ELECTRICAL SAFETY WITH HANDS-ON PRACTICAL SKILLS & 2014 NATIONAL ELECTRICAL CODE

OSHA's mandated training requirements apply to employees who face a risk of electric shock that is not reduced to a safe level by the electrical installation requirements of OSHA 29 CFR 1910.303-308. A good step towards becoming a qualified worker.

The purpose of the 2014 NEC® is the practical safeguarding of persons and property from hazards arising from the use of electricity. The requirements in the 2014 NEC® address the fundamental principles of installation for safety.

CLASS FORMAT:

Hands-On

STANDARD CLASS SIZE:

NTT recommends a class of 12 participants to obtain the best results.

NTT PROVIDES:

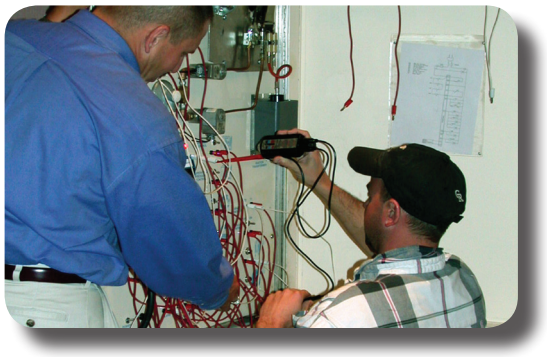
- 5-days (40 contact hours)
- Textbooks
- Classroom consumables
- Completion certificates
- Shipping and all instructor fees and travel expenses

CLIENT PROVIDES:

- Classroom, with easy access, of 750 square feet or greater
- Projection screen, white board and/or flip chart(s)
- A dock facility and/or a forklift to unload the training equipment
- Pallet jack may be needed to move the crate around after it has been unloaded
- The equipment should be placed in the training room for the NTT instructor to test and set up prior to course start

SHIPPING

1 crate at 54" x 38" x 74" (1,000 lbs.)



NTT Training

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COURSE AGENDA

OSHA 29 CFR 1910.331-335: ELECTRICAL SAFE WORK PRACTICES

- Qualified person requirements
- Training requirements
- Selection and use of work practices
- Work on de-energized parts
- Lockout/Tagout
- Working on or near exposed energized parts
- Test instruments and equipment
- Safeguards for personal protection
- Proper use of rubber goods
- Insulated tools
- Flame resistant (ATPV) clothing

STANDARDS REFERENCED & ORGANIZATIONS

- American National Standards Institute (ANSI)
- American Society of Testing and Materials (ASTM)
- Institute of Electrical and Electronic Engineers (IEEE)
- National Fire Protection Association (NFPA)

ELECTRICAL HAZARDS

- Electrical shocks, arcs and blasts
- Fault current and potential difference
- Electrical safety in industrial plants

SAFETY MAINTENANCE PRACTICES

- Switchgear
- Fuses and circuit breakers
- Premise wiring controllers

SAFE INSTALLATION PRACTICES NFPA 70

- Guarding live parts
- Effective grounding
- Working clearances

TRAINING REQUIREMENTS FOR EMPLOYEES WORKING ON HIGH VOLTAGE SYSTEMS AND EQUIPMENT

ELECTRICAL HAZARDS IN SWITCHGEAR ROOMS

MINIMUM APPROACH FOR OVER 600 VOLTS

- Shock and flash boundaries for over 600 volts
- Evaluations of posted arc flash labels
- Determine boundaries if no label is applied
- Safe electrical work practices for high voltage systems and equipment
- Safe switching procedures and documentation of electrical equipment
- Applying the two-person rule
- Proper PPE for switching and clearance duties
- Documenting the job plan
- Selecting & using test equipment to ensure absence of voltage
- How to inspect and test personal protective equipment
- Proper sizing, inspecting and installing of grounding clusters
- Care and proper body positioning when handling live line tools, including hot sticks

NEW OR REVISED ARTICLES FOR 2014

- Article 393—Low Voltage Suspend Ceiling Power Distribution Systems
- Article 646—Modular Data Centers
- Article 728—Fire Resistant Cable Systems
- Article 750—Energy Management Systems
- Symbol requirements for controlled receptacles
- DC voltage requirements expanding
- Increasing the voltage threshold from 600 volts to 1,000 volts
- Electrical Safety labeling requirements changing and new sections added

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- Increased requirements for GFCIs in laundry areas, facilities like car washes, and generator receptacles
- AFCI requirements expanding into laundry rooms and kitchens as the NEC move towards whole-house protection
- New section on Ground Fault Protection of equipment Exception for XHHW-2 conductors for specified temperature corrections for ampacity values
- Mounting of luminaires
- Increasing receptacle requirements in health care facilities
- Deleting the term “Emergency Systems” in health care facilities
- Moving several definitions from individual articles to Article 100

