



Electrical Transmission & Distribution Partnership

Continuing Education Training

-Personal Protective Equipment

Presenter Guide

-2nd Quarter 2017

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Introduction

This PPE Refresher course is a presenter lead (supervisor, safety professional) process. The presenter may choose to augment the material with videos, handouts or other media to enhance the learning experience. The presenter may want to incorporate visual aids 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.

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 presenter can direct the group back on track by using comments like “Good discussion, but let’s get back to the subject at hand”.

Another tool is the “Parking Lot” which is simply a newsprint chart or dry erase board or note pad where the presenter records questions/discussion points not answered or 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.

Deliver this refresher during the second quarter of 2017. Delivery time is approximately 1 hour, in one setting or divided-up into three, 15 to twenty minute settings. The presenter may deliver the topic in a formalized meeting room setting using the PowerPoint slide deck or by using the three, key point sheets (located at the end of each session) as in a tailgate safety talk. It is critical that the presenter makes him or herself familiar with the material prior to delivery.

This module may be presented with the Peer Coaching-Listen Up/Speak Up module or presented separately.

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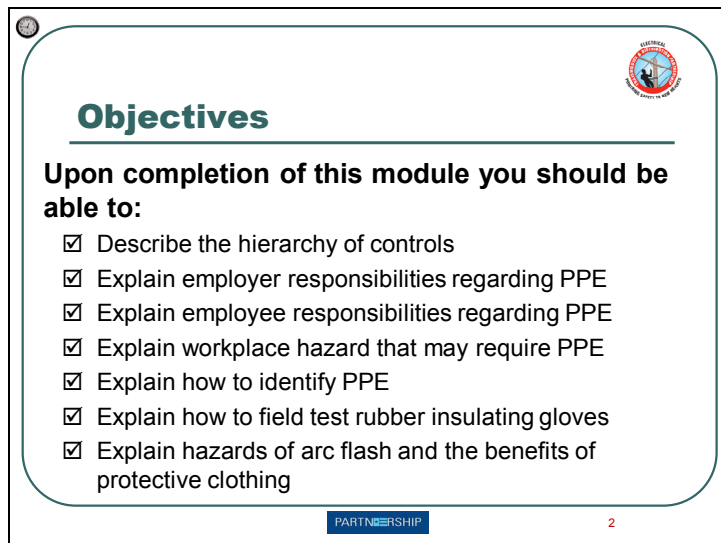
Slide 1



Begin session one

Introduce the subject. Explain that this is the continuing education module for the 2nd quarter 2017.

Slide 2



Discuss the overall objectives of this module. Explain that in the first session you are going to discuss the hierarchy of controls when dealing with hazards.

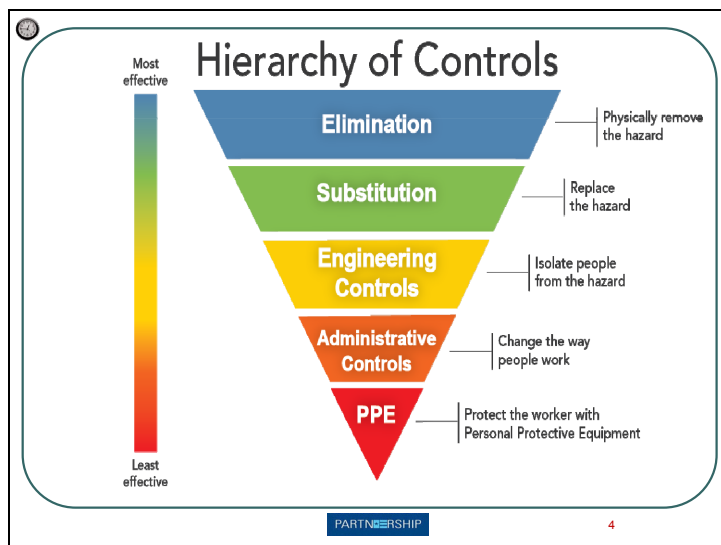



Employers Must

- Use all feasible engineering and work practice controls to eliminate and reduce hazards
- Use personal protective equipment if the controls don't eliminate the hazards
- Identify which PPE items are the last level of control!

