OSC | 11
Ohio Safety Congress & Expo

#345 Electrical safe work practices: Critical information for all industries

Robert Nicholson

Wednesday, March 30, 2011
2:30 to 3:30 p.m.

Ohio Bureau of Workers' Compensation

OHIO SAFETY CONGRESS 2011

Electrical Safe Work Practices

Program presented by:

JDRM Engineering, Inc.

Mechanical ♦ Electrical ♦ Telecommunications

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Seminar Agenda

- *Electrical Safety Start-up Questions (handout)*
- *Electrical Hazards*
- *OSHA Electrical Safety Requirements*
- *NFPA 70E Introduction*
- *Electrical Hazard Assessment*
- *Electrical Safety Compliance Flow Chart (handout)*

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Electrical Safe Work Practices Start-up Questions (Handout)

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Electrical Safe Work Practices Basics

- **"Assess"** all Hazards
- **"Mitigate"** all Hazards
- **"Identify"** Employee's Qualified and Unqualified
- **"Provide"** Training, PPE, Safety Policies, Auditing
- **"Document"** Safety Programs
  - Conduct a Safety Meeting
  - Distribute and Enforce Safety Rules
  - Investigate and Document all Accidents

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Electrical Hazards Definitions

- **Electric Shock** - trauma caused by the passage of electric current through the body.
- **Arc-Flash** – an unexpected sudden release of intense heat and light energy produced by electricity traveling through air, usually caused by accidental contact between live conductors.
- **Arc-Blast** - a pressure wave created by heating, melting, vaporization, and expansion of conducting material and surrounding air during an Arc-Flash.

Photos courtesy of Littelfuse

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Westex Arc Flash Videos

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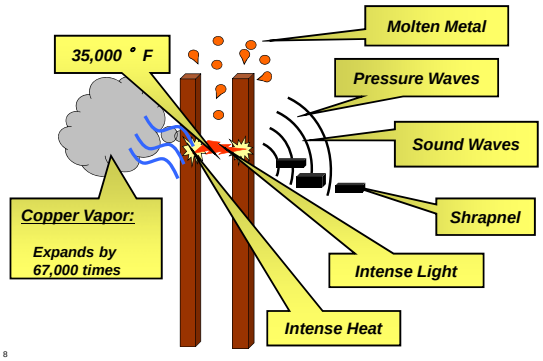
Electrical Arc



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Simulation-Fault Current and Protective Device Clearing Time

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Common Mistakes

Question:

Per an OSHA study of workplace fatalities, what percentage of workers killed were actually experienced in their jobs?

Answer:

80 %

Statistic from ISHN article:

" Safety Programs Alone Are Not Enough" 7/2000

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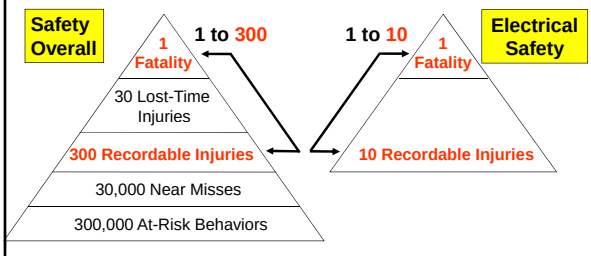
Why Electrical Safety?



Slide courtesy of Cooper Bussmann

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Electrical Shock Effects

- Currents greater than 75 mA* can cause ventricular fibrillation
  (rapid, ineffective heartbeat)
- Will cause death in a few minutes unless a defibrillator is used
- 75 mA is not much current – a small power drill typically uses 2.25A or 30 times as much

Defibrillator in use Photo courtesy of OSHA

***NOTE: mA = milliampere = 1/1000 of an ampere**

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Electrical Current Effects

Condition	Effects
1-3 mA of current	Mild sensation
3-10 mA of current	Muscles contract, releasing grip may be difficult
10-40 mA of current	"Let-go" threshold, possible loss of consciousness
30-75 mA of current	Respiratory paralysis
100-200 mA of current	Ventricular fibrillation
62 mA of current	Directly across chest - potentially fatal
> 1500 mA of current	Tissue and organs burn

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NFPA 70E

Incident Energy

- Definition – "The amount of energy impressed on a surface, a certain distance from the source, generated during an electrical arc event. One of the units used to measure incident energy is calories per centimeter squared (cal/cm^2)."

