



Electrical Transmission & Distribution Partnership

OSHA Construction Outreach Training Course

Fall Protection Continuing Education

Presenter Guide
-3rd Quarter 2016

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Introduction

This Fall Protection continuing education course is designed to be presenter lead. The presenter may choose to augment the material with videos, handouts or other media to enhance the learning experience. The presenter may choose to incorporate visual aids such as a body harness, lanyard, self-retracting lifeline etc. to enhance the presentation.

Using this material in combination with practical experience, good presentation skills and knowledge of adult learning techniques, the presenter has a greater opportunity to deliver the information effectively.

Edgar Dale stated that 2 weeks after a learning event, adult learners remember:

- ✓ 10% of what they read
- ✓ 20% of what they hear
- ✓ 30% of what they see
- ✓ 50% of what they see and hear
- ✓ 70% of what they say
- ✓ 90% of what they say while performing a task

Microsoft® PowerPoint® combined with good instructional skills and instructor/student dialogue work strongly in the fifty to seventy percent range. PowerPoint® presents the information to the attendee and the instructor summarizes the content of the slides. It is critical to engage and involve the attendee in the process. Ask open-ended questions that will elicit conversation and discussion, but be cautious to maintain control of the discussion.

Conversation and scenarios are good, but can cause the discussion to run long. If it seems like the group is losing focus during the course, the facilitator can direct the group back on track by using comments like “This is a great discussion, but let’s get back to the subject at hand”.

Another tool is the “Parking Lot” which is simply a newsprint chart, dry erase board, or note pad where the presenter records questions that are not answered or comments not addressed during the meeting and that may require more research. It is vital to capture any ongoing discussions or questions on the “Parking Lot” and follow up when the information is known.

This refresher is to be delivered in the third quarter of 2016. Delivery time is approximately 1 to 1.5 hours in one setting or divided-up into multiple, shorter sessions. [It is critical that the presenter familiarizes himself or herself with the material prior to delivery.](#)

At the end of this document is a handout that discusses the ABC's of fall protection that the presenter can use in conjunction with the PowerPoint® presentation to augment the topic.

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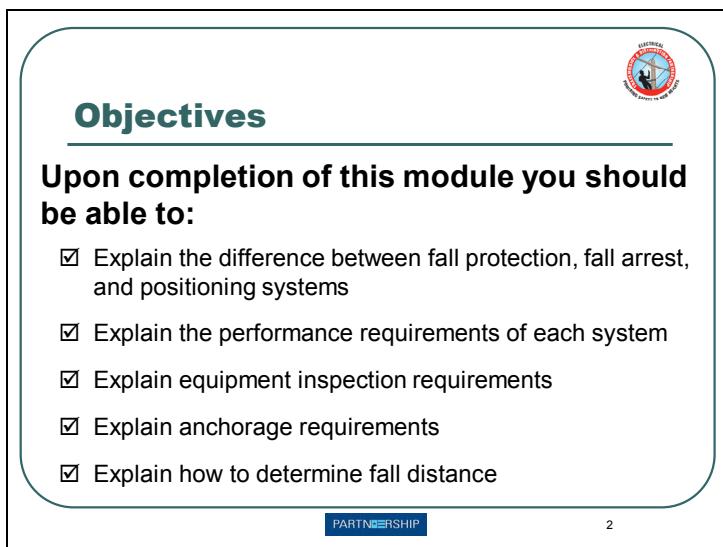
Slide 1



The slide features a dark teal header and footer bar. The main content area has a white background with a thin green border. At the top center is a circular logo for 'ELECTRICAL TRANSMISSION & DISTRIBUTION PARTNERSHIP' featuring a silhouette of a worker on a utility pole. Below the logo, the title 'Fall Protection' is in large bold teal font, followed by 'Continuing Education' in a slightly smaller teal font. In the bottom left corner of the main area is another circular logo for 'ELECTRICAL TRANSMISSION & DISTRIBUTION PARTNERSHIP' with the tagline 'POWERING SAFETY TO NEW HEIGHTS'. To its right is a blue rectangular button with the word 'PARTNERSHIP' in white. A small number '1' is centered at the bottom of the slide.