PARTNERSHIP
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Explain that there are numerous hazards in our workplaces and not all of them can be eliminated. Employers must protect employees from hazards such as falling objects, harmful substances, and noise exposures that can cause injury.



Elimination

De-Energize

Use equipment versus mechanical means. E.g., eliminate manual lifting, bucket use versus climbing

Substitution

Use equipment versus mechanical means. Change position or location

Engineering Controls

Use cover-up or additional cover-up
Additional switching, Fast trip, /one shot

PPE

Last line of defense to protect worker

Administrative Controls

Rotation of workers

Additional job briefs when applicable

Scheduling time of task like time of day during high heat

Procedures and written policies & JSA's



Training Requirements

- Why PPE is necessary?
- How it will protect you?
- What are its limitations?
- Why do you need a proper fit?
- Why identify signs of wear?
- How to clean and disinfect?
- Useful life?





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Explain that workers must know and understand the how, when, and the why of PPE. Each affected employee must demonstrate an understanding of the required training, and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE. When the employee is trained, but does not demonstrate the required skill and understanding, retraining is required.



Engineering Controls

- If The work environment can be physically changed to prevent employee exposure to the potential hazard
- Then the hazard can be eliminated with an engineering control





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Explain that the first and best strategy is to control the hazard at its source. Engineering controls do this, unlike other controls that generally focus on the employee exposed to the hazard. The basic concept behind engineering controls is that, to the extent feasible, the work environment and the job itself should be designed to eliminate hazards or reduce exposure to hazards.



Administrative/Work Practice Controls

- If employees can change the way they do their jobs and the exposure to the potential hazard is removed,
- Then the hazard can be eliminated with a work practice control





PARTNERSHIP
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Explain that Work Practice Controls are a type of administrative control where the employer modifies the manner in which the employee performs assigned work. The modification may result in a reduction of exposure through such methods as changing work habits, improving sanitation and hygiene practices, or making other changes in the way the employee performs the job.



Controls	Hazards
Job Rotation	Heat – Cold
Wet Method	Dust
Housekeeping	Slips, Trips, Falls
Hygiene	Illness



PARTNERSHIP
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These are
examples of
Administrative
and Work
Practice
Controls

The following are some examples of work practice controls. Job rotation only reduces exposure – it does not eliminate the hazard. Wet methods suppress dust. Housekeeping and maintenance are essential tools in eliminating hazards such as slips, trips, and falls.

Slide 9



Responsibilities

- **Employer**
 - Assess workplace for hazards
 - Provide PPE
 - Determine when to use
 - Provide PPE training for employees and instruction in proper use



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Explain that in the second session you are going to discuss the employer and the employee responsibilities concerning PPE and examples of different types of PPE.

Slide 10



Responsibilities

- **Employee**
 - Use PPE according to training received and other instructions
 - Inspect daily and maintain in a clean and reliable condition



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Explain that employees must follow their company policies and procedures regarding the use of PPE.

End session one

Key points-Session one

The presenter should have touched on the following items when discussing section one:

1. What is the last level of control?
 - a. PPE
2. What is the first level of control?
 - a. Elimination
3. Employees should be trained on and understand:
 - a. Why they wear PPE
 - b. When to wear PPE
 - c. How to wear PPE
 - d. How to inspect it
 - e. Its limitations
 - f. When and how to replace it

Begin Session Two

Slide 11



Eye Protection

- Safety glasses must be marked Z87.1
 - ✓ Employees that use corrective lenses shall be protected by goggles or spectacles of one of the following types:
 - ✓ Spectacles whose protective lenses provide optical correction;
 - ✓ Goggles that can be worn over corrective spectacles without disturbing the adjustment of the spectacles;
 - ✓ Goggles that incorporate corrective lenses mounted behind the protective lenses.



