Utility Company Work Leader Electrocuted While Replacing a Lightning Arrester on a Utility Pole

DATE: October 2, 1992

SUMMARY

On May 17, 1992, a 43-year-old male utility company work leader died after he contacted 7,200 volts of electricity while replacing a lightning arrester on a utility pole. The victim and two co-workers had been assigned to replace a step-down transformer and two lightning arresters that had been damaged by lightning. The victim was working in the bucket of a insulated aerial lift truck and removed one of his rubber insulating gloves while replacing a lightning arrester. As he was holding the grounded lightning arrester bracket, his shoulder contacted an energized cut-out switch. NJDOH FACE personnel concluded that, in order to prevent similar incidents in the future, the following safety guidelines should be followed:

- ***If practical, employers should ensure that all power lines are de-energized prior to working in their vicinity.***
- ***Employers should ensure that all energized powerlines and conductors are thoroughly insulated to prevent inadvertent contact.***
- ***Employers should evaluate their training and retraining programs to ensure that personal protective equipment is consistently used.***
- ***Employers should ensure that established company safety procedures are followed at all times.***
- ***Employers should re-evaluate the design of connecting devices to allow easier operation with personal protective equipment.***

INTRODUCTION

On May 18, 1992, an area OSHA safety supervisor notified New Jersey FACE personnel of this work-related electrocution. OSHA visited the site on May 18; FACE field investigators conducted an on-site investigation on May 19 after obtaining permission from the victim's employer and owner of the incident site. Present at the site investigation were the incident site owner, who was a witness to the incident, and representatives of the employer. Information was also obtained from the OSHA file, medical examiner's report and the employer's internal investigation report. The co-workers of the victim did not consent to be interviewed.

The employer was a medium sized electric company that supplies power to a large section of New Jersey. The company employs more than 1000 people, 60 of whom work out of this district office. The company employs a full time safety officer and has extensive written safety procedures. The victim was a journeyman lineman and member of a trade labor union. He had been with the company for eighteen

years in various jobs and held the position of work leader for the past year. As work leader he was responsible for directing and supervising the work of the field crews.

INVESTIGATION

The site of this fatality was a utility pole located on the edge of the property of a private business. On Saturday May 16, 1992, power to the business was knocked out during a severe electrical storm. The following day, a utility company trouble-shooter responded to a complaint from the business owner and determined that the problem was a defective transformer and two damaged lighting arresters on the pole. A three man crew dispatched to the scene and arrived at approximately 8:20 p.m. with three trucks; two electrically insulated aerial lift bucket trucks and a "digger" crane truck. Their assignment was to replace the transformer and two lightning arresters.

The crew (two linemen and a work leader) held a "tailboard" meeting to plan the job and were in agreement about how they would proceed. The damaged transformer was one of three transformers in a 3 phase, 277/480 volt transformer bank. The bank was fed with 12,000 volt (phase to phase) primary lines and mounted on a "dead end" utility pole (i.e., the circuit terminated at the pole). One lineman, working from an electrically insulated bucket truck, covered each phase of the dead-ended 12kv phases with insulating sleeves and then removed the damaged transformer and lowered it to the ground. The victim and second co-worker were on the ground where they readied the new transformer to be hoisted to its position on the pole.

The victim ascended to the work area in the second bucket truck. Wearing a hard hat, flame retardant shirt, and electrically insulated sleeves and gloves, he started work on replacing a lightning arrester while his coworkers started to raise the new transformer into place (see diagram). At some point, the victim removed his right rubber insulating glove. At about 10:07 p.m., he reached under the cross arm of the pole to the lightning arrester bracket, possibly to turn a nut manually with his bare right hand. At the same time, he backed up or turned his body and his back made contact with the energized center primary line cut out switch that was mounted on the crossbeam. The 7,200 volt electrical energy passed into his back, through his body, and exited from his unprotected wrist into the grounded lightning arrester bracket.

