Electrical Safety (NFPA 70E) 16 Hour

Course Outline

Prerequisites: This course shall have no formal pre-requisite.

Course Length: 16 hours - Course length shall vary depending on the number of delegates. Total course time includes breaks.

Class Size: The maximum number of delegates that may be trained and tested per instructor shall be thirty-five (35) in the classroom session.

Course Objective

- Provide delegates with the knowledge to safely perform work around energized and non-energized electrical equipment.
- Provide delegates with recommended practices and guidelines to perform safely while working with electricity.
- Delegates should be able to demonstrate knowledge during written examination.

Course Design

- Power Point© / Lecture / Audio Video / Visual Aids

Successful Course Completion

- Requires a minimum score of 75% or better.
- Delegates will have no more than sixty (60) minutes to complete the exam.
- Grades shall be calculated by dividing the number of questions answered correctly by the total number of exam questions.

Course Content Summary

- Classroom

Breaks: 10 minutes (approximately every hour)

Lunch: 1 Hour

Course Outline

Course Objectives

About NFPA 70E

- What is Covered
- What is Not Covered

Safety Related Work Practices

- Definitions

Article 105 - Application of Safety-Related Work Practices and Procedures

- Responsibilities
    - Employer
    - Employee

Article 110 - General Requirements for Electrical Safety-Related Work Practices

- Electrically Safe Work Condition
- Energized Work
- Normal Operating Condition
- Elements of an Electrical Safety Program
- Risk Assessment Procedure
    - Human Error
    - Hierarchy of Risk Control Methods
- Job Safety Planning and Job Briefing
- Incident Investigations
- Auditing
- Training Requirements
    - Qualified Person
    - Unqualified Person
    - Lockout/Tagout Procedure
    - Emergency Response
- Ground-Fault Circuit-Interrupter (GFCI) Protection

Article 120 - Establishing an Electrically Safe Work Condition

- Lockout/Tagout Program
    - Employer Responsibilities
    - Employee Involvement
    - Procedure
    - Coordination
    - Lockout Device
    - Tagout Device
    - Planning
    - Elements of Control
    - Process Equipment and Piping Isolation Procedures
        - Purpose
        - Scope
        - Applications
        - Hazards
        - Responsibilities
        - Isolation Procedures
        - General Requirements
    - Electrically Safe Work Condition

Article 130 - Work Involving Electrical Hazards

- Energized Electrical Work Permit
- Elements of a Work Permit
- Exemptions to Work Permit
- Shock Risk Assessment
- Arc Flash Risk Assessment
- Incident Energy Analysis Method
- Equipment Labeling
- Personal and Other Protective Equipment
- Care of Equipment
- Personal Protective Equipment (PPE)
    - PPE Category 1 – 4
- Other Protective Equipment
- Portable Ladders
- Alerting Techniques & Other Protective Equipment
- Standards for Other Protective Equipment
- Overhead Lines

Informative Annexes

- Annex C – Limits of Approach
    - Preparation for Approach
    - Unqualified Persons, Safe Approach Distance
    - Qualified Persons, Safe Approach Distance
- Annex D – Incident Energy and Arc Flash Boundary Calculation Methods
- Annex E – Electrical Safety Program
- Annex F – Risk Assessment and Risk Control
    - Introduction to Risk Management
    - Hierarchy of Risk Control
    - Risk Assessment Methods
- Annex G – Sample Lockout/Tagout Program
    - Lockout/Tagout Program General Elements
- Annex H – Guidance on Selection of Protective Clothing and Other Personal Protective Equipment (PPE)
    - Simplified Two-Category Clothing Approach
    - Arc-Rated Clothing and Other Personal Protective Equipment (PPE)
    - Conformity Assessment of Personal Protective Equipment (PPE)
    - Supplier's Declaration of Conformity
- Annex I – Job Briefing and Job Safety Planning Checklist
    - Job Briefing Checklist
    - Job Safety Planning Checklist
- Annex J – Energized Electrical Work Permit

  - Energized Electrical Work Permit Sample
  - Items to Consider When Determining the Need for an Energized Electrical Work Permit
- Annex K – General Categories of Electrical Hazards
  - General
  - Electric Shock
  - Arc Flash
  - Arc Blast
- Annex L – Typical Application of Safeguards in the Cell Line Working Zone
  - Application of Safeguards
- Annex M – Layering of Protective Clothing and Total System Arc Rating
  - Layering of Protective Clothing
  - Layering Using Arc-Rated Clothing over Natural Fiber Clothing Underlayers
  - Total System Arc Rating
- Annex N – Example Industrial Procedures and Policies for Working Near Overhead Electrical Lines and Equipment
  - Introduction
  - Procedures
  - Look Up and Live Flags
  - Heavy Mobile Equipment
  - Aerial Lifts, Cranes, and Boom Devices
  - Tree Work
  - Underground Electrical Lines and Equipment
- Annex O – Safety-Related Design Requirements
  - General Design Considerations
  - Incident Energy Reduction Methods
- Annex P – Aligning Implementation of This Standard with Occupational Health and Safety Management Standards
- Annex Q – Human Performance and Workplace Electrical Safety
  - Introduction
  - Hierarchy of Risk Control
  - Principles of Human Performance
  - Information Processing and Attention
  - Rule-Based Human Performance Mode
    - Rule-Based Human Performance Mode Errors
  - Knowledge-Based Human Performance Mode
    - Knowledge-Based Human Performance Mode Errors
  - Skill-Based Human Performance Mode
    - Skill-Based Human Performance Mode Errors
  - Error Precursors
  - Human Performance Tools
  - Job Planning and Pre-Job Briefing Tool
  - Job Site Review Tool

    - Post-Job Review Tool
    - Procedure Use and Adherence Tool
    - Self-Check with Verbalization Tool
    - Three-Way Communication Tool
    - Stop When Unsure Tool
    - Flagging and Blocking Tools
    - Human Performance Warning Flags
    - Supervisory Performance
    - Worker Performance
    - Workplace Culture
        - Workers
        - Supervisors and Managers
        - The Organization
- Annex R – Working with Capacitors
    - Introduction
    - Qualification and Training
    - Shock Hazard
    - Internal Rupture
    - Performing a Risk Assessment for Capacitors
    - Determining the Shock Hazard
    - Establishing an Electrically Safe Work Condition
    - Capacitor Hazard Labeling

Practical Session

- Conduct Risk Assessment and Risk Control
- Complete Job Briefing and Planning Checklist
- Complete Energized Electrical Work Permit
- LOTO Application

Training Center Provided Material

- Course Materials

Delegate Requirements

- None

Reference Material / Documents

NFPA 70E Standard (National Fire Protection Agency)

- 2021 Edition