Every construction employee who works with or around electrical power sources or wiring should at least have a basic understanding of the electrical hazards around them. Train your employees to recognize and avoid electrical dangers present at your workplace.

In your training session:

1. **Explain the dangers of coming into contact with energized wires.** Electrical energy passes through the body until it reaches an exit point, causing different degrees of damage depending on the amount of the electrical current, its path through the body and the amount of time a person’s body remains in contact with the current. Types of injuries include:
   - **Electrical burns** – caused by electric current passing through tissues and bones, generating heat that results in tissue damage
   - **Arc or flash burns** – caused by exposure to extremely high temperatures resulting from an arc explosion
   - **Thermal contact burns** – caused by contact with overheated electrical conductors
   - **Internal damage to organs** – caused by electrical current’s contact with internal organs
   - **Electrocution (death)** – often result of respiratory or cardiac arrest
   - **Injuries sustained by falls triggered by electric shock**

2. **Review which materials are most conductive and which ones are the best insulators.** Explain why insulating materials should be used when working around electrical hazards.
   - **Conductors** are materials that allow electrical currents to pass through them in one or more directions because they contain free-moving internal electric charges. Examples:
     - Water
     - Metal (such as copper wire and aluminum)
   - **Insulators** are materials that lack free-moving internal electric charges. Insulators therefore limit the ability for an electric current to pass through them. Examples:
     - Glass and fiberglass
     - Rubber and certain plastics like PVC
     - Ceramics

3. **Ask your employees to give examples of the biggest electrical hazards they have seen on different work sites.** Discuss any safety measures you take around these hazards.

If you have Spanish-speaking employees but cannot speak Spanish yourself, consider using a bilingual employee to interpret if he/she is comfortable with that, or even having that person lead a separate discussion if he/she is capable. Regardless of the translation mode, it is important to determine that the employee is literate in his/her native language if written materials are used.

**VOCABULARY**
- **Burn** – Quemadura [kay-mah-DOO-rah]
- **Conductor** – Conductor [kohn-dook-TOR]
- **Death** – Muerte [MWaar-tay]
- **Electricity/Electric current** – Electricidad [ay-ay-laik-tree-see-DAHD]
- **Electric shock** – Choque eléctrico [CHOH-kay ay-LAIK-tree-koh]
- **Fiberglass** – Fibra de vidrio [FEE-brah day VEE-dree-oh]
- **Insulator** – Insulador [een-soo-lah-DOR]
- **Metal** – Metal [may-TAHL]
- **Water** – Agua [AH-gwah]

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AVOID
POWER LINES!

Protect your employees and your business by writing and enforcing a workplace safety program to address any exposure to overhead lines. Train your employees in accordance with your written plan, using the following steps as a guide.

In your training session:

1. Discuss the steps that you take to protect your employees from power lines. OSHA recommends that you take the following steps as an employer. Click the link for further recommendations.
   - Draft and enforce a written safety plan to prepare your employees to recognize and avoid electrical hazards. Update the plan for site-specific hazards.
   - Inspect each worksite:
     - before beginning a job, controlling exposures when possible and conducting necessary training regarding any remaining hazards.
     - daily, before beginning work.
   - Conduct basic training for all employees to work safely around overhead lines.

2. Ask your employees how they plan to be safe around power lines. Make sure they include the following points. For all work around power lines:
   - Stay aware of your surroundings, keeping at least 10 feet between yourself and all power lines depending on the kilo-volts. See OSHA standard [1910.333.(c)(3)(i)].

3. Discuss any applicable power line safety guidelines for equipment operators – and for any employees working around any equipment. Remind your employees that equipment guidelines for power line safety sometimes differ from general regulations. Certain kinds of equipment, such as cranes, must maintain a distance of at least 20 feet from power lines, depending on the kilo-volts. Consult with OSHA standards for all equipment you use.
   - Use fiberglass ladders.
   - Have an assistant when setting up a ladder near power lines.
   - Tie off extension ladders at the top.
   - Carry ladders horizontally.
   - Never lift a ladder without checking for overhead lines.
   - Never assume any line (even a fallen power line) is dead.
   - Never touch a person who is in contact with a power line.
   - Remember that fallen limbs in contact with live electric currents pose an electric shock hazard.
   - Assume that any line, no matter its placement on the pole, is a high voltage power line.

