2009 NFPA 70E: Reducing Workplace Electrical Hazards (transcript)

Because of a careless moment this worker was badly burned by an arc flash from an electrical short-circuit. It happens far too often.

Arc flash injuries cause burns so severe many emergency rooms are not equipped to treat these patients. They must be transported to a burn center where recovery could take months or even years.

Let's look at how to eliminate the three major electrical hazards in the workplace: shock, arc flash and arc blast.

Shock is the most common cause of electrical injuries, and when we say someone is electrocuted that means they didn't survive the shock. So the first principle for working safely with electrical circuits is turn off the electricity.

Individual control is permitted in cases where the electrical disconnect is close to the equipment that is being worked on and under the control of a qualified person at all times. Individual control is limited to minor maintenance they're servicing.

The next procedure is lockout/tagout. Both OSHA and 7E require lockout/tagout when individual control procedures are not possible or not allowed. The complex lockout/tagout procedure provides a higher level of safety and is permitted when there are multiple energy sources; multiple crews, crafts and employers; multiple locations; multiple disconnecting means; or when the work extends beyond one shift.

We're going to energize this power panel similar to the tide found in almost every industrial facility to see what happens when we create an arc flash.

Ready to test.

Three, two, one.

An arc flash can reach 35,000 degrees Fahrenheit, causing disabling second and third degree burns in seconds. It creates a pressure wave called an arc blast that can reach thousands of pounds per square inch--enough to knock someone off a ladder, rupture an eardrum, or collapse a lung. It will blow equipment apart and propel shrapnel with enough force to completely penetrate a worker's body.

NFPA 70E describes two kinds of boundaries for anyone working on or near a live circuit. There are flash protection and shock protection boundaries, and the distances are measure from the exposed live conductor. The flash protection boundary is determined by the circuit's total energy. For example, this high-energy panel requires a flash protection boundary of four feet. Anyone closer than that needs to wear protective clothing suitable for the hazard.

PPE for electrical workers is designed to be flame resistant. It's constructed with high integrity to prevent breaking or tearing. The materials won't melt and they reduce heat transfer to the body.

As a rule don't allow work on a live circuit. But when there's no choice make sure workers observe safe approach boundaries, wear the right level of protective clothing and, finally, make sure everyone who works with electricity understands the hazards and risks and follows procedures designed to keep them safe and on the job.

Thanks for watching. I'm Steve Thomas.