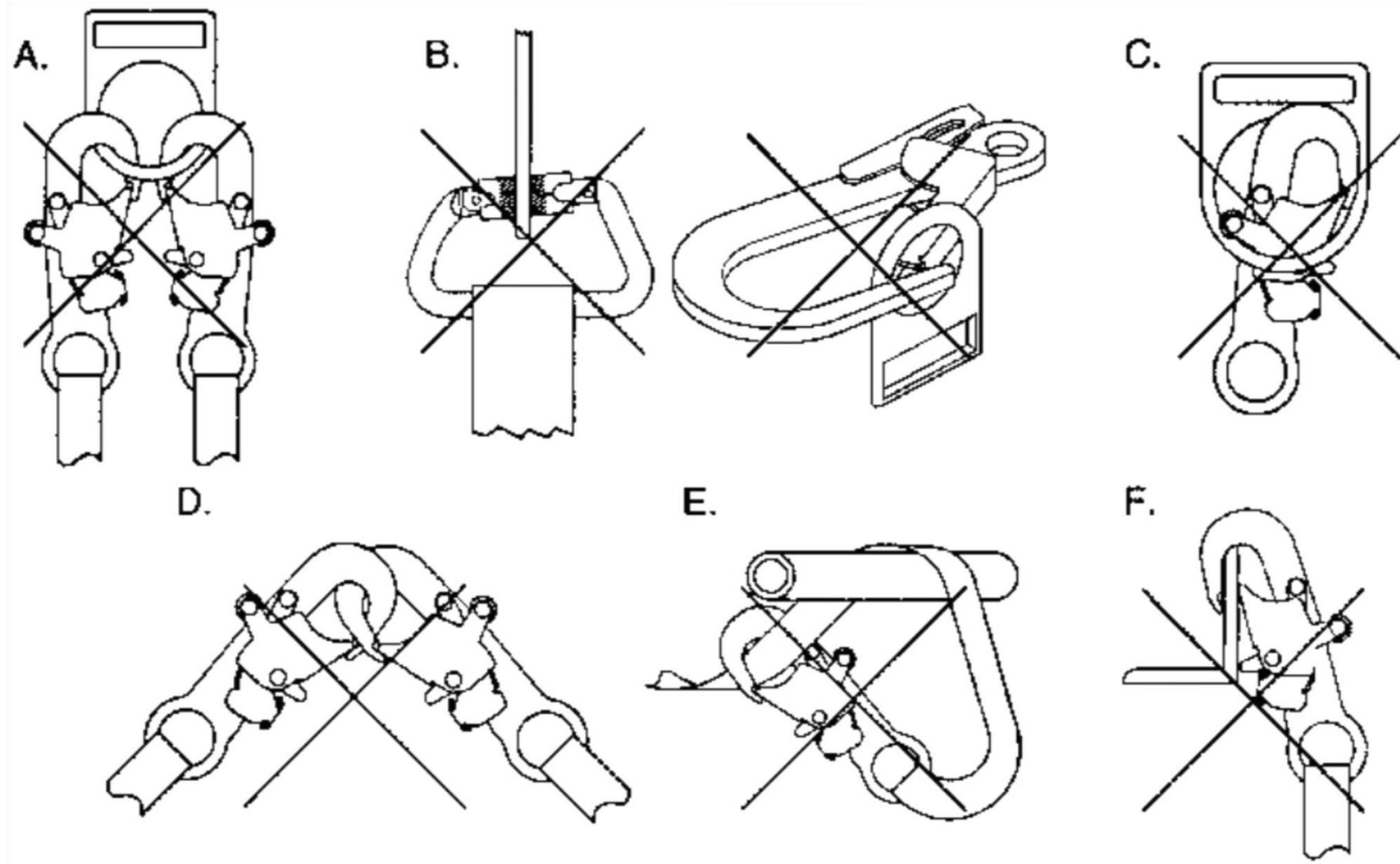
Self-retracting Devices (SRDs)

Hooks

Carabiners



Connector incompatibilities



Shock Absorbing Lanyards



Single Leg



Tieback Lanyard



Twin Leg

Improving Safety Connections

Each Connecting Device will have a connector to attach to the harness and anchorage connector