(NFPA 70E p.12)

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Personal Protective Equipment

NFPA 70E - Table 130.7(C)(11) Protective Clothing Characteristics

Hazard Risk Category	Clothing Description	Rating Cal/cm^2
0	Non-melting flammable materials (i.e., untreated cotton, wool, rayon, or silk, or blends of these materials) with a fabric weight of at least of 4.5 oz/yd (1)	
1	FR shirt & FR pants or coverall (1)	4
2	Cotton underwear plus FR shirt & FR pants (1 or 2)	8
3	Cotton underwear plus FR shirt & FR pants plus FR coverall or cotton underwear plus two FR coveralls (2 or 3)	25
4	Cotton underwear plus FR shirt & FR pants plus double layer switching coat & pants (3 or more)	40

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PPE Class 0

1.2 Calorie Long Sleeve Shirt and Long pants. Safety Glasses, Hearing Protection, VR gloves as needed,

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Hazard Risk Category 1

From IEEE IAS Electrical Safety Workshop 2005

4+ Calorie Long Sleeve Shirt and Long pants, FACESHIELD, Hardhat, Safety Glasses, Hearing Protection, VR gloves as needed, Leather Gloves and Boots (AN) add (Face Shield) 2009

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Hazard Risk Category 2

From IEEE IAS Electrical Safety Workshop 2005

Double layered switching hood or Balaclava for 2*

FR Shirt and Pants or Coverall (8+), Face shield, Safety Glasses, Hardhat, Insulated and Leather Gloves, Leather Shoes, Ear Plugs

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Hazard Risk Category 3

From IEEE IAS Electrical Safety Workshop 2005

25+ Calorie Flashsuit (over long sleeve shirt and long pants),
Voltage Rated Gloves/Leather Protectors,
Leather Boots, Hearing Protection

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Hazard Risk Category 4

Class 4 Hood New

Class 4 Hood 2 Weeks Later

40 cal. FR Suit (with hood over FR coveralls or FR shirt and pants),
Leather Gloves, Insulated Gloves, Leather Boots, Ear Plugs

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Who Pays for PPE?

OSHA **29 CFR 1910.132(h)(1)**

Subpart I – Personal Protective Equipment, payment for requirement

. . . the protective equipment, including personal protective equipment (PPE), used to comply with this part, shall be provided by the employer at no cost to employees.

This paragraph (h) shall become effective **February 13, 2008**. Employers must implement the PPE payment requirements no later than **May 15, 2008**.

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OSHA's "Hierarchy of Controls"

OSHA

1. **Engineering Controls –** Seek to eliminate the hazards at the source.
2. **Safety/Process Controls –** Can not eliminate hazard…reduce the hazard and/or worker exposure to hazardous conditions**.**
3. **PPE Controls –** Devices and clothing worn by workers to safeguard themselves against the hazards.

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Occupational Safety & Health Act of 1970

OSHA "General Duty Clause"

5. Duties
   a. Each Employer
      1) Shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.

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Employee PPE Requirements

OSHA **29 CFR 1910.335(a)(1)(i)**

Employees working in areas where there are potential electrical hazards shall be provided with, and shall use, electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed.

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Employer Training Objectives

OSHA 29 CFR 1910.332

- Specific Electrical Electrical Work Task and PPE Training is a requirement of each employer, to be supplied to their employees. Also the employer should determine the degree of risk to the employee. Failure to perform training activities constitute a violation of the intent of the OSHA's training requirements.
- **This classroom**, computer based training by itself is not sufficient to meet the intent of the OSHA's training requirements

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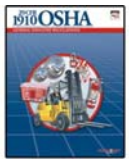
Training

OSHA 29 CFR 1910.332



Training By EMPLOYER

(1) **The employer shall provide training** to each employee who is required by this section to use PPE. **Each such employee shall be trained to know** the following:

- **(i) Skills and techniques; determine live parts**
- **(ii) Skills and techniques; determine voltage**
- **(iii) Skills to; determine clearance distances**

