

MASSACHUSETTS DPH/DLI/NIOSH  
FACE MA-92-03  
DATE: May 04, 1992

TO: Director, Massachusetts Department of Public Health,  
Occupational Health Surveillance Program

FROM: Massachusetts Fatal Accident Circumstances and  
Epidemiology (MA FACE) Project Field Investigator

SUBJECT: Self-Employed Carpentry Specialist Electrocuted When He  
Contacted Energized Public Utility Powerline in  
Massachusetts

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SUMMARY

A 25 year old male self-employed carpentry specialist (victim) was electrocuted after he contacted an overhead energized public utility power line. The victim and an employee had been applying new siding to a private multi-family dwelling and were nearing completion of the project. In the course of dismantling pump jack scaffolding, both men were manning a single 30 foot aluminum staging pole specifically in the effort to avoid both damage to the dwelling AND contact with the powerlines. While both men were apparently succeeding in their efforts to do so, either difficulty in uprighting the staging pole or a gust of wind caused the staging pole to sway resulting in contact with the inner most power distribution line located some 70 inches from the dwelling itself. The point of contact was 13.8 kV line to line with 7,967 volts line to ground. Staging pole contact with the powerline provided a path to ground for the electrical current shocking the employee who was able to break free, yet electrocuting the victim who did not break contact in time to survive. The Massachusetts FACE Investigator concluded that employers should:

- \* ensure and enforce strict compliance with established Federal and/or State regulations requiring pre-project electrical system assessments and safeguarding measures for protection of employees engaged in work in close proximity to energized powerlines
- \* develop, or revise when applicable, safety rules and procedures that address working in close proximity to energized overhead powerlines
- \* investigate alternative use of non-conductive staging members when performing tasks in close proximity to high voltage hazards

- \* utilize personal protective equipment to eliminate or minimize exposure to possible high voltage hazards

In addition, public utilities should:

- \* investigate, or revise when applicable, placement or protection of potentially hazardous utilities in close proximity to places of residence or business, such as underground placement, placement of utility lines further from building., permanent insulation, etc. Consider implementation of a permit system whereby persons or firms engaged in general exterior renovation and/or repair must notify public utility prior to commencement of work.

## INTRODUCTION

The Massachusetts FACE Investigator was notified by the Massachusetts Department of Labor and Industries on December 02, 1991 that a morning municipal newspaper carried the story of a 25 year old male self-employed carpentry specialist, also acting as a general building contractor, was electrocuted on November 30, 1991 when a 30 foot aluminum pump jack staging pole he was holding made contact with an overhead energized public utility powerline carrying 7,967 volts. An immediate investigation of the incident was initiated. On December 04, 1991, the MA FACE Investigator reviewed the incident with a public utility representative, a tenant of the dwelling who witnessed the incident, and the victim's father-in-law who owned the property. The sole company employee working with the victim at the time of the incident was unable to be interviewed. Police reports and diagrams, multiple photographs of the site, and the death certificate were obtained during the investigation.

The employer in this incident was a general building contracting company in business for seven years and employed 3 workers, one as foreman and two as laborers. The company did not have any written safety program or designated safety officer. No safety training of any kind was provided. The victim in this incident was the employer who established the company and remained the president/owner until death.

## INVESTIGATION

The company had been contracted by the victim's father-in-law who owned the property to apply new siding to the multi-family dwelling. The east side front porch facade of the two story dwelling was located approximately 70 inches away from the overhead public utility powerline which was part of a three phase energized system. The point of contact was 13.8 kV line to line with 7,967 volts line to ground.

On November 30, 1991, the victim and his employee had reported to the jobsite to complete the project and were dismantling pump jack staging equipment to leave the jobsite for the final time.

The dwelling tenant eyewitness described taking part in a three-way conversation in close proximity to one another while both workers were steadying a 30 foot aluminum pump jack staging pole they had moved from the facade of the front porch. Facing one another, the victim and the employee were steadying the pole when either difficulty in uprighting the staging pole or a gust of wind caused the pole to sway when a crackling sound was heard. Contact with the energized powerline approximately 70 inches from the dwelling facade was made. While the employee was able to immediately push the pole away from him to break contact in approximately 3-4 seconds falling to one knee, the victim did not, or was unable to break contact for several seconds more. The victim appeared to be attempting to control the direction of the staging pole to prevent possible damage to the jobsite dwelling as well as the dwelling next door. Further, when the victim did attempt to let go, a muscular contraction type reflex appeared to draw the energized pole inward causing both arms to wrap around it. With visible steam emitting from the right arm, contact was broken in approx. 9-10 seconds. The victim, body rigid, fell straight backwards striking the rear of his head on the concrete sidewalk. Injuries to the body included burn marks not only to his right arm, but also on the soles of his feet and on the right side of his back.

The incident occurred at 15:01. Police and Emergency Medical Services were notified by building tenant at 15:02. Both arrived within minutes. The time interval between injury and CPR by certified person (EMS) was approximately three to four minutes. Emergency Medical Services transported victim to regional medical

center where he was pronounced dead approximately one hour later at 16:00.

