

UNDERSTANDING NFPA 70E... **ELECTRICAL SAFETY PROGRAMS IN** **INDUSTRIAL ENVIRONMENTS**

COURSE OUTLINE

- **The Occupational Safety and Health Administration (OSHA) requires employers to protect employees from electrical hazards in the workplace.**
- **To help with this, the National Fire Prevention Association (NFPA) created NFPA 70E in 1979.**
 - This is now the consensus standard for electrical safety.
- **The Standard is revised every three years to account for changes that occur in industries it affects, as well as new technology and equipment design.**
 - So it's important to stay up to date with its policies as they change.
- **One of the key terms you need to know as you work with the Standard is “qualified person”.**
 - NFPA 70E defines a qualified person as someone who is “...*trained and knowledgeable in the construction and operation of equipment or a specific work method and is trained to identify and avoid the electrical hazards that might be present with respect to that equipment or work method*”.
- **Qualified persons should also...**
 - Know what precautionary techniques should be used in various electrical safety situations.
 - Understand electrical policies and procedures.
 - Be familiar with insulating materials, shielding materials, and insulated tools and equipment.
 - Know what PPE should be used in specific electrical hazard situations.
- **Because they have this specialized knowledge, they are integrally involved in creating your Electrical Safety Program.**

- **They are also responsible for...**
 - Writing “Job Safety Plans”.
 - Supervising “unqualified persons”.
 - Performing tasks such as testing and troubleshooting on electrical equipment when an electrical hazard exists.
- **NFPA 70E has three chapters.**
 - Chapter One is the “heart” of the Standard, defining key terms and describing safe electrical work practices and procedures, as well as the general requirements for maintaining an electrically safe work environment.
 - Chapter Two examines maintenance practices that can help keep work areas safe and protect employees from electrical hazards.
 - Chapter Three discusses safety practices that should be used when handling special equipment such as batteries and lasers.
- **There are also various “informational annexes” to the Standard.**
 - They provide additional resources and tools that help you understand and implement NFPA 70E in your facility.
- **The Standard specifies that it relates to any hazards associated with electrical energy during the installation, removal, inspection, operation, maintenance and demolition of...**
 - Electric conductors.
 - Electrical equipment.
 - Signaling and communications conductors and equipment.
 - Raceways.
- **Now that you know what NFPA 70E is and what it contains, you might also wonder how your facility can comply with it.**
 - To start, it can be used to help develop your facility’s Electrical Safety Program.
- **But remember, NFPA 70E is updated every three years.**
 - So you need to be aware of any changes that occur within each revision and how they might affect your Program.
- **When workers suffer injuries from electrically related accidents, the results can be career-ending.**
 - In some cases they can even be fatal.

- **One of the best ways to avoid this is by putting an Electrical Safety Program (ESP) in place at your facility, as recommended by the NFPA 70E consensus standard.**
- **It is your employer's responsibility to create and establish this program.**
 - But it's up to you to familiarize yourself and comply with it.
- **Some policies that the Program should include are...**
 - Identifying and minimizing electrical hazards.
 - Creating a written plan for every electrical task.
 - Documenting first-time procedures for electrical jobs.
 - Reporting and investigating all electricity-related incidents.
 - Implementing "Electrical Safety Program Controls".
- **"Electrical Safety Program Controls" are metrics that can be used to measure the Program's effectiveness and can include...**
 - Total time lost to injuries.
 - Money spent on worker's compensation.
 - Hours of employee training.
 - The number of hazards identified and eliminated.
 - The number of work procedures that have been altered to create a de-energized environment.
- **Your company's ESP should also emphasize the importance of making employees aware of potential electrical hazards.**
- **After all, you can't identify hazards if you don't know what to look for.**
 - So your program should be designed so that you and your coworkers always understand what electrical hazards could exist in your facility.
- **This means that you should know...**
 - Whenever there is an electrical hazard present in your work area.
 - What could lead to you being exposed to an electrical hazard.
 - What other personnel could enter the work area and be exposed to electrical hazards.
 - Changing work conditions that could lead to increased electrical hazards.
 - How exhaustion, illness or distraction could affect your performance and lead to unsafe conditions or committing unsafe "acts".