Introduce the module. Explain that this is the next module in the continuing quarterly education series.

Slide 2



The slide has a light blue header and footer bar. The main content area has a white background with a thin blue border. At the top center is a circular logo for 'ELECTRICAL TRANSMISSION & DISTRIBUTION PARTNERSHIP' featuring a silhouette of a worker on a utility pole. Below the logo, the section title 'Objectives' is in bold teal font. Underneath it, the text 'Upon completion of this module you should be able to:' is in bold black font. A bulleted list follows, each item preceded by a checked checkbox:

- ☐ Explain the difference between fall protection, fall arrest, and positioning systems
- ☐ Explain the performance requirements of each system
- ☐ Explain equipment inspection requirements
- ☐ Explain anchorage requirements
- ☐ Explain how to determine fall distance

A small number '2' is centered at the bottom of the slide.

Explain that this module is not intended to cover every aspect of fall protection. It is simply a review of some pertinent points. It is designed to cover the more basic aspects for overhead electrical work. Please note that specific company and client rules may be more stringent than those discussed. Upon completion of this module you should be able to determine when fall protection is needed; what is needed; how to inspect, use and care for this equipment.



Employer's Duty

- Determine if the surfaces on which its employees are to work have the strength and structural integrity to support employees safely



PARTNERSHIP

3

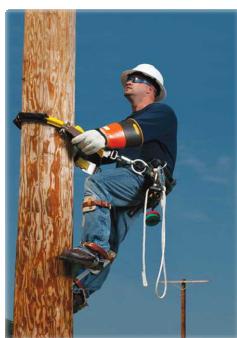
Explain that Fall Protection is governed by OSHA regulations and that the regulations have certain requirements. The regulation that governs fall protection is titled "Subpart M". Subpart M, sub-section 1926.501(a)(2) states that the employer shall determine if the walking/working surfaces on which its employees are to work have the strength and structural integrity to support employees safely. Employees shall be allowed to work on those surfaces only when the surfaces have the requisite strength and structural integrity. In addition, Subpart M requires that the employer must provide fall protection when there is a hazard of falling 6 feet or more to a lower level. This can include wall openings that are less than 39 inches from the floor that have a fall hazard of 6 feet or more to a lower level. An example of this would be a building under construction that has a rough window opening in place. These standards would take precedence over work not covered by the Power Transmission & Distribution standard "Subpart V".

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Subpart “V” Change



- Fall protection and fall arrest is now required for Power Transmission and Distribution workers
 - Wooden & Steel Poles
 - Towers



PARTNERSHIP

4

OSHA requires that each employee in elevated locations more than 1.2 meters (4 feet) above the ground on poles, towers, or similar structures shall use a personal fall arrest system, work-positioning equipment, or fall restraint system, as appropriate, if the employer has not provided other fall protection meeting Subpart M of this part.

Explain that these regulations apply to structures that support overhead electric power transmission and distribution lines and equipment. They do not apply to portions of buildings, such as loading docks, or to electric equipment, such as transformers and capacitors. Subpart M of this part contains the duty to provide fall protection associated with walking and working surfaces.

Explain that these regulations require that until the employer ensures that employees are proficient in climbing and the use of fall protection the employees are not considered "qualified employees".

Slide 5



The slide features a teal border with rounded corners. At the top center is a circular logo with a red border containing a silhouette of a person working on a utility pole. The text "ELECTRICAL TRANSMISSION & DISTRIBUTION PARTNERSHIP" is written around the top of the circle, and "POWERING SAFETY TO NEW HEIGHTS" is at the bottom. Below the logo is a teal rectangular box with a white border containing the word "PARTNERSHIP". The number "5" is centered at the bottom of the slide.

Explain that the following slides will briefly discuss pre-use inspection of equipment.

