



The National Institute for Occupational Safety and Health (NIOSH)

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Fatal Incident Summary Report: Electrocution of an Electrician

FACE 83-08

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) Study. By scientifically collecting data from a sample of similar fatal incidents, this study will identify and rank factors which increase the risk of fatal injury for selected employees.

On July 12, 1983, a Class A electrician with approximately ten years' experience was working at a nonunion coal-fired power plant. At approximately noon, he was electrocuted while replacing a limit switch on a coal sampler. The attending medical examiner notified DSR about this fatality on July 13, 1983.

CONTACTS/ACTIVITIES

Subsequent to receiving notification, DSR sent a research team, consisting of an epidemiologist and industrial hygienist, to visit the company and survey the incident site on July 25-26, 1983. Interviews were held with the plant manager, assistant plant manager, personnel supervisor, personnel assistant, coal yard foreman, electrician foreman and electricians. Information obtained from these interviews pertained to the company history and processes, policies and procedures, incident scenario, safety and training programs, employee evaluations, injury record, and relevant work practices. The incident site was surveyed in the presence of a plant representative who was able to describe the appearance of the site when the victim was found. The condition of the site when surveyed was similar to that when the incident occurred except the tools and equipment used by the victim had been removed and installation of the coal sampler limit switch had been completed. During the survey, the locations of the victim, his possessions and tools, and the limit switch were identified and 35 mm pictures were taken.

SYNOPSIS OF EVENTS

The coal-fired power plant, which was built in 1950, has a generating capability of 1.1 million kilowatts and employs approximately 350 workers (6 of whom are Class A electricians). Specific technical and safety training programs exist in addition to written safety rules (general, hazardous energy, first aid, transport, etc.) Specific procedures exist for job briefings, job clearances, and lockout/tagout practices.

On Monday, July 12, the victim had his scheduled day off (he had also been on vacation the entire previous week). On the afternoon of July 12, another electrician examined the malfunctioning coal sampler and concluded that its limit switch needed to be replaced. However, insufficient time precluded its being replaced that afternoon and a job order was written for its replacement the next day.

On Tuesday, July 13, the victim reported to work on time and received a job briefing at 7:30 a.m. which concerned the repair of an elevator and the replacement of the coal sampler limit switch. By 11:30 a.m. the victim had received a second job briefing for the limit switch together with a written job order. The victim walked to the building containing the coal sampler and supposedly took a normal lunch break from 11:45 to 12:15. At about 12:25 three workers were riding a manlift up to the fourth floor of the building. As they reached the third floor, they saw the victim lying face-up underneath a conveyor belt. On the ground next to the victim were a pack of cigarettes and two folded one dollar bills. The victim's body had no traumatic medical signs associated with a fall to the concrete, nor was his body in a position that would result from a fall.

Based upon information collected and observations made, the probable sequence of events are as follows: The victim was standing on the conveyor belt guard in the process of installing the new limit switch. Two of the three wires were connected and he was in the process of connecting the last wire, the hot one with approximately 220 volts. However, this wire coming out of the conduit was too short to reach the switch. Probably, the victim grabbed this wire with his right hand and attempted to pull it down further out of the conduit. As he did, the bottom part of his hand contacted the limit switch. When the wire hit the upper part of his palm, a completed circuit was made. Due to the amount of voltage, the victim was not killed instantly; his heart probably went into arrhythmia. He probably felt uncomfortable, decided to get down and perhaps take a smoke, and, according to the medical examiner, died seconds later.

MEDICAL FINDINGS

Examination of the body showed electrical burns on the right hand, aspiration of foodstuff into secondary and tertiary bronchi, contusion of left mastoid scalp and abrasion of right mid-tibial area. Toxicologic tests of blood for alcohol and urine for basic, neutral and narcotic drugs were all negative. The attending medical examiner concluded that the cause of death was electrocution.

GENERAL CONCLUSIONS AND RECOMMENDATIONS

The major etiologic factor for this fatal incident was the failure of the victim to follow a standard permit/clearance procedure for lockout of electrical power. It appeared that this failure resulted from the inattention of the victim rather than the difficulty of the procedure or the lack of sufficient time to complete the job. If the switch had been de-energized by the appropriate lockout procedure at one of two possible locations, this fatal incident would have been prevented. The lockout procedure had been successfully used in the past by the victim and other electricians in similar as well as much more hazardous and complicated situations.

One explanation for the failure to follow the lockout and permit procedures may have been a somewhat cavalier attitude of the victim towards relatively small voltages of electricity. The research team was able to observe and was concerned about such an attitude in other electricians at the plant.

It is recommended that future efforts be made to stress the importance of and strictly enforce the company permit and lockout procedures regardless of the voltage involved. Safety training should stress that all voltages of electricity are potentially lethal.

The courtesy and cooperation of the company officials and employees interviewed by the research team were exemplary and are gratefully acknowledged.

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