Case 533. 53-year-old male journeyman substation technician was electrocuted by induced voltage from a nearby 345KV energized line when removing the ground wire from a de-energized line.

A 53-year-old male journeyman substation technician was electrocuted by induced voltage from a nearby 345KV energized line when removing the ground wire from a de-energized line. The standard method to removing a ground wire from a de-energized line is to remove the wire from the "hot" line side first and then the grounded steel side. The substation was being enlarged and the firm for whom the decedent worked was contracted to, among other work, remove ground wires from de-energized lines. The firm's employees were instructed to treat de-energized lines as "hot"; maintain minimum approach distances, use a hot stick, leather gloves, hard hat, boots, and fire-resistant clothing. The firm indicated that because the lines being worked on were not energized, rubber gloves were not required. The firm required three workers to be present when removing the ground leads; the two workers in the basket and a spotter. The firm also required a "qualified spotter" when removing ground leads; the individual asked was not trained to be a "qualified spotter", one who would be would be familiar with electrical issues concerning electrical lines. The decedent asked another worker to be his spotter, while he was using an aerial lift to access the ground wire location. This spotter noted that the lift was not grounded and asked the decedent if he wanted to ground the lift; the decedent replied no. The decedent accessed the ground wire for removal. A hot stick was in the aerial lift platform. He was wearing leather gloves, not wearing rubber gloves. The decedent removed the de-energized line's ground wire from the steel side first using an un-insulated screwdriver. An energized line can cause an induced voltage hazard on a nearby de-energized line. When the decedent removed the protective ground wire from the steel side, he was electrocuted by the induced voltage from the nearby energized 345KV line. The spotter noted that after the ground lug was removed from the steel side, the decedent slumped over. Fellow employees lowered the aerial lift platform and performed CPR until paramedics arrived and took over. He was pronounced dead at the hospital. A ground lug was seen in his hand by several employees.

MIOSHA Construction Safety and Health Division issued the following Serious citations at the conclusion of its investigation.

Serious: Construction Safety and Health Standard: Part 16 Power Transmission and Distribution

- 1926.950(b)(1)(ii): Each employee shall also be trained in and familiar with any other safety practices, including applicable emergency procedures (such as pole-top and manhole rescue), that are not specifically addressed by this subpart but that are related to his or her work and are necessary for his or her safety.

  An employee was exposed to an electrocution hazard when removing a protective grounding cable. The spotter did not use his 'stop work' authority when the spotter noticed the grounding cable was not attached to the aerial work platform, when the employee entered the minimum approach distance to the grounded cable, when the employee did not use the hot stick and when the employee was not wearing rubber protective PPE.

- 1926.950(b)(2): Each qualified employee shall also be trained and competent in:
  - i The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment,
  - ii The skills and techniques necessary to determine the nominal voltage of exposed live parts,

iii The minimum approach distances specified in this subpart corresponding to the voltages to which the qualified employee will be exposed and the skills and techniques necessary to maintain those distances,
iv The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment, and
v The recognition of electrical hazards to which the employee may be exposed and the skills and techniques necessary to control or avoid these hazards. Note to paragraph (b)(2): For the purposes of this subpart, a person must have the training required by paragraph (b)(2) of this section to be considered a qualified person.

The employee removing the grounding cable was exposed to an electrocution hazard. The employees did not recognize:

Instance A) The electrical hazard of induced voltages.
Instance B) The minimum approach distance set up in the Task Hazard Analysis.
Instance C) The proper technique for removing a protective grounding cable.
Instance D) The need to use the hot stick.
Instance E) The need for rubber protective PPE when exposed to an energized part.
Instance F) The use of an uninsulated tool (screwdriver) on an energized line.
Instance G) The need to ground the aerial work platform.
Instance H) Only one person was in the aerial lift when 2 were required.

- 1926.952(b)(2): Subjects to be covered. The briefing shall cover at least the following subjects: Hazards associated with the job, work procedures involved, special precautions, energy-source controls, and personal protective equipment requirements.

  The job briefing did not cover the use of rubber protective gear when disconnecting protective grounds from assumed energized electrical lines. The employee was exposed to an electrocution hazard.

- 1926.959(d)(2): A designated employee other than the equipment operator shall observe the approach distance to exposed lines and equipment and provide timely warnings before the minimum approach distance required by paragraph (d)(1) of this section is reached, unless the employer can demonstrate that the operator can accurately determine that the minimum approach distance is being maintained.

  The employee being used as an observer/spotter did not provide a timely warning to the employee in the aerial lift removing the grounded connection within the minimum approach distance. The employee removing the grounded connection was exposed to an electrocution hazard of induced voltage.

- 1926.960(b)(3)(i): Except as provided in paragraph (b)(3)(ii) of this section, at least two employees shall be present while any employees performed the following types of work in 1926.960(b)(3)(i)(A)-(E) of this section:

Two qualified employees were not present when an employee in an aerial lift removed the grounded connection of a grounding cable. The employee was exposed to an induced voltage from a nearby powerline at 345 KV.

- 1926.960(c)(1)(iii): The employer shall ensure that no employee approaches or takes any conductive object closer to exposed energized parts than the employer's established minimum approach distance, unless: 1926.960(c)(1)(iii)(A). The employee is insulated from the energized part (rubber insulating gloves or rubber insulating gloves and sleeves worn in accordance with paragraph (c)(2) of this section constitutes insulation of the employee from the energized part upon which the employee is working provided that the employee has control of the part in a manner sufficient to prevent exposure to uninsulated portions of the employee's body), or 1926.960(c)(1)(iii)(B) or 1926.960(c)(1)(iii)(C). The employee is insulated from any other exposed conduction object in accordance with the requirements for live-line barehand work in § 1926.964(c).

  The employee removing a ground cable entered into the minimum approach distance, wore leather gloves and used an uninsulated screwdriver to remove the grounded cable connection. The employee was exposed to an electrocution hazard.

- 1926.962(f)(2): The employer shall ensure that, when an employee removes a ground, the employee removes the grounding device from the line or equipment using a live-line tool before he or she removes the ground end connection. For lines or equipment operating at 600 volts or less, the employer may permit the employee to use insulating equipment other than a live-line tool if the employer ensures that the line or equipment is not energized at the time the ground is disconnected or if the employer can demonstrate that each employee is protected from hazards that may develop If the line or equipment is energized.

  An employee was exposed to an electrocution hazard when removing a protective ground cable. The employee removed the grounded end connection first, by hand without rubber insulated PPE or the use of a live-line tool.