VOCABULARY

Electric shock – Descarga eléctrica [dace-KAR-gah ay-LAIK-tree-kah]
Fiberglass ladder – Escalera de fibra de vidrio [ace-kah-LAY-rah day FEE-brah day VEE-dree-oh]
Metal ladder – Escalera de metal [ace-kah-LAY-rah day may-TAHL]
Live (energized) – Vivo [VEE-voh]
Power lines – Líneas de alta tensión [LEE-nay-ahs day AHL-tah tain-see-OWN]
Voltage – Voltaje [voHl-TAH-hay]

USEFUL EXPRESSIONS

Be aware of your surroundings – Esté atento a su entorno [ace-TAY ah-TAIN-toh ah soo ain-TOR-noh]
Carry the ladder horizontally – Lleva la escalera en una posición horizontal [YAY-vah la ace-kah-LAY-rah en OO-nah poh-see-SEE-OWN oh-ree-sohn-TAHL]
Check for power lines before lifting a ladder – Compruebe que no haya ninguna línea eléctrica antes de levantar una escalera [kohn-PROO-AY-bay kay no AH-yah neen-GOO-nah LEE-nay-ah ay-LAIK-tree-kah AHN-tace day lay-vaHn-TAR OO-nah ace-kah-LAY-rah]
ELECTRICAL HAZARD RECOGNITION

Take advantage of the following training guide to better prepare your employees to recognize and correct electrical hazards they may face on the job.

In your training session:

1. Review lock-out/tag-out procedures at your workplace. While all employees should understand the basics of this process, you should also regularly train the employees who are directly responsible for electrical work to ensure that they understand the process.

2. Perform this exercise to make sure your employees recognize common electrical hazards: Show photos of the following electrical hazards and ask your employees to identify what is wrong in each case.
   - Damaged or unsafely altered wires, cords, electrical equipment or power tools
   - Inadequate or poorly insulated wiring
   - Overloaded circuits
   - Electrical systems or power tools that are not double-insulated or properly grounded
   - Improperly covered electrical parts
   - Improper storage or positioning of electrical equipment, such as:
     - near dangerous chemicals and/or vapors
     - near water or other conductors

3. Discuss your company’s policy for responding to the hazards you named for step 2. Who should employees notify? In what cases is it safe for employees to correct the hazard themselves?

4. Discuss the procedure for reporting near-miss accidents or any contact with an electric current (no matter how minor it may seem to you).

5. For more information on specific electrical hazards and safety procedures, consult:
   - NIOSH’s "Electrical Safety Student Manual"
   - OSHA’s Construction e-Tool in English or Spanish

VOCABULARY

Damaged – Dañado [dah-NYAH-doh]
Electricity/Electric current – Electricidad [ay-laik-tree-see-DAHD]
Electric shock – Choque eléctrico [CHOH-kay ay-LAIK-tree-koh]
Exposed electrical parts – Partes eléctricas expuestas [PAR-tace ay-LAIK-tree-kahs aiks-PWACE-tahs]
Grounded – Conectado a tierra [koh-naik-TAH-doh ah TEE-AIR-rah]
Lock-out/Tag-out – Interrupción de energía usando candado y etiqueta [een-tair-roop-SEE-OWN day ay-nair-HEE-ah oo-SAHN-doh kahn-DAH-doh ee ay-tee-KAY-tah]
Overloaded circuit – Circuito sobrecargado [srear-KWEE-toh SOH-bray-kahr-GAH-doh]

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Prepare your employees to act quickly in the event that someone on site is injured in an electrical accident.

**In your training session:**

1. Ensure that your employees can identify the location of the following before beginning work on any site:
   - Electrical shut-offs
   - First aid supplies
   - A properly-rated fire extinguisher
   - A telephone
   
   "Best practice: Have your employees carry work cell phones or other portable communication devices with them at all times.

2. Review with your employees the following first aid steps based on recommendations from NIOSH. See pages 16 and 17 of NIOSH’s “Electrical Safety Student Manual” for more on first aid.
   - If the victim is still in contact with the electric current, shut off electricity from the source while another person calls for help. If you cannot get to the electricity shut-off switches, attempt to separate the person from the electric current with an insulated material (an object such as PVC, rubber or dry wood that does not conduct electricity). Do NOT touch the victim directly while he/she is connected to the electrical current.
   - If the victim is no longer in contact with the electrical current, first call 911. Then call out to the victim to check his/her responses:
     - If he/she is conscious, tell the victim to stay still.
     - If he/she is bleeding, cover the wound with a clean cloth and have the victim apply pressure if possible. Otherwise, put on latex-free medical gloves and apply pressure yourself. If the victim is bleeding from a limb, elevate it to slow the bleeding.
     - If he/she is not breathing and has no pulse, have someone perform CPR immediately if he/she is trained to do so.
     - Look out for signs of shock and treat the victim accordingly if you are trained to do so.
     - Wait with the victim until emergency personnel arrive.

