



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research **NIOSH**

Two Electrical Contractor Employees Electrocuted in Kentucky

FACE 86-11

Introduction:

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR) is currently conducting the Fatal Accident Circumstances and Epidemiology (FACE) Project, which is focusing primarily upon selected electrical-related and confined space-related fatalities. By scientifically collecting data from a sample of fatal accidents, it will be possible to identify and rank factors that influence the risk of fatal injuries for selected employees.

On November 18, 1985, two electrical contractor employees (a crew foreman and lineman) were electrocuted while installing electrical service to a mobile home.

Contacts/Activities:

Officials of the Occupational Safety and Health Program for the State of Kentucky notified DSR concerning these fatalities and requested technical assistance. This case has been included in the FACE Project. A DSR research team (two safety specialists) visited the site of these fatalities in cooperation with Kentucky OSHA officials. A meeting was held with representatives of the company and co-worker interviews were conducted. Photographs were taken of the accident site and a next-of-kin interview was conducted.

Overview of Employer's Safety Program:

This company has been in operation and under the present ownership for the past 40 years. The company is an electrical contracting firm that operates in fifteen states and employs 1300 people.

A written safety policy and safety programs have been developed and implemented. The staff of the safety department consists of a safety professional and two full-time, safety assistants. Field supervisors are held accountable for safety at the various field office locations. The company promotes safety through the use of safety evaluations, communications, and incentive programs.

Synopsis of Events:

On November 18, 1985, at approximately 7:30 a.m. a three-man crew (a crew foreman, lineman, and groundman) arrived at a private residence to install electrical service. At approximately 1:40 p.m. the crew had covered all three power lines with insulating hose, set a mid-span pole, and attached a cross bar to that pole in preparation for the installation of a transformer. The crew foreman and lineman were working from the bucket of an aerial truck while the groundman assisted them from the ground. After the crew foreman and lineman finished attaching the cross bar to the pole, they removed the insulating hoses from the power lines.

As the victims attempted to lower the bucket to attach a neutral bracket to the pole, the bucket raised bringing the victims into contact with the power lines (34.5 kV phase to phase – 19.9 kV phase to ground). Contact points were visible on two of the three power lines. After an undetermined amount of time, the groundman became aware of the problem and lowered the bucket containing the victims to the ground.

The victims were burned beyond recognition and were pronounced dead at the scene of the accident by the local deputy-coroner. An investigation by a representative of the boom manufacturer revealed that the upper boom “down” hydraulic line contained air. This could prevent the downward movement of the upper boom. Additionally, the design of the controller is awkward and may have been a major contributing factor in this incident. The operator may have been moving the controller from the down to the up position, repeatedly (rocking) the controller in an effort to lower the boom. By rocking the controller the operator was trying to free the boom so that it would operate properly.

Cause of Death:

The deputy coroner ruled electrocution as the cause of death.

Recommendations/Discussion:

Recommendation #1: Employers should emphasize the importance of employees following safe job procedures. These procedures should include the identification and repair of defective equipment in accordance with the company’s safe job manual.

Discussion: Since the possibility of faulty equipment may have contributed to the cause of this accident, employees must be aware of and follow all safe job procedures, as defined in the company’s safe job manual. It is the responsibility of the employer to train all employees involved with aerial trucks so that they are aware of proper testing of control systems and proper work procedures. These procedures must be closely followed at all times.

Recommendation #2: The boom control system should be further evaluated to determine that human factor engineering considerations are addressed.

Discussion: Although this incident may have occurred because the upper boom was not operating properly (i.e., could not be lowered), the design of the controller appears to increase the potential for an operator error. One lever controls all movements of the boom. Lifting the lever up raises the boom while pushing the lever down lowers the boom. This single action control may not adequately prevent incorrect operation, when one considers that an incorrect movement could move the operator into contact with high voltage lines. DSR personnel will evaluate the controls of all aerial bucket trucks involved in future FACE evaluations to determine if this problem is widespread.

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