

# Toolbox Talk

## Personal Fall Arrest Systems

### Fall Protection - 1926.500 (also known as Subpart M)

This is a follow up to a previous Toolbox Talk - Fall Protection, where we learned about all the types of protection. But let's take a closer look at how to set up a Personal Fall Arrest System (PFAS).

### Recap of the Rule

Fall Protection is REQUIRED any time you are working 6 feet above a lower level. This includes Guard Rails, Safety Nets, PFAS, Positioning Device, Warning Line, Controlled Access Zone, Safety Monitor, or a Cover over the hole.

Positioning Devices and Personal Fall Arrest Systems offer the greatest sense of safety, but only work when they are set up correctly.

### Parts of a PFAS

First need to establish two very important definitions:

*Competent Person* – can see the hazard before it exists and can enforce effective means to eliminate it.

*Qualified Person* – one with a recognized degree or professional certification and extensive knowledge and experience in the subject field.

Competent person recognizes the need to use PFAS, Qualified person tells him how to anchor the system. CP trains the user on what the QP said needs to happen and ensures they do just that.

Next is the hardware itself (ABC)

- Anchorage Device - The connection to a sturdy tie off point, capable of supporting a 5,000 pound load. While the worker may only be 200 pounds, the force applied to the anchor will be much more than that to stop and hold the fall. (Math on that in just a minute)
- Body Support - The full body harness made of straps, webbing, and a D-ring (the metal connection point for the lanyard that connects you to the anchorage device)
- Connectors - The D rings and self closing hooks that connect all of the parts together.

Lanyards are typically 6 feet long and are designed to stretch just enough to not cause additional injury to the falling person. You can also have a Deceleration Pack, which is essentially a lanyard folded like an accordion and stitched together, slowing the fall as it tears itself apart.

### Setting Up the PFAS

For the safe use of the system that if/when the worker falls they are not making contact with the lower level or swung into other hazards. For that we need to run some math to determine the clear space needed when selecting the anchor point.

## How to Calculate the Fall Distance (using a 6' lanyard)

- Starting at the D Ring on the workers Body Harness
- If anchor point is above D ring, subtract that distance from 6'
- If anchor point is below D ring, add that distance to 6'
  
- + Length of Deceleration Pack
- + "Slippage" add 1ft for stretch of equipment
- + Add minimum of 1ft for clearance

Example: Anchor point is 4' above the D ring on the harness

$$6' - 4' = 2' \text{ (potential fall distance before slowing starts)}$$

$$+ \text{ Deceleration Pack} = 3.5'$$

$$+ \text{ Slippage} = 1'$$

$$+ \text{ Clearance} = 1'$$

Minimum 7.5 feet of clear space required.

Let's also consider the tremendous force put on the body when the sudden stop occurs.

A 200 pound person Falling 6 feet = 1,200 ft/lb of force.

Which is why a Body Harness is required for a Fall Arrest System. DO NOT USE A BODY BELT.

*1926.502(d)(16) - Maximum arresting force with use of a body belt is 900 pounds*

## Time To Rescue

In a Full Body Harness, the max time to hang after a fall is 14.38 minutes. In a Body Belt max time to hang is 1.63 minutes (usually because the body cracked like a glow stick)

It is important to rescue the fallen and suspended person as fast as possible. The effects of prolonged suspension are:

- Elevated Heart Rate
- Nausea
- Numbness
- Difficulty Breathing
- Extreme Discomfort

Venous Pooling: Hanging with legs immobile blood will stay in the legs -> Heart pressure drops -> Less oxygenated blood gets to the brain. Fainting or Loss of Consciousness increases as the body becomes aware of venous pooling, thus increasing the need to retrieve the suspended person.

For additional information on how to field test your PFAS please see [Subpart M Appendix C](#)