Requires all workers that work on or near energized equipment to be trained in safe work practices, including:

- Deenergizing electric equipment before inspecting or making repairs
- Using electric tools that are in good repair
- Using good judgment when working near energized lines
- Using appropriate protective equipment

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Training

OSHA 29 CFR 1910.332

Training By EMPLOYER

(1) **The employer shall provide training** to each unqualified employee who is required by this section. **Each such employee shall be trained to know** the following:

- **(b)(2) Unqualified employees shall be trained in and familiar with any electrically related safety practices not specifically addressed by 1910.331 through 1910.335 but are necessary for there safety**

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Are you OSHA Qualified?

OSHA 1910.399 Definition

Qualified Person:

"One who has received training in and has demonstrated skills and knowledge in the construction and operation of electric equipment and installations and the hazards involved."

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Work it Hot or Not?

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Energized Parts

OSHA 29 CFR 1910.333

(2) Energized parts

If exposed live parts are not deenergized (i.e., for reasons of increased or additional hazards or infeasibility), other safety-related work practices shall be used to protect employees who may be exposed to the electrical hazards involved.

Such work practices shall protect employees against contact with energized circuit parts directly with any part of their body or indirectly through some other conductive object….

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Lockout/Tagout Training (LOTO)

OSHA 1910.147(c)(7)(i)
The employer shall provide training to ensure that the purpose and function of the energy control program are understood by employees and that the knowledge and skills required for the safe application, usage, and removal of the energy controls are acquired by employees

NFPA 70E 120.2 (B) (2)
Each employer shall provide training as required to ensure employees' understanding of the lockout/tagout procedure content and their duty in executing such procedures

Training

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Employee Audits (LOTO)

OSHA 1910.147(c)(6)(i)
The employer shall conduct a periodic inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are being followed

NFPA 70E 120.2 (C) (3)
An audit shall be conducted at least annually by a qualified person and shall cover at least one lockout/tagout in progress and the procedure details. The audit shall be designed to correct deficiencies in the procedure or in employee understanding.

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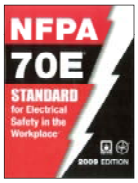
NFPA 70E Introduction

NFPA 70E, *Standard for Electrical Safety in the Workplace*:

- The de facto "How to" standard to meet OSHA regulations
- The industry preferred consensus standard to assess electrical hazard risks and implement safe work practices
- Establishes Shock and Arc-Flash Protection Boundaries
- Determines Hazard Risk Categories and required Personal Protective Equipment
- Complies with OSHA and all state occupational safety standards
- Host Employer Responsibilities



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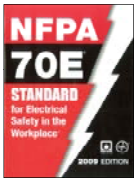
Flash Hazard Analysis Methods

NFPA 70E describes two methods to determine Hazard Risk Categories, Flash Protection Boundaries and required PPE:

1. NFPA 70E and IEEE calculations

   or

2. NFPA 70E Table 130.7(C)(9)



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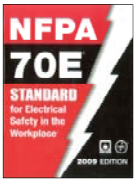
Shock Hazard Analysis

NFPA 70E Article 130.2(A)

A Shock Hazard Analysis Determines:

- Voltage of Live Parts
- Shock Protection Boundaries
- PPE Requirements for Shock Protection



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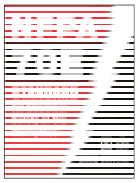
Flash Hazard Analysis

NFPA 70E Article 130.3

A Flash Hazard Analysis determines:

- Incident Energy
- Hazard Risk Category
- Flash Protection Boundary
- PPE Requirements for Arc-flash Protection



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Article 130.3(B)

Where it has been determined that work will be performed within the Flash Protection Boundary, the flash hazard analysis shall determine, and the employer shall document, the incident energy exposure of the worker (in calories per square centimeter)…"

Article 130.3(B)(2) states that Table 130.7(C)(9) may be used to determine the Hazard Risk Category and required PPE. All table notes shall considered and applied before the tables may be used.

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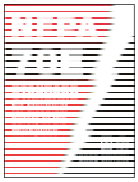
Host Employer Responsibilities

Outside Contractors, (Contract Employees), **NFPA 70E Article 110.5** requires communication between Host Employer and Contract Employers.