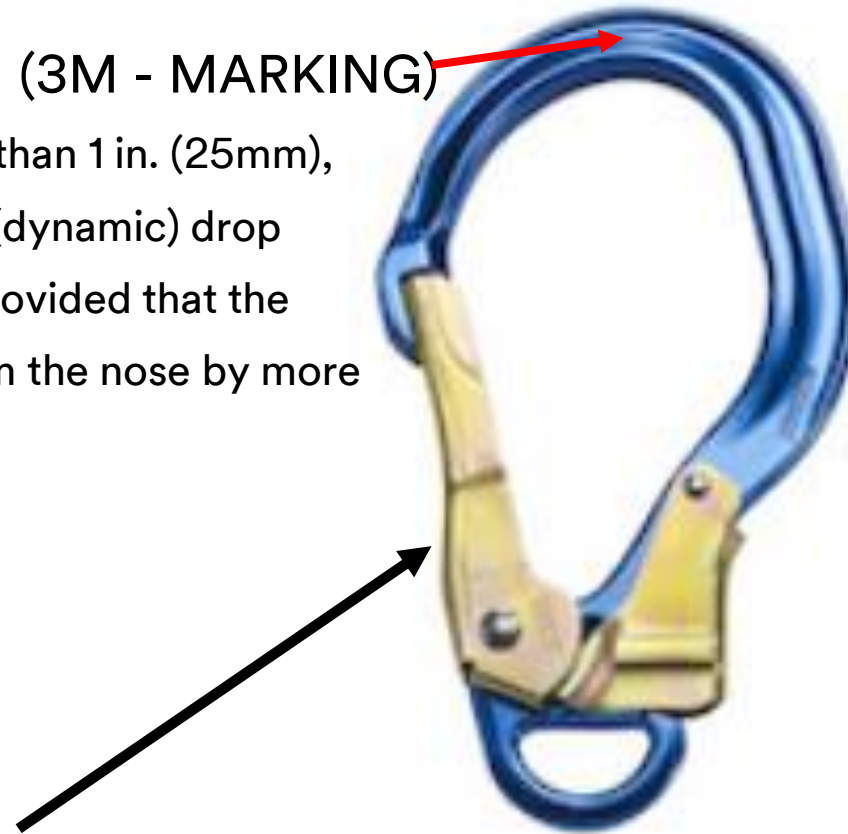
ANSI Z359.12-2019 – Transverse Loading (3M - MARKING)

Snaphooks and carabiners with gate opening larger than 1 in. (25mm), shall be capable of withstanding a transverse body (dynamic) drop test. Permanent deformation shall be acceptable, provided that the deformation is not sufficient to release the gate from the nose by more than 0.125 in. (3.1mm).

Gate Strength

ANSI & OSHA - 3,600lbs

Must be stamped on the gate



Fall Clearance Calculations for Shock Absorbing Lanyards

General Rule from your anchor:



Free Fall

“You need 17.5 ft of clearance with a 6 ft lanyard”

Deceleration

6.0 ft for Free Fall

Worker Height

3.5 ft for Deceleration (4' ANSI)

Safety Factor

6.0 ft for Worker Height

2.0 ft for Safety Factor

17.5 ft clearance required





**SRL-R
(rescue/retrieval)**



Self-Retracting Lifelines



SRL-LE (leading edge)



Personal SRL's

Self Retracting Lifeline Fall Clearance

Figure 3A:

Clearance required in feet (meters) between Working Level and Nearest Obstruction for User with Total Weight up to 310 lbs (141 kg)

