FUNDAMENTAL 55: NFPA 70E Arc Flash

Key Takeaways:

– Understanding the difference between arc flash and electric shock
– Understanding hazards, injuries, and indirect consequences related to arc flash and electric shock
– Comprehending the way approach protection boundaries are determined
– Connecting approach boundary criteria with worker qualifications
– Recognizing necessary training and skills for qualified workers
– Identifying the primary elements of an electrical safety program
– Understanding the purpose of lock and tag procedures
– Acknowledging different types of lock and tag devices
– Understanding basic procedural steps for lock and tag
– Learning the requirements for the use of test instruments and equipment
– Remembering the requirements, benefits, and components of a job briefing
– Observing the requirements, benefits, and components of an energized work permit
– Acknowledging PPE responsibilities and requirements related to work around energized electrical equipment and parts

Course Description

OSHA has labeled electrocution as one of the “fatal four” causes

of fatalities in the private construction industry, accounting for 9% of deaths.

Death by electrocution is a daily hazard that requires attention for lineman and other utility workers. Especially in the utility sector, daily awareness of electrical hazards must be emphasized by safety and training professionals.

In order to minimize the risk of injury in the utility industry, trade associations and federal agencies now have many safe work practices and procedures in place to protect employees working on or near energized electrical equipment and conductors. Today, following regulations and industry standards protects electrical workers from the hazards of shock, electrocution, arc flash, and arc blast.

The regulatory bodies that govern electrical safety in the workplace are the National Fire Protection Association (NFPA) and the Occupational Safety and Health Administration (OSHA). NFPA provides information and guidelines that protect workers from electrical hazards, while OSHA is the enforcement agency for electrical safety in the workplace.

Industry regulations that govern electrical hazards:

NFPA Standards:
– 70-NEC
– 70B Maintenance Electrical
– 70E “Standard for Electrical Safety in the Workplace”

For the safety of all employees, your company must provide electrical safety training to employees who face a risk of electrical hazards that are not reduced to a safe level by the applicable electrical installation requirements.

NFPA 70E (Arc Flash Training) must teach about:
– All specific hazards around electrical energy.
– Necessary safe work practices and procedures for providing protection from electrical hazards associated with jobs or tasks.
– The relationship between electrical hazards and possible injury.

In the case that there has been a big, recent change in how your workforce operates or interacts with electrical equipment and power generation devices, safety professionals must make appropriate changes to protect the workforce.

When supervision or annual inspections show that employees fail to comply with the safety-related work practices, them retraining is then required. As well, retraining is required if new technology, equipment types, or changes in processes alter the safe work practices, or if workers need to employ safe work practices that are not normally used during regular job duties.

Also, for tasks performed less than once a year, retraining is a must before employees go back in the field for the performance of related work.

For further illustration, NFPA 70E 110.2 (E) states employers need to record each employee receiving the training required for both qualified and unqualified employees.

Training documentation is required to:
– Identify employee names and dates of training.
– Happen when the employee demonstrates proficiency in the work practice involved.
– Continue throughout an employee’s employment.

It is important that electrical tasks involving work around energized electrical equipment or conductors need to be performed only by qualified employees (i.e. employees that have received the necessary training required to safely negotiate specific hazards).

To be qualified, one must have the skills and knowledge related to the construction and operation of the electrical equipment and installations, and have received safety training to recognize and avoid the electrical hazards that might be present with respect to that equipment or work method. As well, they must have received additional training and demonstrate proficiency in working on exposed energized equipment, recognizing the hazards associated with the task or job, and taking precautions needed to prevent injury or death.

Also, a qualified person will be trained in the proper use of special precautionary techniques and in selecting and using the appropriate personal protective equipment (PPE) – including arc flash, insulating and shielding materials, and insulated tool and test equipment. Lastly, they need to have proper training in responding to emergency situations, which is especially important but often overlooked.

To become qualified, the employee needs to actually do the work or have 'hands on', performance based training. It should be that only trained and qualified employees ever have access to the space within reach of 'live' parts or equipment. NFPA 70E (Arc Flash) enforces that only trained and qualified employees are allowed to work on or near exposed energized electrical parts and supervise unqualified persons in the vicinity of the hazard.

In addition, another requirement of NFPA 70E (Arc Flash) is the development of an overall electrical safety program.

NFPA 70E (Arc Flash) requires that electrical safety programs:
– Supply awareness training of electrical hazards that includes shock and arc flash.
– Implement administrative and engineering controls to measure and monitor methods, and procedures, for working within the Limited Approach Boundary of energized electrical conductors and circuit parts 50 volts or more.
– Evaluate hazards and risks, and job briefing before each job, for repetitive or similar tasks, and for routine work.
– Prescribe activity appropriate for the voltage, energy level, and circuit conditions.

Electrical safety programs need to be audited regularly to ensure principle and procedures are being followed. Ensure that your electrical safety program is frequently reviewed, but also measured for performance. Employers will determine the frequency of audits is determined based on the complexity of the procedures and the type of work being covered. Although, OSHA also requires employers to audit their Safety Programs, which include Electrical Safety Programs, at least every year.