- 110.5(A) Host Employer Responsibilities
- 110.5(B) Contract Employer Responsibilities



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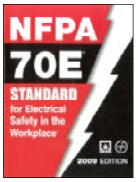
Equipment Labeling NFPA-70E

New Article 130.3(C)

"Equipment shall be field marked with a label containing the available incident energy or required level of PPE"

Example of minimum label requirements



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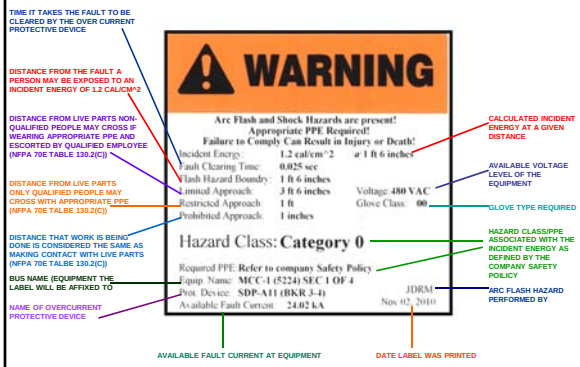
Equipment Labeling, Engineering



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NFPA 70E Article 130.1

Article 130.1 Justification for Work.

(A) General. Energized electrical conductors and circuit parts to which an employee might be exposed shall be put into an electrically safe work condition before an employee works within the Limited Approach Boundary of those conductors or parts.

Exceptions:

(1) Greater Hazard. Energized work shall be permitted where the employer can demonstrate that deenergizing introduces additional or increased hazards.

(2) Infeasibility. Energized work shall be permitted where the employer can demonstrate that the task to be performed is infeasible in a deenergized state due to equipment design or operational limitations.

(3) Less than 50 Volts. Energized electrical conductors and circuit parts that operate at less than 50 volts to ground shall not be required to be deenergized …

Exceptions:

Greater Hazard Examples
Life Support Equipment
Emergency Alarm Equipment
Hazardous Ventilation Equipment

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Electrical Work Permits

NFPA 70E Article 130.1(B)(1) states:

"When working on energized electrical conductors or circuit parts that are not placed in an electrically safe work condition (i.e., for the reasons of increased or additional hazards or infeasibility per 130.1), work to be performed shall be considered energized electrical work and shall be performed by written permit only."

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Electrical Work Permit Exceptions

- Electrical Work Permits are not required per NFPA 70E Article 130.1(B)(3) for:
  - Troubleshooting
  - Testing
  - Visual Inspections
- However, workers must be Qualified and proper Shock and Arc-Flash Personal Protective Equipment and tools must be used.

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Electrical Work Permit Elements

NFPA 70E 130.1(B)(2) requires a minimum of 11 elements:

1. The location and description of equipment
2. Justification why circuit cannot be de-energized
3. Description of safe work practices employed
4. Results of the shock hazard analysis
5. Determination of the shock protection boundaries
6. Results of the flash hazard analysis
7. The Flash Protection Boundary
8. Description of PPE to be used
9. Description of barriers used to restrict access
10. Evidence of job briefing
11. Signature of responsible management

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Signs and Barricades NFPA 130.7 (E) (2)

- The limited approach boundary shall be posted to keep unqualified personnel out of the area
- Post FHB if greater than the LAB
- Signs IAW ANSI Z535
- If posting is inadequate, attendants may be used

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OSHA 29 CFR 1910.334

Test Instruments and Equipment

(1) **Proper test equipment** shall be used.

Each such employee shall be trained to know the following:

1. **Only Qualified persons permitted to use.**
2. **Visual Inspection of test equipment.**
3. **Rating of test equipment**

Multimeter Safety

- IEC 61010 defines four locations or categories:

CAT IV	"Origin of installation" Utility level and any outside cable run
CAT III	Distribution wiring, including "mains" bus, feeders and branch circuits; permanently installed loads
CAT II	Receptacle outlet circuit, plug-in loads
CAT I	Protected electronic circuits

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Insulating Gloves OSHA 1910.333(a)(1)

- Rubber Insulating Gloves are among the most important articles of personal protec equipment for electrical workers.