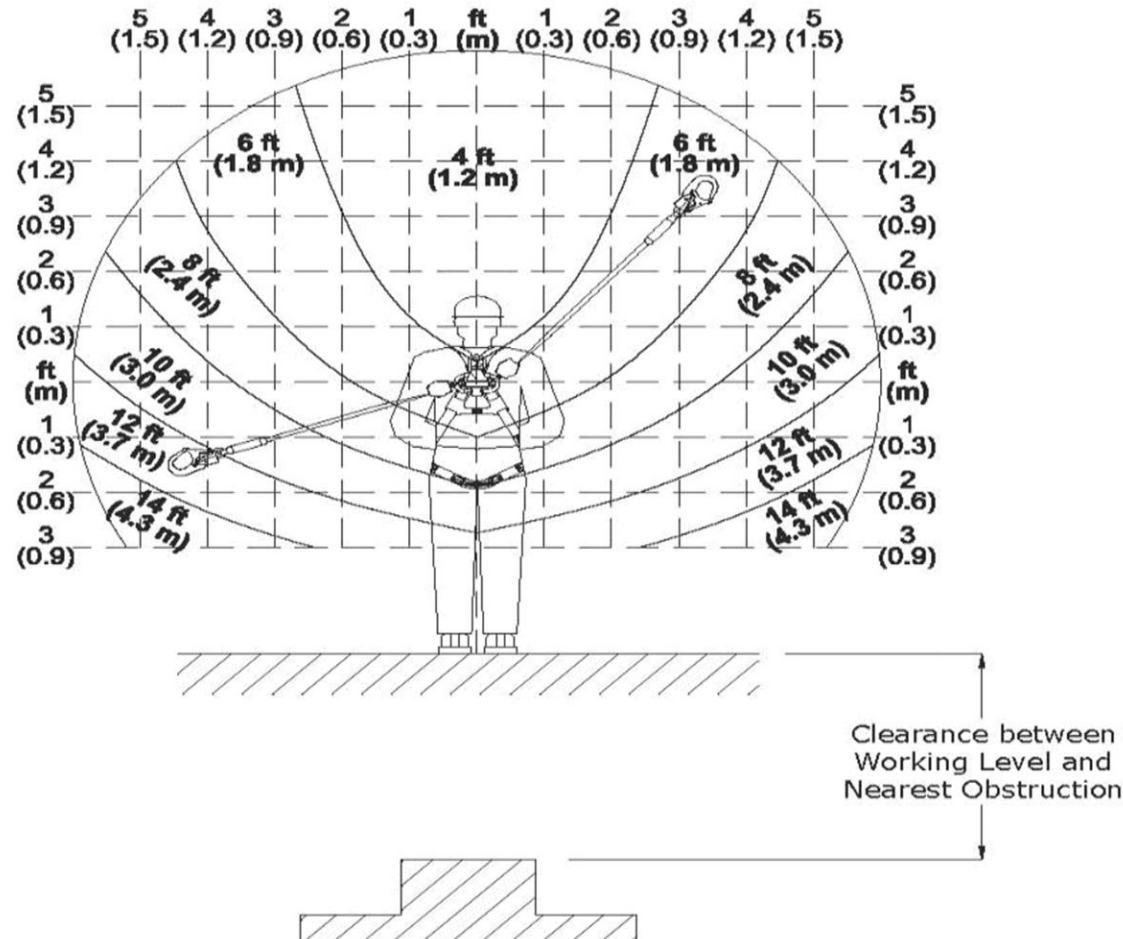
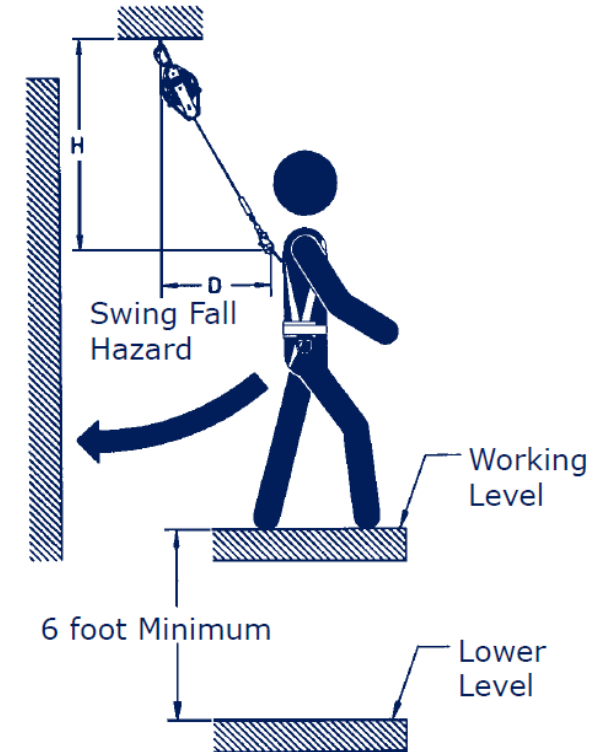