Slide 6



The slide features a teal border with rounded corners. At the top center is a circular logo with a red border containing a silhouette of a person working on a utility pole. The text "ELECTRICAL TRANSMISSION & DISTRIBUTION PARTNERSHIP" is written around the top of the circle, and "POWERING SAFETY TO NEW HEIGHTS" is at the bottom. Below the logo is a teal rectangular box with a white border containing the word "PARTNERSHIP". To the left of the box is a list of four bullet points under the heading "General". To the right of the box is a photograph of a person wearing a blue fall arrest harness. The number "6" is centered at the bottom of the slide.

- Inspection prior to use
- Done by a competent person
- Defective or damaged equipment removed from service
- This includes equipment subjected to fall event

Explain that fall protection, fall arrest, and/or work-positioning equipment shall be inspected before use each day to determine that the equipment is in safe a working condition. Any equipment that is not in a safe working condition may not be used.



Body Belt

- Look for:
 - Cracks, nicks, distortion, or corrosion
 - No loose or worn rivets are present
 - The waist strap has no loose grommets
 - The fastening straps are not 100-percent leather
 - No worn materials that could affect the safety of the user are present



PARTNERSHIP

7

Explain that the following specific items of the worker's body belt shall be inspected to determine that:

- ✓ The hardware has no cracks, distortion, or corrosion
- ✓ There are no loose or worn rivets
- ✓ The waist strap has no loose grommets
- ✓ There are no worn materials that could affect the safety of the user
- ✓ The d-rings are compatible with the snap hooks with which they are used
- ✓ There are no non-approved modifications have been made to carry tools or materials

9



Positioning Strap

- Inspect for the following:
 - Damage to the snaps
 - Locking snap type
 - Electrical burns
 - Damage rivets
 - Elongated holes
 - Red warning indicator
 - Dry rot


PARTNERSHIP 8

These straps and lanyards must be inspected prior to each use. They should be inspected for the following:

- ✓ Electrical burns, cracks, or deformation of the snaphooks, buckle, friction adjustor, or carabineer
- ✓ Loose rivets or broken stitching on the hardware attachment points, sewn splices or compression fittings, and other primary strength members
- ✓ Degraded or torn nylon strength members, as well as other physical, chemical, heat or age related damage
- ✓ Dry rotted leather
- ✓ Exposed red wear indicator
- ✓ Elongated holes, or broken stitches

Body Harness

- Manufacturer's markings
- Missing pieces
- Defects or damage
- Alteration
- UV exposure
- Chemical exposure
- Frayed webbing



ELECTRICAL
SAFETY
PARTNERSHIP
Protecting Safety in Work Places

PARTNERSHIP

9

Explain that some of the following specific items of the harness shall be inspected to determine:

- ✓ The absence or illegibility of manufacturer's markings
- ✓ The absence of any elements affecting the equipment
- ✓ The form, fit or function
- ✓ Any evidence of defects or damage to hardware elements including:

-Cracks	-Sharp Edges
-Deformation	-Corrision
-Chemical Damage	-Excessive Heat Exposure
-Alteration	-Excessive Wear

- ✓ Any evidence of defects or damage to straps or ropes including:

-Fraying	-Kinking
-Knotting	-Broken Stitches
-Pulled Stitches	-Excessive Elongation
-Chemical Damage	-Excessive Soiling
-Abrasion Damage	-Alteration
-Lack of or Excessive Lubrication	-Excessive Aging &
-Missing Parts	Wear -Defects

Flammability

- If a worker is exposed to flames or electric arcs
 - The fall protection equipment must be capable of withstanding these hazards



PARTNERSHIP

10



Explain that when used by employees weighing no more than 140 kilograms (kg) or 310 pounds fully equipped, body belts and positioning straps that conform to American Society of Testing and Materials Standard Specifications for Personal Climbing Equipment, ASTM F887, are deemed to be in compliance with the flammability requirements.