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Explain that all prescription and non-prescription glasses must be marked ANSI Z87.1 or Z87 to be considered safety glasses. There are three common types of eye and face protection. They are safety glasses, goggles, and face shields. Face shields are considered secondary protection and may be required to be used in addition to safety glasses or goggles. Other types of eye protection include welding shields and laser safety goggles.

Slide 12



Head Injuries

- Falling objects such as tools
- Bumping head against objects, such as pipes or beams
- Contact with exposed electrical wiring or components



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Explain that head protection is needed to protect employees from potential head injuries. A head injury can impair an employee for life or it can be fatal. Wearing a hard hat is one of the easiest ways to protect your head from injury.



The Correct Hard Hat (ANSI Z89.1)

- Class C
 - Construction – Rated at 2 kV
 - Good impact protection but limited voltage protection
- Class E
 - Electrical / Utility work – Rated at 20 kV
 - Protects against falling objects and high-voltage shock
- Class G
 - General use. Offers limited protection
 - Protects against bumps from fixed objects, but does not protect against falling objects
 - No electrical rating

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Explain that a hard hat known as the class E has been tested to protect against 20,000 volts of electricity. A hardhat is called a bump cap or a class G cap. It is very lightweight with simplified suspension. These are only used to protect against bumping and scraping of the head.

Just like with any piece of safety equipment, you will want to make sure that your hard hat fits properly. You do not want one that is too loose or too tight. This can hinder their performance and threaten your safety.



Two Types

- Type I
 - Top impact protection
- Type II
 - Top and Side impact protection



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Explain that anyone who works in an industrial setting knows that hard hats are an essential part of the available safety gear. There are two types of hard hats from which to choose. They are type I and type II. Type 1 hard hats protect from objects that are falling from above. Type II hard hats have to meet vertical and lateral penetration and impact requirements. These have a foam inner liner.

The slide features a title "Hearing Protection (ANSI S12.6)" in bold teal text. To the left of the image is a bulleted list: "If we cannot reduce the noise or its duration", "Use ear protective devices", and "Fit is critical". To the right is a photograph of a pair of red foam earplugs with a blue cord. In the top right corner is a small circular logo with a person wearing a hard hat. At the bottom, there is a blue "PARTNERSHIP" logo and the number "15".

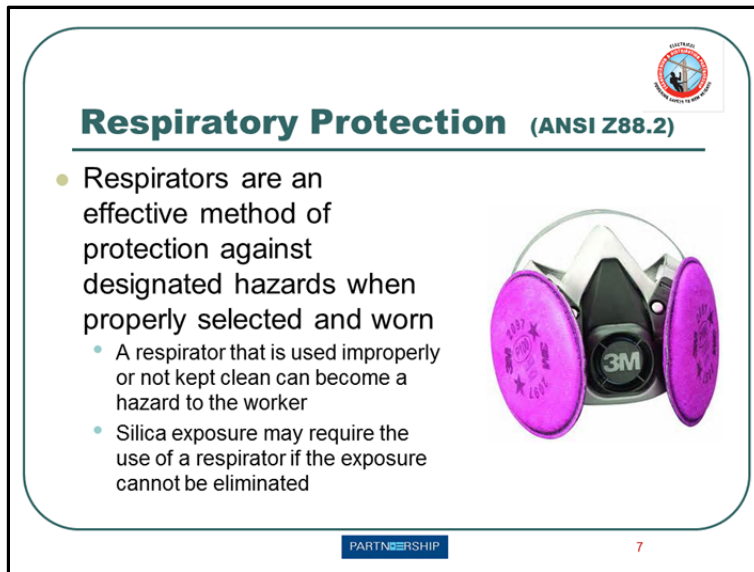
Hearing Protection (ANSI S12.6)

- If we cannot reduce the noise or its duration
- Use ear protective devices
- Fit is critical



PARTNERSHIP 15

Explain that if engineering and work practice controls do not lower noise exposure to acceptable levels, employees must wear appropriate hearing protection. It is important to understand that hearing protectors reduce only the amount of noise that gets through to the ears.

