

Case 111. 25-year-old male lineman was electrocuted when he contacted a 40,000 volt energized chain.

On September 23, 2005, a 25-year-old male lineman was electrocuted when he contacted a 40,000 volt energized chain. The deceased was a member of a eight-person crew; the deceased and one coworker were in the South bucket truck, two coworkers were in the north bucket truck, one coworker was acting as the ground man, and three coworkers were material handlers. The deceased and his coworker began to remove south grounding/bonding conductors from the phase conductors on the tower. The coworkers in the north truck removed the north grounds. The coworkers in the North truck removed the phase grounds and the conductor end of the tower to conductor ground. All of the grounds up to this point were handled and removed using "hot sticks". The deceased told one of the workers in the north truck that he would remove the "cold-end"/tower end of the ground. The North truck operator held the free end of the ground conductor "clear" from the phase jumpers that now had approximately 40 kV induced onto them from the parallel running 345 kV energized conductors approximately 42 feet to the east. The deceased maneuvered the bucket through the opening between the insulators of the bottom west cross arm and the phase jumpers to approach the connection of the ground conductor to the tower cross arm approximately one foot to the east of the insulator attachments. As he approached the desired location, a ground man saw that a chain was hanging approximately two to three feet from the victim's truck. The ground man whistled to get the attention of the truck operators. One of the workers in the North truck acknowledged ground man. The ground man told the North man that the deceased's chain was hanging. The worker in the North truck got the deceased's attention by yelling to him. The deceased stopped the progress of the truck. The deceased looked back and down in the direction of the chain, appearing to understand the warning being given to him his coworker. The chain was in contact with the phase conductor jumpers. The deceased was standing on the remainder of the chain that was coiled in the floor of the bucket. The deceased reached out and grabbed the ground conductor. The deceased grabbed the personal protective grounding cable with his left hand approximately 18 inches below the clamp assuming he would use his right hand to loosen the clamp. Grabbing the cable became the second point of contact. Induced current traveled from his leg to his left hand. He contracted to a position of embracing the cable with both hands. Once the deceased grabbed the ground he became the path between the energized phase conductor and ground. After coworker who was working with deceased in the bucket requested verbal assistance, he grabbed the deceased by the webbing of his harness and yanked him free from the ground conductor. He then brought the bucket to the ground and he and his coworkers removed the deceased out of the bucket. Two employees performed CPR on deceased until paramedics arrived and transported him to the hospital where he died.

MIOSHA issued the following 3 Serious citations to the employer:

NOTE: The agreement number and articles cited in the violations has been changed by MIFACE to maintain the anonymity of the employer. The transmission tower numbers have been changed to letters.

Serious:

GENERAL RULES, PART 1, RULE 114(1).

An employer shall develop, maintain, and coordinate with employees an accident prevention program, a copy of which shall be available at the worksite.

- A. Agreement #123 of the company's accident prevention program has not been coordinated with employees installing components to transmission towers, A and B. Sections addressing rubber protective equipment use, particularly during personal protective grounding installation and removal activities are not known by and implemented with the employees. Referenced sections include: (1) Article 4 – when working on or near live conductors or other live apparatus operating at voltages above 300 volts, the use of rubber protective clothing and equipment shall be required. (2) Article 5- rubber protective clothing and equipment shall be worn at all times by all employees when working on or near energized primary equipment. (3) Article 6 – Grounding cables should always be placed on either side of the point of work and at other points where it is deemed advisable. Such grounding devices should always be placed by the use of live-line tools. Such grounding devices should always be removed by the use of live-line tools.
- B. Agreement #123 of the company's accident prevention program has not been coordinated with employees installing components to transmission towers. The section addressing bucket location in proximity to energized conductors are not known by and implemented with the employees. Referenced section: Article 7 – Baskets should be located under or to the side of conductors or equipment being worked. Raising the basket directly above energized primary conductors or equipment should be kept at a minimum.

Serious:

GENERAL RULES, PART 1, RULE 119(3).

The floor of a work area or aisle shall be maintained in a manner that does not create a hazard to an employee.

The floor and inside work area of the aerial work platform is not maintained in a manner that does not create a hazard to employees working within the bucket. Excess materials and tools are being stored inside the bucket during the removal of personal protective grounding devices. Employees were unable to contain unnecessary tools within the protective bucket due to the congestion of personnel, tools, and materials resulting in the chain escaping the bucket and contacting the energized line below the bucket. The contact created a path to the ground through an employee resulting in a fatal accident.

Serious:

POWER TRANSMISSION AND DISTRIBUTION, PART 16, RULE 1627(1)(a).

An employee shall not be permitted to approach or take any conductive object without an approved insulating handle closer to the exposed energized parts than shown in Table 1 unless the following is complied with:

- i) The employee is insulated or guarded from the energized part. Gloves or gloves with sleeves rated for the voltage involved, which are provided for pursuant to rules 617 and 641 of Construction Safety Standard, Part 6, Personal Protective Equipment, being R408.41617 and R408.40641 of the Michigan Administrative Code, shall be considered insulation of the employee from the energized part. The work method on parts energized above 5,000 volts phase to ground shall be with rubber gloves and sleeves out of an insulated bucket, by the use of hot line tools, or with rubber gloves and sleeves in conjunction with a factory-made and approved insulated platform that provides a method of belting off other than to the pole or structure. This rule does not apply to the bare-hand technique.
 - ii) The energized part is insulated or guarded from the employee and any other conductive object at a different potential.
 - iii) The employee is isolated, insulated or guarded from any other conductive object, as during live-line, bare-hand work.
- A. Employees not insulated or guarded from hazardous voltage by the use of rated gloves, sleeves, and hotline tools as they perform the removal of the protective grounding conductor from the bottom west cross arm of tower A. Employees approaching exposed energized conductors with a metal come-along in the insulated aerial bucket from which the employees are working. Appropriate minimum clearance has not been maintained for the chain of the come-along hanging out of the bucket and contacting the energized conductor below the bucket location. The operating voltage of the exposed energized conductor is 345kV to ground.
- B. Employees not insulated or guarded from hazardous voltage by the use of rated gloves, sleeves, and hotline tools as they perform the removal of the protective grounding conductor from the bottom west cross arm of tower A. The 4/0 grounding conductor is connected approximately 1 foot to the east above the energized conductor. The ground conductor hangs down next to the energized conductors. Employees in another insulated bucket are holding the free end of the conductive ground conductor away from contacting the exposed energized conductor using a hot-stick. Appropriate minimum clearance has not been assured between the ground conductor and the energized conductor. The operating line voltage of the exposed energized conductor is 345kV to ground.