



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research



Service Operations Technician Dies after Contacting 7680-volt Switch.

FACE 89-40

Introduction:

The National Institute for Occupational Safety and Health (NIOSH), Division of Safety Research (DSR), performs Fatal Accident Circumstances and Epidemiology (FACE) investigations when a participating state reports an occupational fatality and requests technical assistance. The goal of these evaluations is to prevent fatal work injuries in the future by studying the working environment, the worker, the task the worker was performing, the tools the worker was using, the energy exchange resulting in fatal injury, and the role of management in controlling how these factors interact.

On May 13, 1989, a 40-year-old male service operations technician died after contacting an energized 7680-volt switch while observing a service operations technician trainee operating the switch.

Contacts/Activities:

State officials notified DSR of this fatality and requested technical assistance. DSR personnel discussed this case with state compliance personnel. On June 28, 1989, a safety specialist and a safety engineer from DSR reviewed the case with company officials, visited and photographed the incident site, and met with responding Emergency Medical Service (EMS) personnel to obtain information about the sequence of events leading up to and following this incident.

Overview of Employer's Safety Program:

The employer in this incident is a large utility company which has been in operation for more than 140 years. The company employs 8,600 employees, including full-time safety and industrial hygiene personnel at both the corporate level and at field operations locations. The company has a comprehensive, multifaceted safety program which addresses all hazards to which employees may be exposed. Scheduled safety training programs are held on a regular basis. In addition, specialized training is provided whenever operations or equipment change, and all employees receive periodic refresher training in their areas of expertise.

The victim was one of 106 service operations technicians employed by the company. Service operations technicians routinely perform such tasks as streetlight repair and switching operations. In order to become a service operations technician, an individual must first become a journeyman lineman and must then complete an additional 6 weeks of

classroom training and a 6-month “trainee” period under the direction of an experienced service operations technician. The victim had worked for the company for 19 years prior to the incident, serving as a journeyman lineman for 14 years prior to becoming a service operations technician 2 years ago.

Synopsis of Events:

On the day of the incident, the victim was working the third shift. Although normally he would be working alone, for the month preceding the incident the victim had been training a service operations technician trainee.

The two men began work at midnight on the day of the incident performing a variety of routine tasks. Near the end of their shift, at approximately 7:15 a.m., they were assigned the task of restoring power to a large shopping mall. Construction crews from the company had been working at the mall all night in response to a power outage which occurred the previous evening. In order to restore normal power to the mall, the crew had to unlock and open a pad-mounted cabinet and throw a knife switch. The interior of the cabinet contained three sections, each of which contained a vertical knife switch flanked by nonconductive panels.

Standard procedure for opening or closing one of these switches called for an employee to use a “load-buster” (a device designed to contain electrical arcing) attached to a fiberglass “hot stick” (a non-conductive extension tool designed to allow a lineman or technician to work safely with or around energized conductors). The end of the load-buster fits into a socket on the hot stick, with a spring-loaded button from the load-buster protruding through a hole in the hot stick to secure the connection. The opposite end of the load-buster has a hook which is used to grasp and pull the knife switch to the desired position. Company policy calls for the employee using a hot stick, and anyone working with him, to wear rubber lineman’s gloves, rubber sleeves, goggles, and a hardhat. This operation is typically accomplished by a service operations technician working alone.

When the service crew reached the incident site, they met a two-man construction crew which had been working in the area. While the victim was talking to the men on this crew, the trainee attached the load-buster to the hot stick, put on his required personal protective equipment (PPE), and walked over to the cabinet. A trench, approximately 2 feet wide and 4 inches deep, ran the length of the cabinet face. (This trench had been made by the construction crew during their work.) The trainee opened the cabinet and prepared to throw the knife switch. At this time, the victim told the construction crew that he had “better go over and watch the trainee throw the switch.” He walked over to the cabinet and stood in the trench directly in front of the open cabinet and to the right of the trainee. The technician was not wearing any of the required PPE, with the exception of his hardhat. This was in violation of a company policy that requires an employee to wear the required protective equipment when within 3 feet of an open cabinet.

Due to the construction work that had been done, the trainee had to stand to the left of, rather than directly in front of, the knife switch. While the trainee was attempting to throw the switch, the spring-loaded button on the load-buster became disengaged from the hole in the hot stick. This allowed the hot stick to rotate freely instead of turning the load-buster. As the trainee attempted to realign the hole in the hot stick with the button on the load-buster, the technician reached out with his bare right hand to assist him. It is not known whether his bare hand touched the energized switch or the load-buster, or came close enough (within a quarter inch of an energized surface) to establish contact with the current. In any case, the current followed a “path-to-ground” from the energized equipment to the victim’s right hand, through his body, and out his feet. The victim straightened into an upright position. Flames were observed coming from the victim’s right hand. The victim, still conscious, fell away from the cabinet.

The two-man construction crew observed this incident. One member of the crew immediately used the vehicle radio to call for an Emergency Medical Service (EMS) ambulance while the other ran to the victim. As the trainee and the men of the construction crew attempted to help him, the victim told them “I’ll be O.K., just leave me alone for a minute.” The victim then lost consciousness.

The construction crew members, who were trained in Cardiopulmonary Resuscitation (CPR), immediately began to administer CPR to the victim. They were unable to detect any vital signs. The EMS crew was on the scene approximately 5 minutes after the incident. They continued CPR on the victim, but were not able to detect any vital signs. They initiated

transport of the victim to a local hospital; however, when they were unable to detect any vital signs, the victim was pronounced dead and they were instead routed to the county morgue.

Cause of Death:

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

Recommendations/Discussion:

Recommendation #1: The design of the system for attaching the load-buster to the hot stick should be reviewed.

Discussion: While problems with the attachment system had not been previously recorded, this incident clearly shows that the potential for such problems exists. The design of this system should be reviewed and consideration given to the practicality of installing guards to prevent the locking button from being inadvertently depressed.

Recommendation #2: Periodic spot checks of worksites by management/supervisory personnel should be conducted to verify that established safe work practices are being followed.

Discussion: A program of periodic spot checks conducted at random intervals and times by supervisory personnel would have the twofold effect of providing management with knowledge of whether or not established safe work practices are being followed by field personnel, while at the same time providing an incentive to field staff to follow the practices.

Recommendation #3: Safety rules and practices must be followed at all times by all employees.

Discussion: In this case company policy requires the use of appropriate personal protective equipment when working around energized equipment. The policy of using the fiberglass hot stick and rubber gloves and sleeves provides redundant protection; i.e., two "layers" of protection for the worker. In spite of this policy, the victim, an experienced employee, entered an area known to contain energized electrical equipment without his PPE. When the problem developed, he reacted without thinking, contacted an energized piece of equipment, and was electrocuted. This momentary lapse in adherence to known safe work practices cost him his life.

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