NFPA 70E® 2012..... What's New and What do I Need to Know?

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PRESENTATION GOALS

- Understand the key elements of the NFPA 70E® 2012 Standard for Electrical Safety in the Workplace.
- Recognize the importance of electrical safety-related work practices.
- Review the development of the standard and the importance of an integrated approach to electrical safety.
- Understand the major changes since the 2009 edition
- Recognize the value of an integrated approach to electrical safety

What is the NFPA 70E® Standard for Electrical Safety in the Workplace?

- A consensus standard that addresses employee safety issues associated with installation of electrical systems; to support the NFPA 70th National Electric Code (NEC) and OSHA’s electrical safety standards
- First published in 1979 70E® originally consisted only of Part I Installation Safety Requirements
- Development of the “complete” standard has been a process (and remains so).
The standard was expanded in subsequent editions to include:
- Limits of Approach and establishment of an “arc” in 1995
- In the 6th Edition in 2000 a new Part IV was finally added. The standard then included:
  - Part I Installation Safety Requirements
  - Part II Safety-Related Work Practices
  - Part III Safety-Related Maintenance Requirements
  - Part IV Safety Requirements for Special Equipment

The 7th edition in 2004 had significant changes:
- The Standard name was changed to the current name
- Parts were renamed as Chapters
- Major changes emphasized safe work practices
- Reorganized with Safety Related Work Practices up front
- New emphasis on live work as last alternative
- Added an energized electrical work permit and associated requirements
- Usability of the standard was improved
- Added and modified definitions
- Part 4 was updated to correlate with NFPA 70 NEC 2002
- 70E® was reformatted to comply with NFPA 70 Style Manual

The 2009 edition again yielded significant changes throughout
- Chapter 4 was deleted because it duplicated parts of NEC
- 70E now consisted of:
  - Chapter 1 Safety-Related Work Practices
  - Chapter 2 Safety-Related Maintenance Requirements
  - Chapter 3 Safety Requirements for Special Equipment
  - Annexes A – O
- Other significant changes included:
  - Protective clothing and equipment changes
  - Revisions to Annexes D, F and J
  - Addition of Annexes M, N and O
NFPA 70E® 2012

- Currently consists of 3 chapters:
  - Chapter 1 Safety-Related Work Practices
  - Chapter 2 Safety-Related Maintenance Requirements
  - Chapter 3 Safety Requirements for Special Equipment
  - Annexes A - P
- Significant changes have been made in Chapter 1. Other revisions expand or clarify NFPA 70E 2009, add new technical material, remove requirements related to safe installation, expand coverage of the concepts of hazard identification and risk assessment.

NFPA Annexes

- Annex A Referenced Publications
- Annex B Informational References
- Annex C Limits of Approach
- Annex D Incident Energy and Arc Flash Boundary Calculation Methods
- Annex E Electrical Safety Program
- Annex F Hazard Analysis, Risk Estimation and Risk Evaluation Procedure
- Annex G Sample Lockout/Tagout Procedure
- Annex H Guidance on Selection of Protective Clothing and Other Personal Protective Equipment

NFPA Annexes (2)

- Annex I Job Briefing and Planning Checklist
- Annex J Energized Electrical Work Permit
- Annex K General Categories of Electrical Hazards
- Annex L Typical Application of Safeguards in the Cell Line Work Zone
- Annex M Layering of Protective Clothing and Total System Arc Rating
- Annex O Safety Related Design Requirements
- Annex P Aligning Implementation of This Standard with Occupational Health & Safety Management Standards
Article 90 Introduction and Coverage

- NFPA 70E covers electrical safety requirements for employee workplaces in the following:
  - Public and private premises
  - Yards, lots, parking lots, carnivals and industrial substations
  - Installations of conductors and equipment that connect to electrical supply
  - Utility installations that are not part of power generation, transmission and distribution... offices, warehouses, service centers, etc.

- Not covered: Some clarification has been added
  - Installations under the exclusive control of communications utilities or electric utilities; installations in ships, watercraft, railway rolling stock, aircraft, automotive vehicles, underground mines and surface mining machinery, and for operation of railway rolling stock... offices, warehouses, service centers, etc.

NFPA 70E® 2012 Chapter 1 – Safety Related Work Practices

Key Elements of Chapter 1
- Article 100 Definitions
- Article 105 Applications of Safety Related Work Practices
- Article 110 General Requirements
- Article 120 Establishing an Electrically Safe Work Condition
- Article 130 Work Involving Electrical Hazards

Article 100 Definitions - Changes
- Arc Rating/Arc Rated – expanded and differentiates from Flame-resistant
- Automatic – added (functions w/o humans)
- Arc Flash Boundary – added based on 2^s burn
- Building – added
- Bare Conductor – added
- Covered Conductor – added (no code recognition)
- Insulated Conductor – added (code recognized)
Article 100 Definitions (2)

- Dwelling Unit — Added
- Incident Energy Analysis — added
- Service Drop — revised
- Service Lateral — revised
- Working on (energized parts) — revised to specify intentional contact regardless of PPE

Article 105 Application of Safety Related Work Practices

- Entire Article added
  - Defines the scope of Chapter 1
  - Defines the purpose of electrical safety related work practices
  - Stipulates the employer is responsible to provide work practices and training, employees are responsible to implement
  - Describes the organization of Chapter 1

Article 110 General Requirements

- Multi-employer Relationships (outside contractor coordination). Added requirement for documented coordination meeting
- Training
  - Emergency Procedures — Clarification added
  - Qualified Persons — Clarification added
  - Unqualified Persons — Clarification added
  - Retraining — Added “performed at intervals not to exceed 3 years”
- Formal Electrical Safety Program
  - Numerous clarifications and renumbering throughout
  - Hazard/Risk Evaluation Procedure — Revised to require employees to implement
  - Electrical Safety Auditing — Significant revision and additions
    - Added frequency requirement not to exceed every 3 years
    - Implementation of program put into new Field Work paragraph
    - Added requirement for audit documentation
Article 110 General Requirements (2)