Photos courtesy of Salisbury

- They are the first line of defense for contact with any energized components or lines.
  - Rubber gloves (in service) tested every (6) months
  - Rubber gloves (not in service) tested every (12) months

Use Correct Insulated Tools

- Insulated tools that meet ASTM F1505 & IEC 900 Standards – rated 1,000V
- Must be used anytime work is performed on or near energized equipment

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Electrical Safe Work Practice Checklist

1. Have you deenergized the equipment, LOTO and used proper PPE to verify that it is deenergized?
2. Are you "qualified" and properly trained for the task?
3. Are you familiar with the equipment and understand the hazards involved?
4. Have you justified why the equipment cannot be deenergized while working on it?
5. Have you identified the safe work practices you will use to work on energized equipment?
6. Do you know the Voltage, Shock, and Flash Protection boundaries?
7. Do you know the possible Arc-Flash incident energy and Hazard Risk Category?

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Electrical Safe Work Practice Checklist (continued)

8. Did you inspect your PPE before using it?
9. Have you put barriers up to prevent unqualified workers from entering the area?
10. Is there adequate lighting to do the task?
11. Have you had a job briefing and does someone know you are working on energized equipment?
12. Do you have a signed Energized Work Permit by your manager?
13. Has your written Electrical Safety Policy been updated to conform with OSHA and NFPA 70E?

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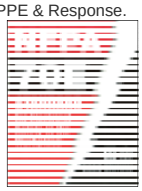
Electrical Safety-Related Program Related Requirements (110.7 Electrical Safety Program)

- (A) General: Employer Develop Implement an Over All Safety Program.
- (B) Program: Supply Awareness Self-Discipline.
- (C) Safety Program Principles: Identify Items on Which the Program is Based
- (D) Safety Program Controls: Identify Measurement & Monitor Systems.
- (E) Safety Program Procedures: Steps to Safety Execute Job or Task.
- (F) Hazard/Risk Evaluation: Identify How Risk Shall be Evaluated.
- (G) Job Briefing Discussion: Work Task, Precautions, PPE & Response.



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ANSI/AIHA Z10-2005

American National Standard for Occupational Health and Safety Management Systems, provides a framework for establishing a comprehensive electrical safety program as a component of an employer's occupational safety and health program.

- **Management Commitment…….**
- **Project Engineering Practices……..**
- **Maintenance Programs……..**
- **Warning Labels……..**
- **Administrative/Management Controls…….**

Additional Electrical Safety Publications

OSHA e-Tools
BWC Course- Fundamentals of a Effective Safety Program
NIOSH- Arc Flash Awareness, Video and Leadership Guide

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Hazard Control Measures (ANSI Z10)

- Elimination
  - Eliminate the hazard during design (Addressed by Engineering)
- Substitution (Addressed by Engineering)
  - Substitution of less hazardous equipment, system or energy
- Engineering Controls (Addressed by Engineering)
  - Design options that automatically reduces risk
- Warnings (Addressed by NFPA-70E)
  - Automatic or manual, permanent or temporary, visible or audible warning systems, signs, barriers and labels
- Administrative Controls (Addressed by NFPA-70E)
  - Planning processes, training permits, safe work practices, maintenance systems, communications, and work management
- PPE (Addressed by NFPA-70E)(Tables)
  - Available, effective, easy to use

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Hazard Management System (CSA Z462)

- Safety Professionals
  - Skill set in safety management systems, risk management
- Electrical Engineers, electricians, Technicians
  - Skill set in design, construction, maintenance, operation of electrical equipment and systems
- Management
  - Responsible for managing priorities, resources, and business objectives

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EMPLOYEE INVOLVEMET

- All employees involved with live electrical work should take to heart the importance of company safety policies by putting into practice and offering suggestions to company safety rules and guidelines.

ULTIMATELY

We all are responsible for *our* actions

The industrial costs are significant to companies, but no higher price can be paid than from YOU!