Explain that the severity of arc flash is measured in terms of the heat energy imparted by the electric current. The ASTM F887 standard specifies exposures of 40 cal/cm². This exposure level is considered to be a very high-risk category, typically encountered only by working on energized parts like voltage testing in switchgear greater than 1000 Volts.

Weight Rating

- Standard body harness is rated for 310 pounds
 - Weight of the worker and tools



PARTNERSHIP 11

Explain that when used by employees weighing no more than 140 kg or 310 pounds fully equipped, body belts and positioning straps that conform to American Society of Testing and Materials Standard Specifications for Personal Climbing Equipment, ASTM F887 are deemed to be in compliance with the worker size requirement.

Proper Fit

- D-ring in center of back near shoulders
- Chest strap in center of chest
- Leg straps tight
- Snug Fit
- All On” or “All Off”**



PARTNERSHIP 12



Slide has animation.

Explain the need for the “Buddy System”. Explain that the harnesses must have the d-ring in the center of the back near the shoulders. Explain the last bullet which means the wearer either has the harness completely on or taken off. Do not wear a harness with the leg straps unfastened.



Shock Absorbing Lanyard

- Shock Absorbing lanyards that are subjected to a fall must be removed from service
- Even if the lanyard does not fully deploy



PARTNERSHIP 13

Explain that if a shock-absorbing lanyard starts to deploy, it must be removed from service, even if it does not fully deploy.



System Types

 PARTNERSHIP

14

Explain that you are going to discuss the three basic systems.

Types of Systems

- Fall Protection System
- Fall Arrest Systems
- Positioning System
 - Performance criteria is different for each



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SAFETY PARTNERSHIP
WORKING SAFELY TO SAVE LIVES

PARTNERSHIP

15

Explain that the following section will discuss the three basic systems, which are Fall Protection, Fall Arrest, and Positioning.

Three Systems

- Fall Protection
 - Prevents a fall
- Fall Arrest
 - Limit free fall to 6'
- Positioning
 - Free fall < 2 feet



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SAFETY PARTNERSHIP
WORKING SAFELY TO SAVE LIVES

PARTNERSHIP

16

Ask if the steel (in the picture) is of sufficient strength to function as an anchorage and support the worker should the worker experience a fall?

Explain that a fall prevention or fall protection system is a system, which may include a positioning system, intended to prevent a worker from falling from an elevation. Such systems may include guardrails and other barrier systems. Fall prevention systems are used in an attempt to prevent workers from falling from an elevation.

Explain that a personal fall arrest system is an assembly of equipment such as a full-body harness in conjunction with a connecting means (i.e. lanyard), and an anchorage. The system may incorporate an energy absorbing device that limits the forces a worker experiences during a fall. A fall arrest system is designed to prevent a worker, in the process of a fall, from falling more than the designed fall limit and limits the arresting forces imposed on the worker. It does not prevent a worker from falling. Fall distance must be a serious consideration.

Explain that work-positioning systems like a pole strap must be rigged so that an employee can free fall no more than 0.6 meters (2 feet).



Fall Protection Systems



PARTNERSHIP

17

Explain that you are going to explain in greater depth the types of systems and their differences.



Guardrails

- Top rail
 - 42 inches \pm 3 inches
 - Withstand 200 pound side force
- Mid rail
 - Mid-way between top rail and walking surface
 - Withstand 150 pound force



PARTNERSHIP
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Explain that OSHA sets requirements for the strength and height requirements. The top edge height of top rails, or equivalent guardrail system members, shall be 42 inches (1.1 m) plus or minus 3 inches (8 cm) above the walking/working level. When conditions warrant, the height of the top edge may exceed the 45-inch height, provided the guardrail system meets all other criteria of this paragraph.