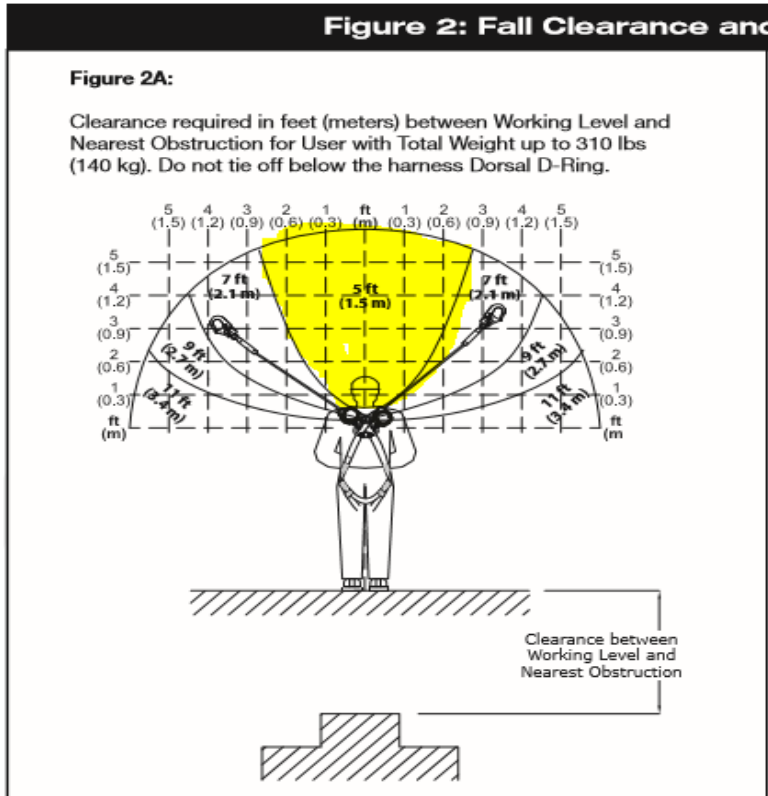
Figure 8 - Swing Fall



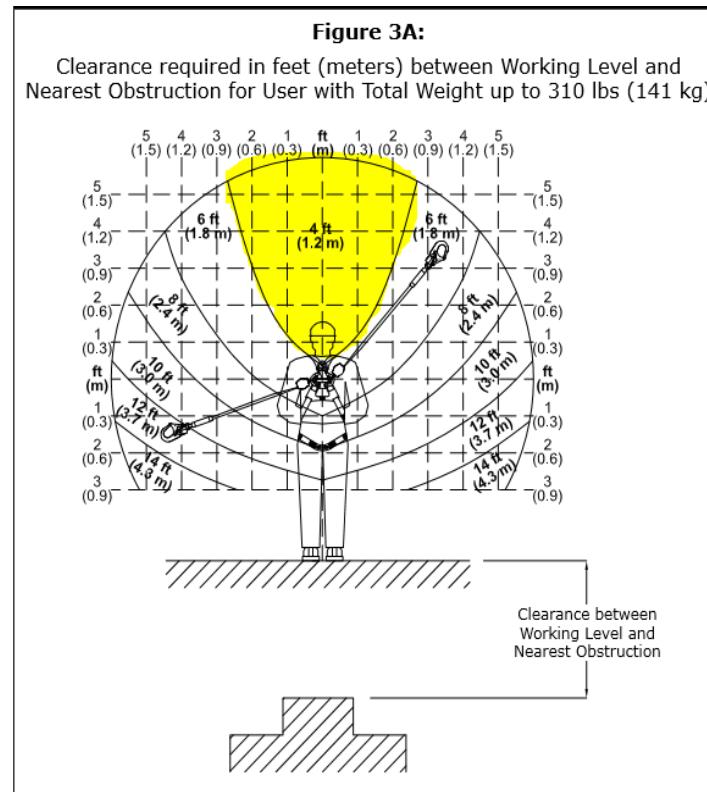
NOTE: The 6 foot minimum assumes the fall occurs from a standing position and the SRL is located overhead. If the worker is kneeling or crouching near an edge when the fall occurs, and additional 3 foot clearance is needed. If the worker is not directly below the SRL, additional clearance is needed.

Miss understanding ON CLASS “A” & CLASS “B”