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Electrical Safe Work Practices Compliance Flow Chart (Handout)

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OSHA and NFPA 70E

Electrical Safe Work Practices

Information

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EMPLOYEE PPE HAZARD ASSESSMENT
OSHA 1910.335
NFPA-70E 130.3(B)

FACILITY ELECTRICAL SAFETY RELATED WORK PRACTICES PROGRAM
OSHA CFR 29 SUBPART S 1910.331-335
OHIO/PERRP 4167-3-01 (A)

HOST EMPLOYER RESPONSIBILITIES

INTERNAL EMPLOYEES

ARE ANY EMPLOYEES EXPOSED TO ENERGIZED CONDUCTORS (NAMES)

IDENTIFY EMPLOYEES TO BE QUALIFIED (ELECTRICAL)
NFPA-70E 110.6(d)(1)
OSHA PART 1910.332
OSHA PART 1910.333(c)(2)

IDENTIFY EMPLOYEES TO BE UNQUALIFIED
NFPA-70E 110.6(d)(2)
OSHA PART 1910.332

IDENTIFY OUTSIDE CONTRACTORS "NEED TO BE APPROVED"(ELECTRICAL) (RECOMMENDED PRACTICE)
NFPA-70E 110.5

OPTION (A) *
ENGINEERING AUDIT
ARC FLASH SOFTWARE
NFPA-70E 110.8(B)(1)(b)
NFPA-70E 130.3(B)(1)

HOW HAVE YOU PERFORMED HAZARD ASSESSMENT FOR THE EMPLOYEES REQUIRED PPE
OSHA PART 1910.335

OPTION (B)
NFPA-70E STANDARD 2009
NFPA-70E 110.8(B)(1)(b)

EQUIPMENT LABELING/SAFETY SIGNS
OSHA PART 1910.335(b)(1)
OSHA PART 1910.303(e)(1)(ii)
OSHA PART 1910.303
OSHA PART 1910.145
NFPA-70E 130.3(C)

JOB TASK DESCRIPTION
EMPLOYEES TO BE QUALIFIED (ELECTRICAL)

ENGINEERING AUDIT * *
ARC FLASH SOFTWARE
DETAILED INCIDENT ENERGY ANALYSIS
IEEE 1584-2002

HAZARD/RISK CATEGORY CLASSIFICATION
130.7(c)(9) TABLES "(NOTES)" (QUALIFIER)
NFPA-70E 130.3(A)(1)

TRAIN EMPLOYEES (CLASSROOM TRAINING)
NFPA-70E 110.6(d)(1)
OSHA PART 1910.332 (b)(3)
OSHA PART 1910.333 (c)(2)
OSHA PART 1910.269(a)(2)(i)

TRAIN EMPLOYEES (HANDS ON (TASK) TRAINING)
OSHA PART 1910.332 (b)(3)
OSHA PART 1910.333 (c)(2)
OSHA PART 1910.269(a)(2)(i)

TRAIN EMPLOYEES UNQUALIFIED
NFPA-70E 110.6(d)(2)
OSHA PART 1910.332(b)(2)

DEVELOP 70-E COMPLIANCE NOTIFICATION LETTER
NFPA-70E 110.5(A)(1)
NFPA-70E 110.5(A)(2)

EQUIPMENT LABELING/SAFETY SIGNS
OSHA PART 1910.335(b)(1)
OSHA PART 1910.303(e)(1)(ii)
OSHA PART 1910.303
OSHA PART 1910.145
NFPA-70E 130.3(C)

ABOVE 100KA CYCLES

NFPA-70E ANNEX D
INCIDENT ENERGY AND FLASH BOUNDARY CALCULATION METHOD *

BELOW 100KA CYCLES
GENERAL NOTES P-34

NFPA-70E 130.7(C)(9)
HAZARD / RISK CATEGORY TABLES *

QUALIFY EMPLOYEE IN WRITING BY JOB TASK/KNOWLEDGE/TRAINING (RECOMMENDED PRACTICE)

DEVELOP LIST OF COMPLIANT, CONTRACTORS FROM APPROVED NOTIFICATION LETTER

CHOSEN ASSESSMENT POLICY

DEVELOP A SAFETY RELATED WORK PRACTICES PROGRAM
OSHA PART 1910.333
NFPA-70E 110.7(A)

