The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

Tree Trimming Groundsman Electrocuted after Grasping a Guy Wire that Contacted an Energized Guy Wire in Virginia

FACE 90-34

SUMMARY

A 20-year-old male tree trimming groundsman was electrocuted after he grasped a guy wire that swayed into contact with an energized pole-mounted jumper wire. One end of the jumper wire was attached to a one amp fuse on a pole-mounted transformer, while the other end was attached to a 14,400-volt powerline. The victim was part of a five-man crew assigned to clear brush and trees from an electric utility right-of-way. The victim had just completed cutting brush and trees from around the guy wire. The guy wire was secured to a utility pole at one end and to a steel rod anchored in the ground at the other end. After cutting the brush and trees, the victim laid the chain saw he was using on the ground. He grasped the butt of a fallen tree with one hand, and the guy wire with the other hand. When the victim grasped the guy wire, it swayed (due to approximately 8 inches of slack in the wire) and contacted the energized jumper wire. The current passed through the guy wire and victim to ground, electrocuting the victim. NIOSH investigators concluded that, in order to prevent future similar occurrences, employers should:

- conduct a jobsite survey before starting any job to identify potential hazards and implement appropriate control measures
- review and revise, where applicable, the existing safety program to include measures that enable workers to recognize and control hazards

Additionally, utility companies should:

- avoid placing transformers and jumper wires on utility poles in close proximity to unguarded uninsulated guy wires

When prime and subcontractors perform work at single worksites, all involved parties should:

- ensure that areas of responsibility for safety and health issues are specified as part of the contract provisions.

INTRODUCTION

On May 7, 1990, a 20-year-old male tree trimming groundsman was electrocuted when he grabbed a guy wire causing it to contact an energized conductor on a utility pole. On May 16, 1990, officials of the Virginia Occupational Safety and Health Administration notified the Division of Safety Research (DSR) of this fatality, and requested technical assistance. On June 29, 1990, a safety specialist from DSR conducted an investigation of this incident. The investigator reviewed the incident with a company representative, the jobsite foreman, and the OSHA compliance officer assigned to the case. Photographs of the incident site and the corresponding medical examiner's report were obtained during the investigation.

The employer in this incident is a tree service company that has been in operation for 2 years and employs 280 workers, including 93 groundsmen. The company has a written safety policy and safety rules which are administered by the safety officer and jobsite foremen. Weekly safety meetings are held and documented, and quarterly safety task force meetings are attended by both employer representatives and employees. A progressive disciplinary system for safety violations is in place and consists of: 1) first violation–verbal warning, 2) second violation–written warning, and 3) third violation–dismissal. The victim worked for this employer for 3 months and 11 days prior to this incident.

INVESTIGATION

The company had been contracted to keep an electric utility right-of-way (consisting of approximately 6,000 miles of lines) clear of brush and trees on a continuing basis. Work was progressing as normal at the jobsite located in a rural part of the state.

On the day of the incident, a five-man crew consisting of a jobsite foreman, two equipment operators, and two groundsmen, arrived at the site to clear brush and trees from the electric utility right-of-way. The foreman and the two equipment operators were working near a utility pole, located approximately one-quarter mile ahead of the two groundsmen. The equipment operators were mowing the right-of-way using brush cutters attached to tractors, while the groundsmen were working ahead of the others using chain saws to cut brush and trees from around utility poles and guy wires. One groundsman, the victim, had just finished cutting brush and trees from around a utility pole guy wire attached to a steel rod anchored in the ground. The utility pole supported a step-down transformer with an attached 1-amp fuse. An uninsulated jumper wire connected the 1-amp fuse to a 14,400-volt powerline (see Figure). After the victim completed cutting the brush and trees, he laid the chain saw he was using on the ground. Next, he apparently reached down with one hand to grasp the butt of a small tree while grasping the guy wire located next to the fallen tree with his other hand. The guy wire, which had approximately 8 inches of slack in it, swayed and contacted the energized, uninsulated jumper wire. The current passed through the metal guy wire and through the victim to ground. The 1-amp fuse burned in half, stopping the current flow, and the victim fell to the ground.

The victim's co-worker had walked to a nearby truck to check his equipment when he saw the victim fall to the ground. The co-worker immediately ran to the victim suspecting that he had suffered a heart attack. After realizing the victim was unconscious, he ran back to the truck and radioed the jobsite foreman for assistance. The foreman, while on his way to the victim, radioed the office and requested an ambulance. The foreman arrived at the incident site about 4-5 minutes after being contacted. He checked the victim's breathing and began administering cardiopulmonary resuscitation (CPR). An emergency medical service (EMS) squad arrived approximately 25 minutes after being contacted. EMS personnel continued CPR and transported the victim to the hospital where he was pronounced dead 75 minutes after the incident occurred.

CAUSE OF DEATH

The medical examiner's certificate listed the cause of death as electrocution.

RECOMMENDATIONS/DISCUSSION:

Recommendation #1: Employers should conduct a jobsite survey before starting any job to identify potential hazards and implement appropriate control measures.

Discussion: Employers should conduct initial jobsite surveys to identify potential hazards to workers. Once initial hazards have been identified, appropriate control measures can be implemented prior to the start of any work. Employees should not be permitted to begin work until appropriate controls have been implemented at the site.

Recommendation #2: Employers should review and revise, where applicable, the existing safety program to include measures that enable workers to recognize and control hazards.

Discussion: Although the employer has a written safety policy and safety program the incident still occurred. The employer should review and revise, where applicable, the safety program to include, but not be limited to, providing training to workers to recognize and avoid unsafe conditions in their work environment.

Recommendation #3: Utility companies should ensure that transformers and jumper wires on utility poles are not placed in close proximity to unguarded uninsulated guy wires.

Discussion: The utility pole, transformer, jumper wire and uninsulated guy wire had been installed more than 5 years before the incident. Upon initial installation, utility companies should ensure that transformers and jumper wires are not placed close to uninsulated conductive guy wires. If conditions dictated the placement of the transformers and jumper wire in close proximity to guy wires, then appropriate control measures should be implemented to avert unintentional contact between the guy wire and jumper wire (i.e., guarding or insulating the guy and jumper wires).

Recommendation #4: Prime contractors and subcontractors should ensure that areas of responsibility for safety and health issues are specified as part of the contract provisions.

Discussion: All contracts should contain provisions that ensure the safety and health of all workers covered by that contract. Where prime contractors (electric utilities) and subcontractors (tree trimming operations) are involved, the contract must contain clear and concise language as to which party is responsible for a given safety and health issue. The provisions for these responsibilities should be established based upon which party has personnel with the necessary technical expertise (i.e., employees of electrical utilities are normally better equipped to assess electrical hazards than the employees of tree-trimming operations). The respective parties should periodically inspect worksites to ensure that the provisions of the contract regarding safety and health issues are upheld.

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Last Reviewed: November 18, 2015