The slide features a title "Respiratory Protection (ANSI Z88.2)" in bold teal text. To the left of the image is a bulleted list: "Respirators are an effective method of protection against designated hazards when properly selected and worn", "A respirator that is used improperly or not kept clean can become a hazard to the worker", and "Silica exposure may require the use of a respirator if the exposure cannot be eliminated". To the right is a photograph of a 3M respirator with purple filters. In the top right corner is a small circular logo with a person wearing a hard hat. At the bottom, there is a blue "PARTNERSHIP" logo and the number "7".

Respiratory Protection (ANSI Z88.2)

- Respirators are an effective method of protection against designated hazards when properly selected and worn
 - A respirator that is used improperly or not kept clean can become a hazard to the worker
 - Silica exposure may require the use of a respirator if the exposure cannot be eliminated



PARTNERSHIP 7

Explain that respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substance does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

(Optional discussion points) You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

Slide 17

Respiratory Protection (ANSI Z88.2)

- Silica:
 - Basic component of soil, sand, granite, and most other types of rock
- Effects:
 - Lung cancer
 - Bronchitis
 - Tuberculosis
 - Scleroderma



PARTNERSHIP 16

① Explain that there are many respiratory hazards (other than exposure to silica dust) that may drive the need to use respirators. Silica is a common problem in many construction areas where rock and/or concrete cutting or drilling is conducted. If respirators are needed, the user must receive additional training and may need to undergo a medical screening.

Silicosis is caused by exposure to breathable crystalline silica dust. Crystalline silica is a basic component of soil, sand, granite, and most other types of rock, and it is used as an abrasive blasting agent. Silicosis is a progressive, disabling, and often fatal lung disease. Cigarette smoking adds to the lung damage caused by silica.




Respiratory Protection

- Sources of Exposure:
 - Sandblasting
 - Drilling rock & concrete
 - Masonry
 - Mining
- Preventing Silicosis:
 - Wet methods for cutting, chipping, drilling, sawing, grinding
 - Respirators



- Do not eat, drink or smoke near silica dust
- Wash hands and face before eating, drinking or smoking



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Sources of Exposure: Sandblasting for surface preparation. Crushing and drilling rock and concrete. Masonry and concrete work (e.g., building and road construction and repair). Mining/tunneling, demolition work.

Preventing Silicosis: Use all available engineering controls such as blasting cabinets and local exhaust ventilation. Avoid using compressed air for cleaning surfaces. Use water sprays, wet methods for cutting, chipping, drilling, sawing, grinding, etc. Substitute non-crystalline silica blasting material. Use respirators approved for protection against silica; if sandblasting, use abrasive blasting respirators. Do not eat, drink, or smoke near crystalline silica dust. Wash hands and face before eating, drinking, or smoking away from exposure area.




Foot Protection (ANSI Z41.1)

- Heavy objects that may roll onto or fall on worker's feet
- Sharp objects that might pierce ordinary shoes
- Molten metal that might splash on feet
- Hot or wet surfaces
- Slippery surfaces





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Explain that sixty-six percent of injured workers were wearing safety shoes, protective footwear, heavy-duty shoes or boots and 33%, regular street shoes. Of those wearing safety shoes, 85% were injured because the object hit an unprotected part of the shoe or boot.

End session two

Key points-Session two

The presenter should have touched on the following items when discussing section two:

1. What are the employer's responsibilities?
 - a) Assess workplace for hazards
 - b) Provide PPE
 - c) Determine when to use
 - d) Provide PPE training for employees and instruction in proper use
2. What are the employee's responsibilities?
 - a. Use PPE according to training received and other instructions
 - b. Inspect daily and maintain in a clean and reliable condition
3. How can we prevent silicosis?
 - a. Personal hygiene. Do not eat or smoke with silica dust on your clothing.
 - b. Wet methods for cutting, chipping, drilling, sawing, grinding, etc.
4. What are the two types of hard hats?
 - a. Type 1 and type 2
5. When do we need hearing protection?
 - a. When the noise exposure cannot be reduced to a safe level.
6. When do we need foot protection?
 - a. Heavy objects that may roll onto or fall on worker's feet
 - b. Sharp objects that might pierce ordinary shoes
 - c. Molten metal that might splash on feet
 - d. Hot or wet surfaces
 - e. Slippery surfaces

