The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces through safety and health research

General Foreman Electrocuted While Testing Circuits in North Carolina

FACE 85-16

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 fatalities. By scientifically collecting data from a sample of fatal accidents, it will be possible to identify and rank factors that increase the risk of fatal injuries for selected employees.

On April 13, 1985, employees of an electrical contracting firm under contract to the local electric company were replacing an existing high voltage distribution switch located in a commercial/residential development. At 9: 00 a.m. the foreman contacted one phase of a 23,000 volt conductor within the switch cabinet. The foreman was electrocuted and a second employee received superficial flash burns of the eyes and face.

Contact/Activities:

The Division of Safety Research was contacted by the North Carolina Occupational Safety and Health Administration (NCOSHA) to provide technical assistance in the evaluation of this incident. This fatality was included as part of the FACE project. A research team consisting of a safety specialist and a consulting engineer visited the site of the fatality. Discussions were held with the NCOSHA Compliance officer, the corporate Personnel Director, the corporate Safety Director, the injured worker, and other employees of the electrical contracting firm. The location of the electrocution was photographed by the research team.

The electrical contracting firm started business forty years ago and presently employs 1,250 in six states. Approximately 100 employees are administrative, with the balance being field personnel. The contractor installs and maintains overhead and underground electrical distribution systems and telephone lines, performs substation work, and maintains right-of-ways. The non-union firm hires local laborers through personal contacts. All training is on the job. A preplacement safety orientation session is given to each new employee along with two books; “Safety Regulations” and “Safety Procedures.” Work hours have increased from forty to sixty hours per week the past several months, due to an excessive workload. The electrical contractor maintains a safety van that provides on-site training to all employees. Video cassettes, slides, etc., are used to demonstrate proper procedures for on the job safety and first aid.

Synopsis of Events:

The local electric company requested that the contractor replace a high voltage distribution switch for an underground system with another switch that included a disconnect on the load side. The new switch could isolate circuits on the load side independently of each other. Although the existing switch had been in service only one year, it became necessary to install a new switch due to the rapid growth of the area.

To install the new switch, it was necessary to schedule a power outage for the morning of April 13, 1985. A written request dated April 4, 1985, scheduled a power outage for the morning of April 13, 1985. The installation of the new switch was assigned to the assistant general foreman, a crew foreman, and a two-man service crew. Shortly before 9:00 a.m. on April 13, a workman for the local electric company arrived at the site to coordinate the power outage. Because none of the contracting firm's employees were present, the workman proceeded to another small job in the area, intending to return later. Prior to the return of the electric company's employee, the assistant general foreman and the crew foreman of the electrical contractor arrived at the site and discussed whether or not the distribution switch had been de-energized. The crew foreman was authorized to have possession of the cabinet lock keys, since his work required access to such cabinets. The crew foreman removed the locks and opened the door of the cabinet. The assistant general foreman removed the insulation barrier and, using a tic tracer, attempted to determine if the distribution system was de-energized. The assistant general foreman guided the tic tracer with his right hand so that it contacted one phase of the 23,000 volt source. The contact allowed 13,200 volts to pass to ground through the assistant general foreman's body. He fell forward and was still breathing. The crew foreman received minor flash burns of the eyes and face and stated that he was "electrified," shaken, and proceeded to run.

By this time the two-man service crew arrived at the site. At 9:03 a.m. the service crew radioed their office to call an ambulance. One of the crew members arriving at the scene had EMT training and applied CPR until the rescue squad arrived. The rescue squad arrived at 9:09 a.m. and continued treatment during transportation to a local hospital, where the victim was pronounced dead at 10:20 a.m.

Upon investigation of the incident, it was learned that the assistant general foreman was not wearing the required personal protective equipment, rubber gloves and rubber sleeves, when he proceeded to work. Written company work procedures require a system to be de-energized and proper grounds installed before and during work on this equipment. The system had not been de-energized and properly grounded. Two days before the incident both workers were present at a safety demonstration that discussed the very job being performed.

Recommendations/Discussion:

Recommendation #1: The employer must enforce proper work procedures.

Discussion: Supervisory employees did not follow proper work procedures when changing a high voltage distribution switch and did not wear personal protective equipment (i.e., rubber gloves and rubber sleeves). Two days before the incident both workers attended a safety demonstration that specifically addressed the correct procedure to follow when performing this task and appropriate protective equipment was on the service truck (30 feet from the accident site). The company had established proper work procedures; however, the employees chose not to follow them. Enforcement of proper work procedures is required to assure compliance.

Recommendation #2: Communication and coordination policies between the power company and the electrical contractor must be followed.

Discussion: It was the policy of the power company and the electrical contractor that representatives of both concerns would meet at the job site before any work was initiated. The employees of the electrical contractor did not follow this policy.

Recommendation #3: Employees should be assigned tasks commensurate with their level of experience, training, and skills.

Discussion: The employees involved in this incident had limited experience replacing an existing high voltage distribution switch. The victim had only worked for the company for six months and the other three employees had no experience replacing an existing high voltage distribution switch. During interviews with several other randomly selected employees, it was noted that they had little or no experience working with electrical energy. The employer did not have a preplacement program to assess the skills of potential employees and to assure their placement into positions for which they were qualified.

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