Slide 19

OEPS-Fall Protection

Open Excavation Protection System

PARTNERSHIP

19

Explain that Open Excavation Protection System. OEPS™ is an industry derived safety device preventing fall related injuries and protecting staff, employers and visitors from danger and loss. OEPS™, which stands for Open Excavation Protection System, is a certified, made for industry barricade that completely secures the area around an excavation site whether excavating holes or trenches. It is an engineered safeguard that offers complete demarcation as well as a physical prevention of a fall event for staff, other workers, members of the public and animals.

Slide 20

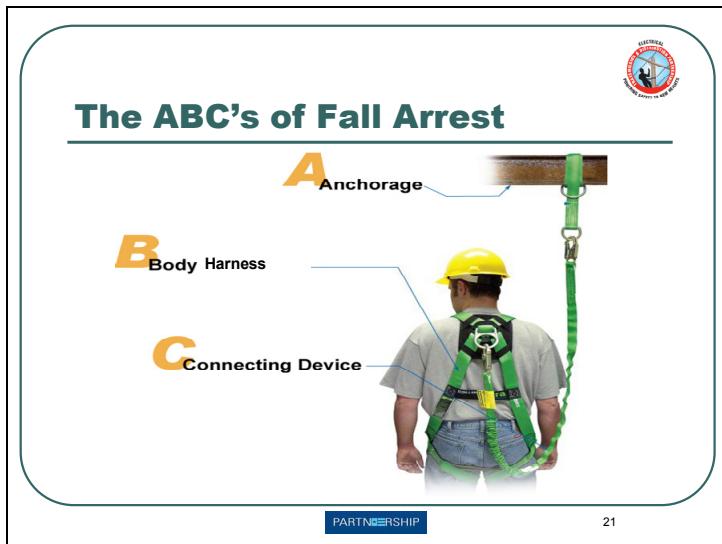
Fall Arrest Systems

ELECTRICAL & DISTRIBUTION PARTNERSHIP
POWERING SAFETY TO NEW HEIGHTS

PARTNERSHIP

20

Explain that you are going to discuss fall arrest systems.





Performance Criteria

- Limit free fall is not more than 6'
- Cannot contact with a lower level
- Shock absorber brings employee to full stop within 3 ½ feet
- Lanyard & harness must be compatible
- System must provide for prompt rescue
- System based on total weight of **310 pounds**
(employee + tools combined weight)

PARTNERSHIP

22

Explain that this slide lists the requirements of a personal fall arrest system. Explain that the harnesses must have the d-ring in the center of the back near the shoulders. The harness and lanyard combination must limit the arresting force to 900 lbs. Explain that the lanyard and harness need not be of the same manufacturer so long as the competent person deems they are compatible.



Anchorage

- Strength
 - Fall Arrest:
 - Support at least 5,000# per employee attached
 - Positioning:
 - 3,000# or twice impact load

PARTNERSHIP

23



Slide has animation

Explain that all anchorage points must be able to support at least 5,000 pounds per employee attached or twice the anticipated load that may be applied. This may be determined by a competent person. Anchorages for positioning devices shall be able to support 3,000 pounds or two times the impact load. Anchorages on our bucket trucks must be independent of the bucket. Always attach to a manufacturer supplied anchor point. This point was engineered for use in accordance with ANSI A92.2 Vehicle-Mounted Elevating and Rotating Aerial Devices. If there is no supplied anchor point, then an approved boom strap must be used.

Explain that the picture shows an anchorage system developed by Gravitec for DirectTv workers installing systems on rooftops. One aspect of the system is a truck mounted anchorage point. This device may be a possible anchorage solution for employees working near excavations.

Slide 24

Tie Back

- Only for lanyards designed to be used in a “Tie-Back” configuration



PARTNERSHIP 24

Explain that only those lanyards that are designed to accommodate a tie back connection may be used in that configuration. Some Tie back lanyards do not allow the snap hook to connect over the webbing but to an additional d-ring attached to the body of the lanyard.