The witness, who was about sixty feet away on the ground, reported seeing a blinding flash about ten inches long and two feet in diameter. The flash was so bright that the victim could not be seen through it. The victim slumped over the bucket of the truck with his arms hanging out. The witness immediately summoned help by dialing 911 while the co-workers lowered the bucket to the ground. Some effort was needed to manually lift the victim from the bucket because of his large size. His right electrical glove was found in the bucket tray.

The victim had a pulse and was breathing after he was removed from the bucket. He was intensively treated at the scene by paramedics who started cardio-pulmonary resuscitation (CPR). He was transported by the local rescue squad to a local hospital emergency room where he was pronounced dead on arrival.

CAUSE OF DEATH

The county medical examiner determined that the cause of death was high voltage electrocution with entry of the electrical energy on the right side of the back and exit at the right wrist.

RECOMMENDATIONS/DISCUSSIONS

Recommendation #1: ***If practical, employers should ensure that all power lines are de-energized prior to working in their vicinity.***

Discussion: At the time of the incident, most of the circuits on the utility pole were de-energized by disconnecting the cut-out switches. The primary lines, which were within two feet of the lightning arresters, remained energized. An employer representative stated that the primary lines could have been de-energized, but it was the decision of the work crew whether to de-energize the lines or insulate them. It is recommended that, as the primary safety measure, all lines and conductors in the work area be de-energized before working on or near them. The use of electrical insulation should be used only when de-energizing the lines are not possible or practical.

Recommendation #2: ***Employers should ensure that all energized powerlines and conductors are thoroughly insulated to prevent inadvertent contact.***

Discussion: Although the primary lines had been covered with insulating hoses, the primary cut-out switches were not insulated. It is recommended that all energized conductors within potential reach of the worker be thoroughly insulated with insulating hoses and blankets to prevent inadvertent contact. If practical, insulating grounding points (such as the grounded brackets) may provide additional protection while working near energized lines.

Recommendation #3: ***Employers should evaluate their training and retraining programs to ensure that personal protective equipment is consistently used.***

Discussion: The victim removed his rubber insulating glove before contacting the energized cutout switch. The failure to wear the gloves, especially by a field work leader, may indicate a lack of understanding of why this personal protective equipment is necessary. It is recommended that management should evaluate their training programs and re-affirm the necessity of following established safety procedures with all supervisors and workers. Use of this equipment is also required by the OSHA standard 29 CFR 1926.950 (c)(1)(i).

Recommendation #4: ***Employers should ensure that established company safety procedures are followed at all times.***

Discussion: In the utility company investigation report of the incident, it was noted that the victim and work crew acted against several established company safety policies. In addition to finding the failure to wear the proper PPE (gloves) and covering the energized conductors, the report stated that "the victim was performing work in the primary zone without proper planning and positioning" and that "two tasks were being concurrently performed aloft with no one on the ground observing". To prevent deviations from safety procedures, management should reenforce the necessity of following these procedures with all supervisors and workers. It may also be useful to have a field supervisor perform unscheduled inspections of work crews to ensure that the policies are being followed.

Recommendation #5: Employers should re-evaluate the design of connecting devices to allow easier operation with personal protective equipment.

Discussion: In this case, the victim may have removed his electrical glove in order to turn a nut on the lighting arrester, an operation that would have been difficult with the glove on. It is recommended that employers should re-evaluate the design of connecting devices to make them compatible with gloves and other personal protective equipment used by linemen.

REFERENCES

Code of Federal Regulations 29 CFR 1926 (Construction Industry), 1990 edition. U.S. Government Printing Office, Office of the Federal Register, Washington DC, pg 312.

To contact New Jersey State FACE program personnel regarding State-based FACE reports, please use information listed on the Contact Sheet on the NIOSH FACE web site. Please contact In-house FACE program personnel regarding In-house FACE reports and to gain assistance when State-FACE program personnel cannot be reached.