DEVELOP LOTO NOTIFICATION JOINT RESPONSIBILITY
OSHA PART 1910.147(f)(2)(i)

MAINTAIN HAZARD ASSESSMENT POLICY
NFPA-70E 130.3

SAFETY RELATED MAINTAIN REQUIREMENTS (ELECTRICAL EQUIPMENT)
NFPA-70E 205.3
NFPA-70E 210.5

DEVELOP/MAINTAIN LOCKOUT AND TAGGING POLICY
OSHA PART 1910.147
SECTIONS (C) THROUGH (F)
OSHA PART 1910.333(b)
NFPA-70E 120.2

DEVELOP & DOCUMENT
AUDIT PROGRAM
NFPA-70E 120.2(C)(3)
NFPA-70E 107.7(H)
BARRICADE/ALERTING PROGRAM
NFPA-70E 130.7(16)(E)(2)(3)
OSHA PART 1910.335(b)(2)
ENERGIZED ELECTRICAL WORK PERMIT
NFPA-70E 130.1(B),110.8(B)(2)

DEVELOP 70-E PRE-JOB CONTRACTOR NOTIFICATION LETTER
NFPA-70E 110.5
NFPA-70E 110.7(G)

QUALIFIED EMPLOYEES *
SUPPLY CORRECT PPE
OSHA PART 1910.335(a)(1)
NFPA-70E 130.7

MAINTAIN PERSONAL PROTECTIVE EQUIPMENT (PPE)
OSHA PART 1910.335(a)
OSHA PART 1910.137
NFPA-70E 130.7(c)(16)

MONITOR EMPLOYEE
NFPA-70E 107.7(H)
CONTRACTOR COMPLIANCE
REVIEW COMPANY POLICIES

* SPECIAL ATTENTION MUST BE PAID RELATED TO THE CHOICE OF THE HAZARD ASSESSMENT AND HOW THE ELECTRICAL SAFE WORK PROGRAM IS EFFECTED INCLUDING THE PROPER SELECTION AND USE OF THE ASSESSMENT MATERIAL AND REQUIRED PPE

NOTE: THIS DOCUMENT FOR REFERENCE ONLY.
FOR MORE INFORMATION ON DEVELOPING A COMPREHENSIVE SAFETY-RELATED WORK PRACTICE PROGRAM CONTACT YOUR LOCAL U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) OFFICE, OR THE OHIO BUREAU OF WORKERS' COMPENSATION (3 SEPARATE PROGRAMS);, OSHA ON-SITE CONSULTATION; SAFETY CONSULTATION, OR PUBLIC EMPLOYMENT RISK REDUCTION PROGRAM (PERRP)

REFERENCES FROM NFPA 70E STANDARD FOR ELECTRICAL SAFETY IN THE WORKPLACE 2009 EDITION
U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION 29 CFR 1910.331 THROUGH 1910.335

(RECOMMENDED PRACTICE) THIS DESCRIBES A DOCUMENT OR PRACTICE WHICH IS NOT REQUIRED BUT IS HIGHLY RECOMMENDED

NFPA-70E/OSHA COMPLIANCE INFORMATION

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Electrical Safe Work Practices Program
Points of Discussion

Employee Training

- Will you initially divide employees into categories based on general tasks expected by their job classification? For example: Maintenance (Electrician), Engineer, Operator
- How many employees will you plan to Qualifying for energized electrical work? What is the highest voltage level your qualified electrical employees will perform energized work on? Have their electrical tasks been evaluated and have you provided general and specific task training? Have they been tested and is it documented?
- Have you identified Unqualified Employees and trained them on electrical safe work practices? Have they been tested and is it documented?
- Have you trained supervisors on electrical safety to help manage employee's electrical safety policies? Have they been tested and is it documented?
- Have you provided PPE (documented) training and CPR (documented) training and has it been documented?

Facility Compliance - What is your Electrical Safe Work Practice Program?