Begin Session Three

Slide 20



***Rubber Insulating Gloves
& Sleeves***

ELECTRICAL
DISTRIBUTION
PARTNERSHIP
POWERING SAFETY TO NEW HEIGHTS

PARTNERSHIP

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Slide 21



Inspection Methods

- Rolling
 - Gently roll between hands
 - Check outside and inside surfaces
- Inflation
 - Listen for leaks
- Water
 - Fill glove with water then roll rest

PARTNERSHIP

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Before each use, gloves and sleeves should be inspected for holes, rips or tears, ozone cutting, UV checking and signs of chemical deterioration. There are three methods for inspecting gloves, rolling, inflating, and water test. All of these, rolling, inflating, and water test are used in the field.

Explain that in California a water test is required. The glove if filled with water then rolled. If there is a hole, water will squirt out.



Common Problems to Look For

- Age cracks
- Dielectric test failure
- Cuts
- Tears
- Hard spots
- Ozone cracks
- Punctures



21

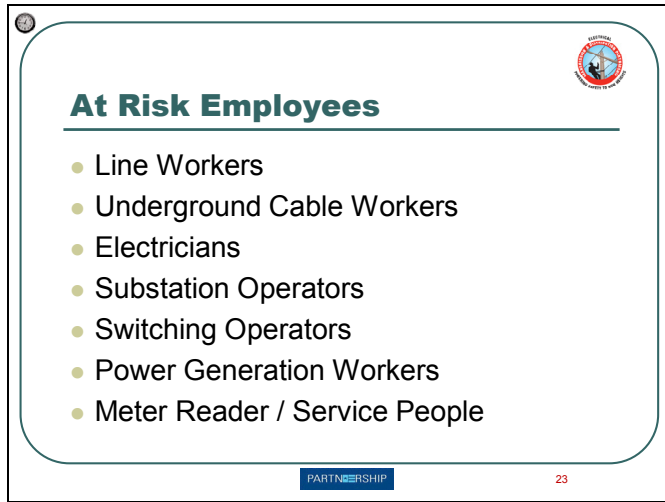
Some common problems to look for when inspecting gloves are shown here. Any defects in the gloves are cause to remove them from service. Cracking and cutting can be caused by prolonged folding or compression. UV checking is caused by prolonged exposure to sunlight due to improper storage.



Protection From Electrical Arcs & Heat







Slide 24 features a title "At Risk Employees" in a dark teal font, underlined. Below the title is a bulleted list of job roles. The slide is framed by a thin black border. In the top right corner, there is a circular logo with a red border and a blue center, containing a white lightning bolt and the text "SAFETY". In the bottom left corner, there is a blue rectangular button with the word "PARTNERSHIP" in white. In the bottom right corner, the number "23" is displayed in red.

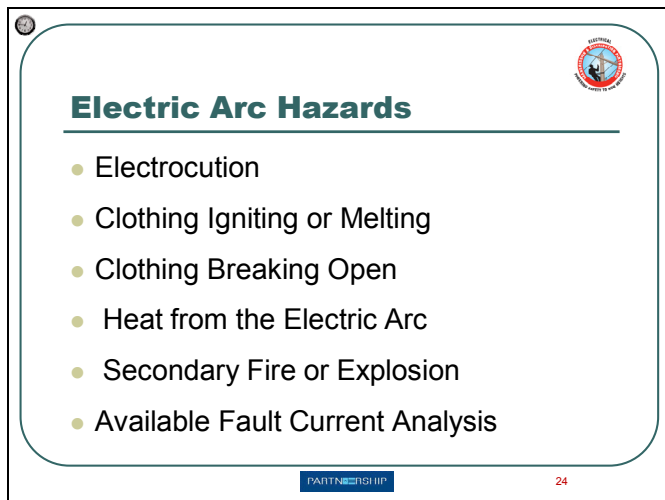
At Risk Employees

- Line Workers
- Underground Cable Workers
- Electricians
- Substation Operators
- Switching Operators
- Power Generation Workers
- Meter Reader / Service People