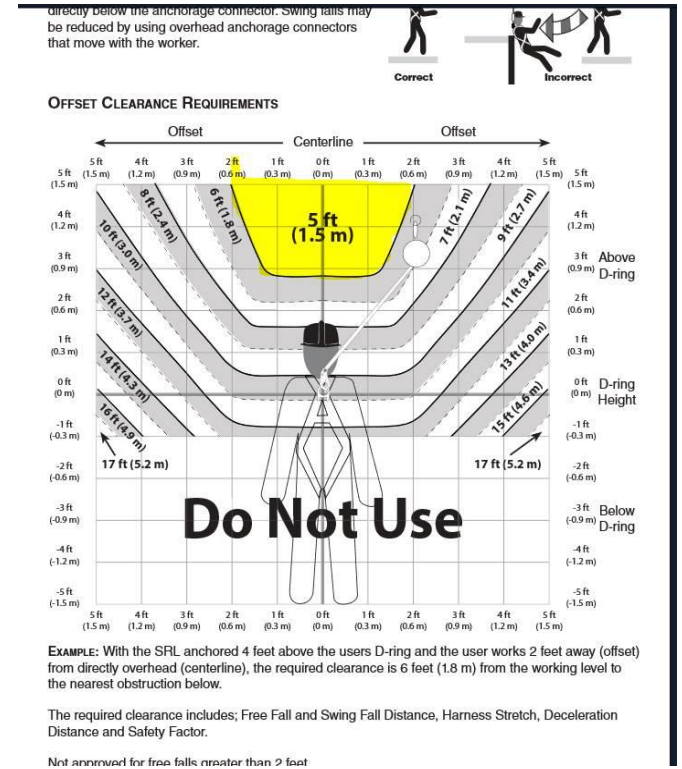
READ THE INSTRUCTION MANUALS TO FIND THE RIGHT FIT FOR YOU



Class A



Class B



Class A

ANSI Update Z359.14-2021 Self-Retracting Devices

SRD Categories

Previous Z359.14-2014  *New* Z359.14-2021 (effective February 1, 2023)



SRL



SRL-LE



SRL-R



SRL



SRL-P



SRL-R

ANSI Update Z359.14-2021 Self-Retracting Devices

SRD Categories

New Z359.14-2021 (effective February 1, 2023)

Self-retracting lifelines that has the housing secured to the anchor point.

SRL



Self-retracting lifelines that has the unit secured to the user's harness.

SRL-P



Self-retracting lifelines that includes an integral means for rescue.

SRL-R



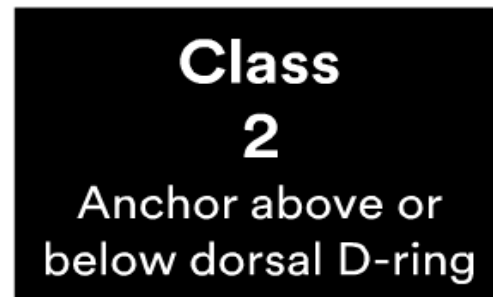
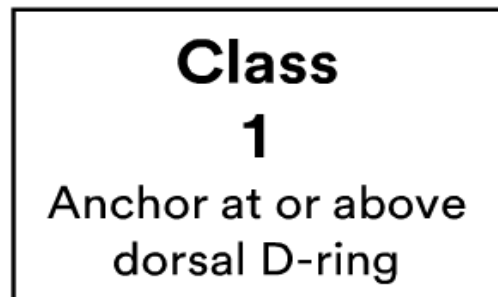
All categories of units will also be classified as either a class 1 or class 2 SRD.

Class 1

- For use with anchorages at or above the dorsal D-ring
- Maximum allowable free fall not to exceed 2 feet

Class 2

- For use with anchorages above or below the dorsal D-ring
- Maximum allowable free fall not to exceed 6 feet



ANSI Update Z359.14-2021 Self-Retracting Devices

SRD Categories

- Always carefully review the labels and written instructions for any self-retracting device to understand that working specifications for that particular device.

Non Leading Edge Web Based SRL



Non Leading Edge Cable Based SRL



Leading Edge Cable Based SRL



What is the Design Difference for Leading Edge?

Experimental evaluation of cable D-ring extension concept

Experimental Cable D-Ring Extender
Evaluated Sept 2018



ANSI/ASSP Z359.7 (2019)

Qualification and Verification Testing of Fall Protection Products

Key Points:

2. Test Equipment:

- Provides testing laboratories with specifics for drop test structure, test weight, test torso, test lanyard, instrumentation, test data analysis etc.

3. Test Specimens:

- Requirements for manufacturing of test specimens
 - “4.3.3 When performing qualification testing on a new product, a minimum of **three specimens** shall be tested. The specimens shall be configured as defined by the applicable test method”
 - “4.3.4 When performing verification testing on an existing product, a minimum of **one specimen** of each compliant product shall be inspected, tested and evaluated to the requirements specified in the respective ANSI/ASSP Z359 standard”
 - “4.3.5 Any variance within product models that affects the product’s performance, design and/or function with regard to the respective ANSI/ASSP Z359 standard shall constitute a different product model.”