Electrical Safe Work Practice Program

- Do you have an Employee Electrical Safe Work Practice Participation program?
- Is there a written Electrical Safe Work Practices Program available to document all electrical policies?
- Do you have either an Arc Flash Hazard Prevention/Control Electrical or an Electrical Safety Planning/Evaluation program?
- Is there a single source of contact for Electrical Safe Work Practices Program development and review?
- What is your discipline plan that covers employee safety program misconduct?
- How solid is management committed to your electrical safety program? Is this commitment visible to those at risk of injury? Are sufficient resources provided to design and implement the program?
- Does your safety program implementation establish hazard knowledge and awareness at all levels in the organization?
- Are there plans to periodically review with management the status of your electrical safety program?

Standards and Regulations

- Do you have a copy of the most current NFPA-70E Standard and OSHA Subpart S 1910.331 - 335 regulations (and for Ohio, PERRP 4167-3-01A)? How have you implemented these standards and regulations to help develop specific electrical policies and procedures required in your facilities?

Facility Electrical Systems Analysis and Maintenance

- Has an Arc Flash Hazard Analysis been performed based on IEEE-1584 or NFPA-70E standards in your facilities? If yes, how are you maintaining the Arc Flash Hazard Analysis?
- What preventive maintenance do you perform on your electrical distribution system? What is it, how often is it preformed? Is this information documented?
- What procedures do you use to track changes in your electrical distribution system? Are these changes evaluated back into your Arc Flash Hazard Analysis? Who is responsible for this on going documentation?
- Are all protection devices switches identified for their load locations? Is there a current one-line diagram of the facility's electrical distribution system? How are changes to the one-line diagram handled? Who is responsible for this on going documentation?
- Do you use only one manufacturer of fuses in your facility?

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- Have employees been instructed on the importance to replace existing current limiting devices as they were documented in the Arc Flash Hazard Analysis? (Sometimes a fuse manufacturer will do this at no charge).
- Do you plan on performing any energized electrical work in your facility (other than diagnostic testing) which would require an Energized Electrical Work Permit? Have you developed an Energized Electrical Work Permit understand the requirements this permit?
- Do you utilize an outside contractor notification letter as a Host Employer?
- What is your alerting method to set the flash boundary as required in the Arc Flash Hazard Analysis, Ribbon, Cones, stand-by person? Do both Qualified and Nonqualified employee's understand their responsibilities?
- Do you have an updated "Lock out - Tag out" written program?
- Do you understand the difference between an electrical safe work condition "Lock out – Tag out" and equipment "Lock out – Tag out" written program? Do you understand that this requires some employees to be qualified electrically and not others?
- Do you audit your employees on your "Lock out - Tag out" written program?
  Field Auditing?
  Written Auditing?

PPE – Testing Meters – Tools - Gloves

- Do you have personal protective equipment (PPE) FR rated clothing for employees? If yes, what incident energy is the clothing rated to and how many sets do you have and how are they maintained? (Who launders them and how have they been instructed?)
- Are employee's supplied voltages testing meters by the company? Are they Category III rated?
- Are your employees supplied voltage rated insulated tools?
- What level of voltage rated gloves do you supply to your employees and is there a written policy pertaining to a voltage rated glove testing program which test and/or replaces the liners every 6 months?

Miscellaneous

- Do you know your DART#?
- Do you know your recordable case rate?
- Are you in the OSHA Site Specific Targeted Inspection (SST) program?
- Do you know your facility Federal Standard Industrial Code (SIC) and what this means to your company?
- Do you know if your facility (SIC) code is part of the National & Special Emphasis Program Index (NEP) and what this means to your company in relation to OSHA inspections?
- Do you know if your facility, or other corporate facility locations, is part of the National & Special Emphasis Program Index (NEP) - Severe Violator Enforcement Program (SVEP)? Do you know how this relates to your local facility to OSHA inspections?
- Is your facility a Primary Metal Industry (PMI) and what this means to your company in relation to OSHA inspections?

Compliance Assistance

- Are you aware that at no cost to the Owner (Private Sector) PERRP Consultants, BWC Safety Services Representative, and OHSA On-Site Representative are available to review electrical safe work practices in your facilities.

These are just some issues to discuss and evaluate which relate directly or indirectly to your electrical safe work practices program and training.
If you have any questions after reviewing these items or any other questions, please call 419-824-2400.
JDRM Engineering can assist in developing a comprehensive electrical safe practices program and training for your facility.
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