- **Next, the Program should provide you with specific safe work procedures that should be followed when you are working with or around electricity.**
 - For instance, it should detail how to verify that new electrically powered equipment has been installed and inspected properly.
 - You also need to make sure that all the equipment is well-maintained and inspect it before each use.
- **But inspection and maintenance aren't the only procedures your ESP should address.**
 - It should also include instructions for performing specific electrically related tasks.
- **For each task, these written procedures should include...**
 - The defined scope of the task.
 - The required qualifications for employees working on the task.
 - The number of employees needed for the task.
 - The hazards associated with the task.
- **The procedures should also address...**
 - The “limits of approach” (how close you have to get to a piece of equipment to be “at risk” of an electrical hazard).
 - Safe work practices that should be followed when working on the task.
 - Any PPE that should be worn.
 - The tools needed for the task.
 - Any precautions that are associated with performing the task.
- **These procedures should come with any equipment maintenance requirements, electrical diagrams and any other visual aids that you might need to safely complete the work.**
- **Another thing that your Electrical Safety Program should include is a risk assessment procedure that helps you to...**
 - Identify any electrical hazards in your work area.
 - Assess the risks associated with those hazards.
 - Implement appropriate risk controls.

- **NFPA 70E recommends following a specific hierarchy when doing this assessment...**
 - First trying to eliminate the hazard.
 - Then trying to substitute the hazardous factor with a safer alternative.
 - If that doesn't work, using engineering controls to guard against the hazard.
 - Making everyone aware of the hazard so that they can avoid it as much as possible.
 - Using administrative controls to change procedures, training or warning labels.
 - Lastly, wearing PPE to protect yourself from the hazard.
- **Remember, your ESP is a “living” document.**
 - It should be updated as equipment and power sources in your facility change... and audited at least once every three years.
- **One of the most integral parts of an Electrical Safety Program is its “Electrically Safe Work Condition” Policy.**
 - The NFPA 70E Standard requires you to establish an “Electrically Safe Work Condition” (ESWC) when working within a piece of equipment’s “limited approach boundary”.
- **The “limited approach boundary” is defined as the “...*limit at a distance from an exposed energized electrical conductor or circuit part within which an electric shock hazard exists*”.**
- **So establishing an “Electrically Safe Work Condition” involves...**
 - Turning off power.
 - Verifying a lack of voltage.
 - Ensuring the equipment cannot be re-energized while you are working on it.
- **So what specific steps should you take to create an “Electrically Safe Work Condition” for a task that you’re working on?**
- **Initially, use any drawings, diagrams as well as identification tags that are available to determine all of the possible sources of electrical supply to the equipment that you’re working with.**

- **Next, “interrupt” the electrical current and open the “disconnecting devices” for each source of electrical supply.**
 - This could be as simple as flipping a switch or unplugging a power cord.
 - Then release any stored electrical energy.
- **After that, you should block or release any non-electrical stored energy to ensure that circuit cannot be accidentally re-energized.**
- **Finally, you should follow your facility’s written procedures for applying lockout/tagout devices.**
 - Your “Electrical Safety Program” should include up-to-date drawings and single-line diagrams so that you can determine where the devices should be installed.
- **The lockout/tagout procedures should also identify...**
 - The person who will de-energize the equipment.
 - The requirements for releasing stored electric or mechanical energy.
 - How to verify that circuits are de-energized, as well as the test instruments that should be used.
 - How to verify that the equipment cannot be re-energized.
 - Any grounding requirements.
 - How to transfer responsibility for lockout and tagout procedures to another person if a task takes longer than one shift.
- **When you are testing the equipment to verify that an ESWC has been established, remember to use a known source of voltage to ensure that the test instrument is working correctly, both before and after you use it on each circuit.**
 - This is called the “LIVE-DEAD-LIVE” test, and will help to make sure that your results are accurate.

*** * * SUMMARY * * ***

- **The National Fire Prevention Association (NFPA) created the NFPA 70E Standard to help companies and their employees comply with OSHA’s electrical safety requirements.**
- **NFPA 70E encourages every workplace that has electrical hazards to create and comply with a written “Electrical Safety Program”.**
- **An “Electrical Safety Program” should include your facility’s electrical safety policies, specific procedures for any electrically related tasks, risk assessment procedures, and an “Electrically Safe Work Condition” policy.**
- **To establish an “Electrically Safe Work Condition”, you must de-energize electrical equipment, verify the absence of voltage, and ensure it cannot be accidentally re-energized while you are working.**
- **Any time a worker needs to enter a piece of equipment’s “limited approach boundary”, an “Electrically Safe Work Condition” must be established.**
- **Now that you know how to identify the electrical hazards that can exist in your facility and how complying with NFPA 70E can help you avoid them, you can help to keep yourself, your coworkers and your workplace safer... every day!**