LE D-Ring Extension Testing Summary

10 Units Tested / 2 Catastrophic Failures

Primary Issues Observed

- D-ring extenders expose the SRL shock pack to greater probability of contacting the leading edge during a fall event
- Connectors and hardware may contact leading edge during a fall event – creating high loading scenarios



Due to potential for catastrophic failure D-ring extensions NOT to be used for LE

INSPECTION AND FREQUENCY

1910.140 Personal fall protection systems.

(18) Personal fall protection systems must be inspected before initial use during each workshift for mildew, wear, damage, and other deterioration, and defective components must be removed from service.

OSHA 1926.502 (d) (21):

Personal fall arrest systems shall be inspected prior to each use for wear, damage and other deterioration, and defective components shall be removed from service.

ANSI Z359.1-2007 (General Industry), requires:

- Inspection Prior to use;
- Inspection of equipment each year by a competent person;
- Comply with manufacturer's instructions

READ THE MANUFACTURE INSTRUCTIONS

A least every 12 months, a Competent Person other than the user must inspect. Competent Person inspections MUST be recorded in inspection log in instruction manual and on equipment inspection grid label.

Service. recommends a five year maximum service life on its soft-goods fall protection products from the documented date that the product is placed into service by the end-user. Soft-goods fall protection products include harnesses, lanyards, and lifelines made of nylon, polyester, or other synthetic fibers.. fall protection products are to be inspected on a daily basis by the user and inspected, with documentation, on a semi-annual basis by a competent person.* Ultraviolet rays, abrasion, corrosive atmospheres, and severe service are among the factors that may affect and terminate a product's life prior to the five year maximum service life.

Formal Inspection requires that all harnesses be inspected by a competent person other than the user at intervals of no more than six months per applicable standard or as specified by a formal fall protection program. Record formal inspections in the provided Inspection Log. Punch or indelibly mark the inspection grid attached to the harness. Do not use a harness with a formal inspection date older than six (6) months unless under provision of formal inspection program. recommends that harnesses with formal inspection dates older than six (6) months be tagged "UNUSABLE"



Descent & Rescue



Rescue: Essential to your Fall Protection Program

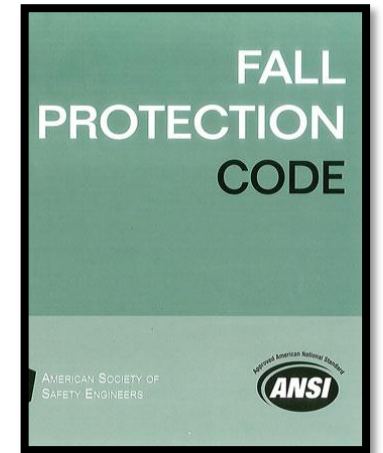
Standards:

OSHA 1910.66 and 1926.502:

“The employer shall provide for prompt rescue...
or shall assure that employees are able to rescue themselves.”

ANSI/ASSE Z359.2-2007:

“Employers shall develop
and maintain written fall protection and rescue procedures
for every location where an active fall protection system
is used to control a fall hazard.”



What is Prompt Rescue?

OSHA 1910.151 – Medical Aid

Recommended “contact” time 4 minutes

(OSHA Letter of interpretation 2004) <https://www.osha.gov/laws-regs/standardinterpretations/2004-04-27>

Definition of “prompt rescue” dependent on situation

[Suspension Trauma](#)



The purpose of a fall arrest system is to arrest the fall of a falling worker and disperse arrest forces throughout the body, reducing the chance of injury. It is not designed for prolonged suspension.

Possible symptoms

- Nausea
- Dizziness
- Sweating
- Paleness
- Altered level of consciousness



Avoiding Suspension Trauma

- Elevate the legs on a nearby structure if safe to do so
- Periodically clutch and hold knees up to the chest
- Move the legs to help maintain circulation
- Use suspension trauma straps, or another means of support under the feet (recommended as most effective method)



Rescue Plan

Procedures

Equipment

Personnel needed

- Requires training



Characteristics of a good rescue system

Simple, Safe, Planned and Practiced:

- Never Cut
- Never Improvise
- Keep it Simple
- Document and Update as situations change
- Be Prepared and.....
- Practice, Practice, Practice



Rescue Devices



Self-Rescue



Ultra-Lok RSQ



R550



They expect you to
come home safely.

Don't disappoint them.

Thank you