3. Ask your employees how they should respond to an electrical fire.
   - If the fire is not contained and/or if you are not trained to use a fire extinguisher, evacuate the building and call 911 as soon as you are out of danger.
   - You can attempt to extinguish the fire with the appropriately rated extinguisher only if the fire is contained and you are trained to use a fire extinguisher. Signal to someone else to call 911. Evacuate the area immediately if you feel the fire is out of control or if you fear for your safety.

4. Consider having your employees sign a safety agreement consenting to follow the electrical safety guidelines covered by this electrical safety training series. See the example, attached.

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**VOCABULARY**

- **Electrical fire** – Fuego por electricidad
- **Evacuate** – Evacuar
- **Fire extinguisher** – Extintor de fuego
- **First aid** – Primeros auxilios
- **Insulator** – Insulador

**USEFUL EXPRESSIONS**

- **Call 911** – Llame al 911
- **Never touch someone who is in contact with an electric current** – Nunca toque a alguien que está en contacto con la electricidad

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(Name of Company) views keeping its employees safe as a first priority. We aim to ensure that all our employees recognize electrical hazards and follow our electrical safety policies. Upon completion of an electrical safety training, we require all of our employees to agree to follow certain safety rules to protect themselves from unnecessary risks.

Please read and initial the following statements to indicate that you understand and agree.

When working around power lines, I will:

• act as if all lines, no matter their placement on the pole, are high voltage power lines
• stay at least the minimum required distance away from all power lines, (10 feet or more depending on the kilo-volts)
• follow safe equipment-operation guidelines

When forced to use a ladder around power lines, I will:

• use ladders made of wood or fiberglass rather than metal
• carry the ladder horizontally
• get the help of a co-worker when setting up the ladder
• tie off the ladder to ensure that it does not fall against surrounding power lines

I will protect myself and my co-workers from electrical hazards by:

• following all lock-out/tag-out procedures for which I am responsible
• using only grounded/double-insulated tools
• using only undamaged, fully-functional tools and cords
• never overloading a circuit
• operating and storing electrical parts and equipment in safe areas, away from dangerous chemicals, water and other conductors
• reporting possible electrical hazards to my supervisor
• never touching any person, object or piece of equipment that may be in contact with a live electric current.

I, _______________________________ (Employee Name), understand and agree to follow the aforementioned electrical safety policies. I understand that violating any of these rules may affect my position here at the company, up to and including termination of employment.

Name: _______________________________ Date: _______________________________

Signature: _______________________________
_____________________________ (Name of Company) considera la seguridad de sus empleados como algo de primera importancia. Tenemos como propósito asegurar que todos nuestros empleados reconozcan los peligros eléctricos y observen nuestras políticas acerca de la seguridad eléctrica. Tras cumplir nuestra capacitación sobre la seguridad eléctrica, requerimos que nuestros empleados firmen un acuerdo en el cual acepten unas condiciones de mantenerse a salvo durante actividades peligrosas.

Lea cada frase que sigue. Firme si entiende y se decide a seguirlas

Initial

Cuando trabajo cerca de las cables de la luz:

• Tomaré decisiones como si todas las cables, no importa sus posiciones en el poste, fueran cables de alta tensión.
• Mantendré por lo menos la distancia requerida entre yo y todos los cables de la luz, (10 pies o más, dependiendo del voltaje).
• Obedeceré las reglas del uso seguro de todo el equipamiento

Cuando tengo que usar una escalera portátil cerca de los cables de la luz:

• Usaré solo las escaleras hechas de madera o de fibra de vidrio en vez de las de metal.
• La llevaré horizontalmente.
• Obtendré la ayuda de otra persona para montar la escalera.
• Amarré la escalera para asegurar que no caiga contra los cables de la luz.

Protegeré a mí y a mis compañeros de los peligros eléctricos por seguir las siguientes prácticas:

• Cumpliré todos los procedimientos de “lock-out/tag-out” (la interrupción de energía usando candado y etiqueta) que aplican a mi trabajo.
• Usaré solo las herramientas conectadas a tierra o doble-aisladas.
• Usaré solo herramientas y cordones que estén completamente operativas y sin daño.
• Nunca sobrecargaré un circuito.
• Usaré y almacenaré el equipo eléctrico solo en lugares seguros, lejos de las químicas peligrosas, el agua y otros conductores.
• Avisaré a mi supervisor de posibles peligros eléctricos.
• No tocaré nunca cualquier persona, objeto o equipamiento que podría estar en contacto con una corriente eléctrica viva.

Yo, ______________________________ (Nombre del empleado), entiendo y acepto las antedichas reglas sobre la seguridad eléctrica. Entiendo que una violación de cualquiera de estas reglas podría acarrear acciones disciplinarias, incluyendo la terminación del contrato laboral.

Name: ________________________________ Date: ______________________________

Signature: ________________________________