Slide 25

Determine Force & Fall Distance

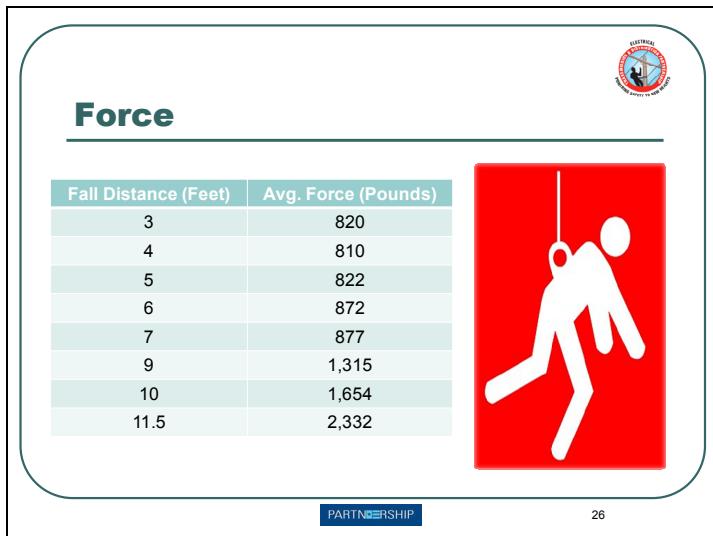


PARTNERSHIP

25

Explain that you are going to discuss force and fall distance.

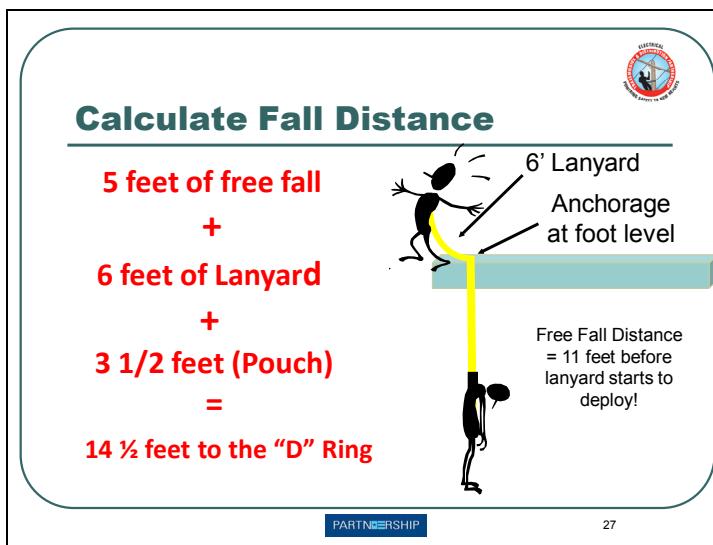
Slide 26



Slide has animation

Explain that the first table shows the force exerted when a 220-pound steel weight was dropped into a non-shock absorbing type nylon lanyard. The second table shows the results dropping the same 220-pound weight into a Miller shock-absorbing lanyard.

Slide 27



Ask the group how far this person would fall then explain all the factors. Also, explain that OSHA limits the maximum allowable free fall distance to 6 feet. To ensure an employee does not strike a lower level – 12.5 to 19.5 feet of clearance distance is typically needed. For power transmission and distribution workers, OSHA does not consider trees, conductor, the tower leg, cross bracing, or lattice work to be a lower level. This is critical when considering fall arrest and fall positioning equipment

Slide 28

Life Lines

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PARTNERSHIP

28

Explain that the following section will discuss both horizontal and vertical lifelines.

