



The National Institute for Occupational Safety and Health (NIOSH)

Promoting productive workplaces
through safety and health research



Assistant Pool Manager Electrocuted

FACE 88-35

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 July 25, 1988, a 17-year-old female assistant pool manager was electrocuted when she contacted an ungrounded electric motor.

Contacts/Activities:

State officials notified DSR of this fatality and requested technical assistance. On August 18, 1988, a DSR safety specialist conducted a site visit and discussed the incident with the Occupational Safety and Health Administration (OSHA) compliance officer and an employer representative.

Overview of Employer's Safety Program:

The victim had worked for 3 months as an assistant pool manager for a municipality. The municipality operates 3 city pools and employs 25 people, including 6 assistant pool managers. Employees receive a 1-week orientation and on-the-job training for assigned tasks. A written safety program describing safety procedures for various operations is also used.

Synopsis of Events:

On August 25, 1988, the victim was performing her assigned duties as assistant pool manager at one of the three municipal swimming pools. At about 1:30 p.m., the victim was told to add soda ash to the swimming pool water to maintain the pH level. This is usually done 2-3 times a day by the pool manager or an assistant. This procedure consists of the following steps:

- fill a plastic drum with 35-40 gallons of water
- plug the mixing motor cord into a 110-volt wall receptacle and turn the mixing motor switch on

- add soda ash to the drum and mix until the soda ash dissolves
- place the motor switch in the off position and unplug the electrical cord
- plug the pump motor cord into wall receptacle and turn the pump motor switch on
- insert the pick-up suction tube into the drum and allow the pump to run until all the solution is added to the swimming pool water (approximately 3 hours)
- place the pump motor switch in the off position after the drum empties.

The event was unwitnessed; however, circumstantial evidence suggests the following scenario. The barefooted victim entered the pump room, which was below ground level, adjacent to the swimming pool. The concrete floor of the room was covered with water at the time of the incident.

The victim filled the plastic drum with water, plugged in the mixing motor, and placed the motor switch in the on position. She was apparently in the process of adding soda ash to the drum when she inadvertently contacted the mixing motor, which had developed a faulty ground and was energized. The victim, standing barefoot in water, contacted the energized motor with her left hand and created a path to ground for the electrical current, causing her electrocution.

At 2:23 p.m., a co-worker was sent to find the victim. As the co-worker entered the pump room she observed the victim slumped over the drum with her face submerged in water. The co-worker summoned help and called an ambulance. Another co-worker tried to remove the victim from the drum but received an electrical shock. A broom was then used to remove the victim. The ambulance and police arrived, and emergency medical personnel checked the victim's vital signs and began cardiopulmonary resuscitation. The victim was transported to the local hospital, 5 minutes away, and was pronounced dead on arrival.

Cause of Death:

The coroner's report stated that the cause of death was electrocution.

Recommendations/Discussion

Recommendation #1: employers should maintain all equipment in safe operating condition.

Discussion: Section 680-25(c) of the National Electric Code (NEC) states, "Pool-associated motors shall be connected to an equipment grounding conductor." An inspection of the pump room revealed that the mixing motor was old and in poor working condition. The grounding pin on the male plug had been removed from the power cord resulting in a faulty electrical ground. Employers should routinely inspect and repair or replace equipment that is faulty, damaged, or presents a safety hazard. An electrical supply cord with the grounding pin intact may have prevented this fatality.

Recommendation #2: All pool area electrical circuits should be installed by qualified electricians in accordance with Article 680 of the NEC.

Discussion: Section 680-24 of the NEC requires that ground-fault circuit-interrupters (GFCI) be installed. In this incident one wire to the GFCI, contained in the junction box and used for the circuit to the wall receptacle, was disconnected. Another wire, the ground conductor to the GFCI, had not been connected and a wire nut had been used instead. Therefore, the GFCI was not functioning as designed. A properly wired and functioning GFCI could have sensed the faulty electrical ground condition and de-energized the circuit, thereby preventing the fatality.

Recommendation #3: The work environment should be free of safety hazards and employers should ensure that workers are aware of the importance of using personal protection equipment.

Discussion: The floor of the pump room was covered with water, increasing the risk of injury or death. In accordance with Section 680-11 of the NEC (Equipment Rooms and Pits), electric equipment shall not be installed in rooms which do not have adequate drainage to prevent water accumulation during normal operation or filter maintenance. Management should ensure adequate drainage of the pump room. Also, all employees entering the pump room should wear insulated boots/shoes. Had the floor been dry and had the victim been wearing insulated boots or shoes, this fatality may have been prevented.

[Return to In-house FACE reports](#)

Last Reviewed: November 18, 2015

How helpful was this page?



Not helpful

Very helpful