#### CAUSE OF DEATH

The death certificate lists the cause of death as accidental electrocution.

#### RECOMMENDATIONS/DISCUSSION

- \* Recommendation #1: Ensure and enforce strict compliance with established Federal and/or State regulations requiring pre-project electrical system assessments and safeguarding measures for protection of employees working in close proximity to energized powerlines.

Discussion: A jobsite evaluation, conducted before personnel perform work, serves to identify potential hazards, so that appropriate control measures can be implemented and corresponding employee training provided. Well informed, well trained personnel could have been knowledgeable of existing regulations dealing with the de-energization of and/or insulating of overhead powerline(s).

OSHA 29 CFR 1926.416 (a)(3) requires pre-project electrical system safety assessments, as do Massachusetts State regulations.

This jobsite included at least three identifiable hazards: a) uninsulated overhead powerlines approximately 25' 10" from ground level, b) work to be performed beneath and in close proximity to the powerlines, and c) an uninsulated/conductive aluminum staging pole. OSHA Standard 29 CFR 1926.416 and .417 as well as Massachusetts State regulation 453 CMR 10.91 (3) also require protection of employees when working in close proximity to energized circuitry by de-energization, grounding or guarding by insulation or other means. Work procedures for de-energizing or insulating energized powerlines and jumper wires should be undertaken by qualified individuals. To be effective, safety measures must be followed at the worksite. Regular safety inspections show personnel a commitment to enforcing safety policies and procedures.

- \* Recommendation #2: Develop, or revise when applicable, safety rules and procedures that address working in close proximity to energized overhead powerlines.

Discussion: Written safety rules and procedures that address all potential worker hazards, including work in close proximity to energized overhead powerlines, should be developed or periodically revised, if applicable. Such rules and procedures should cover, but not be limited to:

- \* recognizing the hazards associated with uninsulated powerlines
- \* recognizing the hazards associated with the performance of work in close proximity of such high voltage
- \* selecting placement site(s) of conductive materials in close proximity to high voltage hazards
- as \* establishing procedures for emergency situations such as staying clear of energized objects or objects that MAY BE energized, and always keeping others away as well.
- \* training personnel in cardiopulmonary resuscitation (CPR)
- \* designating a competent person to observe the clearance between mobile object(s) and high voltage energy source
- \* Recommendation #3: Investigate alternative use of non-conductive staging members or other materials when performing tasks in close proximity to high voltage hazards.

Discussion: Fiberglass ladders commonly used in the electrical and contracting trades frequently eliminate or minimize exposures to electrical hazards. Employers should use or investigate the marketplace for materials typically known for non-conductivity. If manufactured and readily available, use of a non-conductive staging pole may have prevented or minimized the exposure in this incident. Such non-conductive materials quite frequently prevent or minimize the effects of incidents similar to this. When such materials cannot be found or are not produced, other alternative safety measures should be determined, implemented and enforced.

- \* Recommendation #4: Utilize personal protective equipment to eliminate or minimize exposure to possible high voltage hazards.

Discussion: The electrical trades industry utilizes a vast array of personal protective equipment specifically designed to

safeguard personnel when performing work in or about areas of known and/or unknown high voltage. Personal protective equipment such as that described in OSHA 29 CFR 1926.951 and ANSI Standards J6 Series provide such safeguarding. Once the hazard has been identified and all other safety measures have been determined, implemented and enforced, personal protective equipment such as rubber insulating gloves, rubber matting, rubber insulating blankets, rubber insulating hoods, rubber insulating line hose, rubber insulating sleeves, etc. should also be utilized.

\* Recommendation #5: Public/private electrical utilities should investigate, or revise when applicable, placement or protection of potentially hazardous utilities in close proximity to places of residence or business, such as underground placement, placement of utility lines further from building(s), permanent insulation, etc. Consider implementation of a permit system whereby persons or firms engaged in general exterior construction, renovation or repair must first notify public utility prior to commencement of work.

Discussion: Public electrical utilities should analyze municipal powerline layouts to determining the most obvious areas where unreasonable high voltage hazards may exist. Consequently, such areas could be addressed to eliminate or minimize the hazards in the targeted problem areas. They should investigate the possibility of permanently insulating high voltage powerlines in thickly settled areas and consider underground placement of utilities for existing and future installations. Study should be given to implementation of a public utility permit system such as those required for building or plumbing work that would provide aid to both the utility and person or firm engaging in the work to identify jobsite locations most likely to involve high voltage hazards. Unless already in place, a municipal electrical layout or physical site inspection by a qualified utility representative would dictate if de-energization and/or insulating (booting) of the powerline is required PRIOR to issuance of the permit to proceed with the project.

#### REFERENCES

1. Office of the Federal Register: Code of Federal Regulations,  
Labor 29 Parts 1926.416 (a) (1), (2), and (3) (1990)  
1926.417 (a) (b) and (c) (1990)

2. Commonwealth of Massachusetts: Code of Massachusetts Regulations, Labor 454 Parts 10.91 (3) (a) and (b) effective 08 July 1988.
3. American National Standards Institute (ANSI) J6 Series