

ELECTRICAL ACCIDENT: A CASE STUDY

Too often when it comes to electrical safety on the job site, it is assumed that it's only about electricians or those working around live wires. Unfortunately, this is a gross underestimation of the danger that electricity poses for everyone on a jobsite- even those that may not even be working at the moment. Electricity is present at virtually every jobsite, work area and place of employment. The following accident analysis discusses just that kind of case.

On 17 August 1990, a 53 year-old male worker was working the day shift (7 am to 3 pm) at a major steel company. He was part of a four man crew that was conducting normal daily activities. At about 9:50 am the crew took a break. This was normal operating procedure for this crew. Due to the hot working environment of the steel company, they were allowed a 15 minute break once an hour. The victim walked into the employee lunch room and sat on a wooden bench to rest and cool off. The bench was placed next to a floor-model air conditioner that was about 30 inches tall. A toaster oven for employee use sat on top of the air conditioner and was plugged into a 120-volt electrical circuit.

The victim, due to the extreme heat, was sweating profusely and wearing a short sleeve shirt. He rested his right arm on top of the air conditioner. This arm contacted the energized casing of the toaster oven at the same time his right calf was in contact with the grounded air conditioning unit. The victim began to shake violently, causing a coworker to suspect that he was being shocked. The coworker knocked the toaster oven off the air conditioner, causing the plug to be disconnected from the receptacle. However the circuit had been completed and the current traveled through the victim and exited his body where his leg was in contact with the grounded casing of the air conditioner.

A coworker laid the victim down on the bench and began pushing on the victim's chest in an attempt to recreate CPR while waiting for the arrival of the plant's EMS team. They arrived on site about 15- 20 minutes later. They provided advanced cardiac life support. The victim received additional treatment from the local emergency medical service and the victim was then transported by ambulance to the local emergency room where he was pronounced dead on arrival. During the investigation, the toaster oven was found have a non-polarized plug that had been inversely inserted into a polarized receptacle. This caused a condition known as reverse polarity which allowed electrical current to flow through the heating element without the switch being turned to the ON position and energized the toaster oven casing.

The cause of death was later determined to be arteriosclerotic cardiovascular disease complicated by electrocution. When the Maryland OSHA compliance officer and NIOSH completed their investigations they made the following recommendations:

- Employers should periodically inspect all areas of their facility for electrical hazards and apply appropriate control measures. These inspections must include non-production areas like lunch room, break rooms, rest rooms, and the like to check for electrical hazards that may be present. These hazards may be as simple as using non-polarized plugs or improper grounding of appliances located in these types of common areas.
- Employers should require that all appliances brought into their facility be tested for electrical integrity by a qualified person before they are placed in common areas and used by employees. This policy should be communicated with all supervisors and workers at the facility.
- Employers should periodically re-evaluate safety programs and reinforce any training that is related to worker recognition, avoidance and reporting of hazards. It was found during the investigation that the victim and his coworkers were aware that the toaster oven presented an electrical shock hazard. On a number of occasions workers, including the victim, had received electrical shocks from the oven. These incidents, although minor, should have been reported, but weren't. This simple act may have saved a man's life.
- Employers should provide CPR training to all workers, both management and labor. According to the American Heart Association for best results CPR should be started within 4 minutes. Had more employees been properly trained in CPR, this death may have been avoided. The more employees that are trained, the quicker the response time. The initial CPR was administered by a coworker whose last CPR training occurred 15 years previous to the incident. It is recommended by the American Heart Association that CPR training be repeated at least annually to be sure employees remember what to do and have the most up to date information.

Had at least some of these recommendations been in place on the day of the accident, this individual may have made it home safely instead of dead. Hopefully, this case will help to bring home to all workers that electricity can be a danger to everyone that steps foot on the site, not just those that are assigned to work with or around electricity.

For additional help with safety and OSHA compliance, take advantage of the resources available through NCMA. These resources include the NCMA Block Plant Safety Software. The software is available from NCMA at (703) 713-1900 at a cost of \$150 for up to 3 plants/year (nonmember \$450).