PARTNERSHIP 23

Many people are exposed to electric arcs:

- ✓ line workers
- ✓ underground cable workers
- ✓ electricians
- ✓ substation operators
- ✓ switching operators
- ✓ power generation workers
- ✓ meter reader/service people



Slide 25 features a title "Electric Arc Hazards" in a dark teal font, underlined. Below the title is a bulleted list of hazards. The slide is framed by a thin black border. In the top right corner, there is a circular logo with a red border and a blue center, containing a white lightning bolt and the text "SAFETY". In the bottom left corner, there is a blue rectangular button with the word "PARTNERSHIP" in white. In the bottom right corner, the number "24" is displayed in red.

Electric Arc Hazards

- Electrocutation
- Clothing Igniting or Melting
- Clothing Breaking Open
- Heat from the Electric Arc
- Secondary Fire or Explosion
- Available Fault Current Analysis

PARTNERSHIP 24

Some of the hazards of electric arcs are Electrocutation, Clothing igniting or melting, Clothing breaking open and exposing the employee to direct burns. Also the heat from the electric arc and secondary fire or explosion and even hot molten metal.

Consequences

- Worker Injury
 - Second and third-degree burns
 - Potentially fatal burns
- Equipment Damage
- Cost
 - Medical treatment
 - Lost productivity
 - Workers' compensation

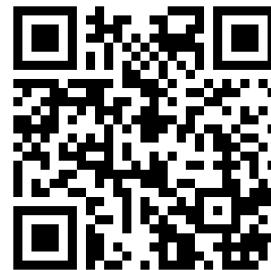
26

Explain some of the consequences of electric arcs are second and third degree burns. They can be fatal. Medical treatment is very costly not to mention very painful. More costs include damage to equipment. Electrical burns may scar you for life. Stress the point that if a worker is involved in a situation where they receive an electrical burn their lives are forever changed. Burns are life-changing incidents.

Protective Clothing

- Minimize or Reduce Burn Injury
- Provide Escape Time
- Will not add to the severity of the injury
- Natural fiber or FR undergarments are critical
- The outer layer must be FR

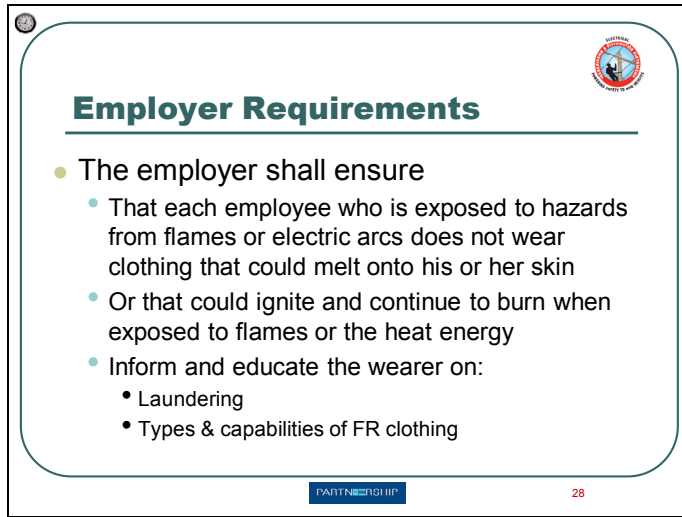
27



Shoot the QR code to view a YouTube video from Westex and Workrite. It discusses under and outer layer garments. Your device will need a QR code reader and an internet connection.

Explain that the employer shall ensure that the outer layer of clothing worn by an employee, except for clothing not required to be arc rated is flame resistant. Also, explain that for FR to work, it must be worn properly. Explain that the sleeves must be rolled down, buttons are buttoned up, and the shirt must be tucked in.