- Reorganized/Revised Use of Equipment
  - Added limits on performing testing/trouble shooting (Qualified only)
  - Added paragraph on GFCI General and Outdoors
- Added 110.5 Underground Electrical Lines and Equipment
  - Identifying and locating

Summary of Article 110.3 Electrical Safety Program

- Documented (written) program based on electrical hazards
- The electrical safety principles on which the program is based
- Controls to measure and monitor the program
- Electrical safety procedures for working within the limited approach boundary (shock protection) and for working within the arc flash boundary
  - Includes hazard identification and a risk assessment procedure to be used prior to working within limited approach boundary or within the arc flash boundary
  - Identify process to be used by employees before work is started to identify hazards and assess risks including mitigation strategies
- A job briefing prior to starting each shift or each job that poses significantly different hazards or if changes occur that might affect employee safety
- A more detailed briefing for complicated or particularly hazardous jobs

Article 120 Establishing an Electrically Safe Work Condition

- Changes are Largely Clarifications
- PROCESS of Achieving Electrically Safe Work Conditions
  - Lockout Tagout
    - Simple lockout procedure
    - Complex lockout procedure
  - Temporary Protective Grounding (Transmission/Distribution)
    - Placement
    - Capacity
    - Impedance
- There is Nothing Else considered to be electrically safe
Article 130 Work Involving Electrical Hazards

130.1 General was added. States that all requirements of 130 shall apply whether an incident energy analysis is completed or if the “Tables” are used in lieu of a study in accordance with the 130.5 Exception.

Electrically Safe Working Conditions was added. Required before employee performs work within the limited approach boundary or an increased arc flash hazard exists where conductors are not exposed.

130.4 Shock Hazards Analysis
- Determine voltage, boundary requirements, and personal protective equipment needed.
- Table 130.4(C)(a) – New number
- Approach boundaries for shock protection – AC
- Table 130.4(C)(b) New Table
- Approach Boundaries for shock protection - DC

130.5 Arc Flash Hazard Analysis
- Determine arc flash boundary, incident energy at the working distance, and the personal protective equipment required within the arc flash boundary.
- Update the arc flash analysis if a major modification or renovation occurs.
- Reviewed periodically, not to exceed 5 years.
- Use of Tables 130.7(C)(15) and 130.7(C)(16) in lieu of a study (i.e. determining incident energy at working distance)… BUT have to take into account the Table limitations in the notes.
Article 130 Work Involving Electrical Hazards (4)

- Equipment Labeling...
  - Such as switchboards, panelboards, industrial control panels, meter socket enclosures, motor control centers... that are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked with a label.
- Required Information
  - Nominal voltage
  - Arc Flash Boundary (Except labels prior to 9/30/2011... available incident energy or PPE level)
  - At least one of the following... incident energy and working distance
  - Minimum arc rating of clothing
  - Required level of PPE
  - Highest hazard/risk category (HRC) for the equipment
- Must document method of determining label information

Energized Work and Electrical Work Permits

- Justification for Energized v. De-energized Work
  - Additional hazards or increased risk
  - Infeasible due to equipment design or operational limits
  - Less than 50 volts – still need hazard assessment...
- Energized electrical work permit
  - Permit exemptions (Within Limited Approach Boundary) for qualified persons
    - Troubleshooting, testing, etc.
    - Visual Inspection

Personal Protective Equipment (PPE)

- Standards on Protective Equipment (ANSI/ASTM/ASSE/ISEA) Table 130.7(C)(14)
- PPE within the Arc Flash Boundary
  - Table 130.7(C)(16) Protective Clothing and Personal Protective Equipment (PPE)
- Some changes...
  - No longer use the term FR. Requirements are for Arc Rated
  - Hearing protection for all categories
  - Arc rated head protection (hood or face shield and balaclava for Category 2)
Remaining Article 130 Changes

- Largely clarifying or informational changes
- Strongly recommend that you get a copy and read the standard

Making 70E Work

- First Things First
  - Conduct basic electrical safety training
    - Qualified persons
    - Unqualified persons
    - Include current practices
  - Assessment of programs, practices and procedures v. 70E
    - Control of Hazardous Energy – Lockout Tagout
    - Safe work practices
    - Identify live work tasks
    - Identify live work frequency
    - Identify who performs live work
    - Evaluate written procedures and implementation
    - Shock Hazard and Arc Flash Hazard Analyses

- Make Improvements
  - Based on the assessment
  - Revise procedures and programs
    - Focus on lockout/tagout
  - Revise Training
  - Conduct Retraining

- Develop Additional Procedures as Needed
- Written Electrical Safety Program
Making 70E Work

- Live Work Permit
  - Similar in concept to confined space
  - Identify work to be performed and justification
  - Identify potential hazards
  - Control the hazards
  - Authorize the live work
- Audit the program periodically (3 years)
- Adjust as needed

SUMMARY

- NFPA 70E 2012 is an integrated program approach
- Focus is on identifying hazards, assessing risk, isolation and control of energy
- Minimize energized work
- Assess shock and arc hazard potential
- Utilize appropriate practices and PPE
- Training is targeted and specific for the facility and tasks performed

For More Information

- NFPA 1-800-344-3555 or www.nfpa.org
- Other standards organizations… ANSI, ASTM, etc
- www.pss-llc.com for a copy of this presentation as a PDF handout