Slide 29

Horizontal Lifeline

- Minimum safety factor of 2
- Protected from being cut or abraded
- Designed, installed, and used under the supervision of a qualified person

PARTNERSHIP

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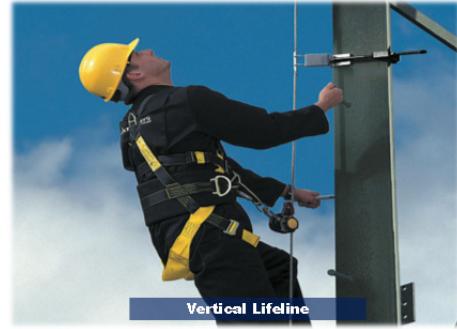
Explain that in the context to this standard, a Qualified person means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

Vertical Lifeline

- Minimum breaking strength of 5,000#
- Designed, installed, and used under the supervision of a qualified person
- Only one worker per lifeline



PARTNERSHIP 30



Slide has animation

Lanyards and vertical lifelines shall have a minimum breaking strength of 5,000 pounds (22.2 kN). Explain that only one person at a time (except elevator workers) is allowed to be attached to a vertical lifeline.

Positioning Systems



PARTNERSHIP

31

Explain that the following section will discuss positioning systems.

Slide 32



Self Retracting Lifeline

- Limits free-fall to Two (2) feet
 - Minimum breaking strength of 3,000 pounds



PARTNERSHIP

32

When using a self-retracting lifeline, it must not allow any more than a 2-foot free fall. The minimum breaking strength of a self-retracting lifeline is 3,000 pounds.

Slide 33



Wooden Pole

- Limits free-fall to Two (2) feet
- Minimum breaking strength of 3,000#.



PARTNERSHIP

33

Wooden pole positioning systems are designed to provide line personnel protection from falling while working from wood poles from the ground, to the elevated work position, and back to the ground. These systems require the user to hitchhike up and down the pole utilizing the cross over strap and the paddle tensioner. If the user starts to fall, the strap squeezes the pole, securing the user and preventing a fall. While climbing over obstructions, the user would secure a second lanyard prior to removing the primary strap. These systems can accommodate various size poles.

Slide 34

Aerial Lifts

- Each employee working from an aerial lift shall use:
 - A fall restraint system or
 - A personal fall arrest system



PARTNERSHIP 34

Explain that each employee working from an aerial lift shall use a fall restraint system or a personal fall arrest system.

Slide 35

Why Fall Protection?

- There are at least 206 very good reasons to protect yourself from a fall
- Remember,
- Gravity is the Law!!**



PARTNERSHIP 35



Slide has animation

There are 206 bones in the human body. Therefore, there are 206 good reasons that you might not want to be involved in a fall.

ABC's Of FALL PROTECTION

ANCHORAGE (The Most Important Component)



Make sure the anchor point is strong enough to withstand the forces generated by a fall. For the tie off to be legal, it must support 3600 lbs with certification, 5,000 pounds in the absence of certification.



Anchorage's shall be inspected every 6 months by a competent person.

Always attempt to tie off above your head.

(A six foot man who ties off at his feet could fall as much as 12 feet).

Always attempt to tie off directly above your head to avoid the pendulum effect.

The shorter the tie-off, the shorter the fall. Always use the shortest lanyard possible.

Look out for sharp beams. Wrapping lanyards around beams could cut them during the tremendous forces generated during a fall. Use a cross-arm strap or a carabiner.

BODY SUPPORT

Two types- Cross Over and Vest style



Full body harnesses are mandatory for fall arrest and attached to a shock absorbing lanyard or self retracting lifeline with a maximum arresting force of less than 1800 pounds to the body.

Full Body harness; It should be snug but it shouldn't bind.

Harness should fit so that the center grommets are used most often.

Make sure all leg snaps or buckles are attached.

The chest strap should be in your mid-chest area.

Elastic harnesses will not absorb shock. They are simply more comfortable

Side and Front "D" rings are for positioning only!

Do not punch holes in a harness to increase the size.



Attach lanyards to back "D"-Ring only.

Rope lanyard may be attached to side "D" Ring for positioning only.

Use only Lanyards with double locking snaps.

Mandatory when used for fall protection and designed for a maximum free fall of 6 feet or less.



Never tie a knot in lanyard. This will reduce the strength



When using shock absorbing lanyards attach shock pack end to back "D"- Ring.

Retractable life lines are faster reacting, allow a larger working area and reduces shock. Do not use at more than a 30° angle.