Alternate link, copy and paste this URL in your browser.
<https://www.youtube.com/watch?v=BPFwGXKSLKg>



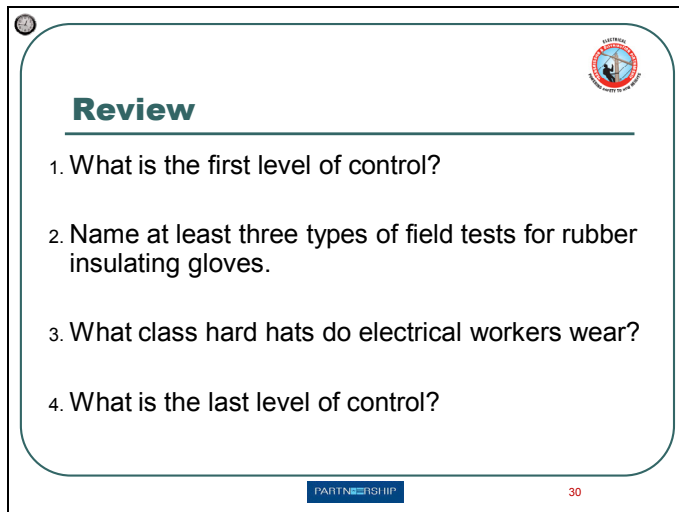
Slide 28 features a title box with the heading "Employer Requirements" in bold green text. Below the title, a yellow bullet point states "The employer shall ensure", followed by three blue bullet points: "That each employee who is exposed to hazards from flames or electric arcs does not wear clothing that could melt onto his or her skin", "Or that could ignite and continue to burn when exposed to flames or the heat energy", and "Inform and educate the wearer on:". The last bullet point has two sub-bullets: "Laundering" and "Types & capabilities of FR clothing". The slide includes a small circular logo in the top right corner and a "PARTNERSHIP" logo in the bottom left corner. The number "28" is in the bottom right corner.

Employer Requirements

- The employer shall ensure
 - That each employee who is exposed to hazards from flames or electric arcs does not wear clothing that could melt onto his or her skin
 - Or that could ignite and continue to burn when exposed to flames or the heat energy
 - Inform and educate the wearer on:
 - Laundering
 - Types & capabilities of FR clothing

① Also, mention that the standard has switched from HRC2 to CAT2 FR clothing.

Explain that the OSHA standards prohibit certain types of clothing. The employer shall ensure that each employee who is exposed to hazards from flames or electric arcs does not wear clothing that could melt onto his or her skin or that could ignite and continue to burn when exposed to flames or the heat energy.



Slide 29 features a title box with the heading "Review" in bold green text. Below the title, there are four numbered questions in black text: "1. What is the first level of control?", "2. Name at least three types of field tests for rubber insulating gloves.", "3. What class hard hats do electrical workers wear?", and "4. What is the last level of control?". The slide includes a small circular logo in the top right corner and a "PARTNERSHIP" logo in the bottom left corner. The number "30" is in the bottom right corner.

Review

1. What is the first level of control?
2. Name at least three types of field tests for rubber insulating gloves.
3. What class hard hats do electrical workers wear?
4. What is the last level of control?

Ask the group the review questions.

1. Eliminate the hazard
2. Air test; roll test; water test
3. Class E
4. PPE

End session three

Key points-Session three

The presenter should have touched on the following items when discussing section three:

1. How to inspect rubber-insulating gloves
 - a. Gently roll between hands
 - b. Check outside and inside surfaces
 - c. Listen for leaks
 - d. Fill glove with water then roll rest
2. The common problems to look for on rubber gloves
 - a. Age cracks
 - b. Ozone damage
 - c. Cuts
 - d. Tears
 - e. Punctures
3. Employees who are at risk involving electric arcs
 - a. line workers
 - b. underground cable workers
 - c. electricians
 - d. substation operators
 - e. switching operators
 - f. power generation workers
 - g. and meter reader/service people
4. Electric arc hazards
 - a. Electrocution
 - b. Clothing Igniting or Melting
 - c. Clothing Breaking Open
 - d. Heat from the Electric Arc
 - e. Secondary Fire or Explosion
5. FR clothing like all PPE must be worn correctly to work properly and do the job it is designed to do.