ALTERNATE ENERGY, GREEN TECHNOLOGIES, AND IT EQUIPMENT CHANGES

- Revised Article 625: Updates on safe battery charging for plug-in hybrid vehicles that reduce the risk of explosion
- Revisions to Article 645: IT Equipment
- New Article 694: First-time requirements for small wind electric systems
- Revised Article 705: Interconnecting generators, windmills, and solar and fuel cells with other power supplies
- New Article 840: The increased demand for broadband communication systems with requirements for wireless, routers, and wireless disconnects

OTHER REQUIREMENTS FOCUSED ON WORKPLACE SAFETY

- Provisions on electrical installations over 600 volts
- 240.87: Means to reduce incident energy
- New Article 399: Incorporates requirements for overhead distribution systems for large electrical system users, such as school or business campus settings
- 408.4B: Labeling at subpanels to identify feeder supply source
- 450.14: Disconnecting means for transformers

NEC COURSE AGENDA

APPLYING THE NEC ARTICLE 90

- NEC process and definitions
- Equipment examination
- Code change introduction
- Metric and standard units

ELECTRICAL INSTALLATIONS ARTICLE 110

- Approval
- Conductors
- Equipment
- Mechanical installations
- Mounting and cooling
- Electrical connections
- Arc flash protection
- Spaces about electrical equipment

BRANCH CIRCUITS AND FEEDERS ARTICLE 210

- Branch circuits
  - Review of Code changes
  - Branch circuit ratings
  - Multiwire branch circuits
  - Identification of ungrounded conductors
  - Color code for branch-circuit grounded conductors
  - Color code for branch-circuit equipment grounding conductors
- Receptacle and cord connectors
  - Replacing receptacles
  - Review of code changes
  - Dwelling units
  - Bathrooms
  - Garages and accessory buildings

ELECTRICAL SAFETY WITH HANDS-ON PRACTICAL SKILLS & 2014 NATIONAL ELECTRICAL CODE

NEC COURSE AGENDA, continued

- Buildings
  - Other than dwelling units
  - Required branch circuits
- Branch-circuit ratings 210.19
  - Review of code changes
  - Minimum size conductors
  - Overcurrent protection
- Feeders
  - Review of code changes
  - Minimum rating and size
  - Feeders with common neutral
  - Identifying high-leg in Delta 4-wire systems
  - Ground-fault protection of equipment

SERVICES ARTICLE 230

- Review of Code changes
- Definitions
- Service limitations
  - Number of services
  - Conductors—outside of buildings
  - Service raceways and seals
  - Clearance from openings
- Overhead service-drop conductors
- Underground service-lateral conductors
- Service-entrance conductors
- Service Equipment
  - AIC rating
  - Identification
  - Disconnecting mMeans
  - Ground-fault protection of equipment

CONDUCTORS AND OVERCURRENT PROTECTION ARTICLE 240

- Conductors
- Ampacity
  - Insulation ratings
  - Ambient temperature
- Overcurrent protection
  - Review of code changes
  - Protection of conductors
  - Ampere ratings
- Location of overcurrent protection devices
  - Underground conductor
  - Grounded conductor
  - Circuit location
- Overcurrent Devices
  - Plug and cartridge fuses
  - Circuit breakers
  - CB markings

GROUNDING & BONDING ARTICLE 250

- Review of Code changes
- Grounding terminology
- Grounding systems
- Grounding equipment and enclosures
- Grounding means
- Bonding
  - Services
  - Bonding over 250 volts
  - Main and equipment bonding jumpers
- Grounding Electrode System—Part III
- Equipment Grounding Conductors

WIRING METHODS ARTICLE 300

- Wiring Methods
  - Conductors of same circuit
  - Conductors of different systems
  - Protection from physical damage
  - Underground installations
  - Protection against corrosion
  - Mechanical continuity of raceways and cables
  - Length of conductors at outlet box
  - Boxes, conduit bodies, or fittings required
- Supporting conductors in a vertical raceway
- Preventing heating effects of inductive current in metallic parts
- Securing integrity of fire-resistant-rated walls
- Preventing spread of toxic fumes in an air-handling system

ELECTRICAL SAFETY WITH HANDS-ON PRACTICAL SKILLS & 2014 NATIONAL ELECTRICAL CODE

NEC COURSE AGENDA, continued

WIRING MATERIALS—RACEWAYS AND BOXES ARTICLE 300

- Review of Code changes
- Raceway systems
  - Rigid metal and nonmetallic conduit
  - Electrical metallic tubing
  - Flexible metal conduit
  - Liquid-tight flexible metal and nonmetallic conduit
- Cable Assemblies
  - Metal-clad cable
  - Armored cable
  - Nonmetallic-sheathed cable
- Other wiring systems
  - Cable Tray Systems
  - Wireways
  - Busways
  - Auxiliary gutters
- Boxes, Conduit Bodies, and Fittings

WIRING MATERIALS

- Review of Code changes
- Switches Article 404
- Switchboards and panelboards

ARTICLE 408

- Panelboards
  - Number of overcurrent devices on one panelboard
  - Grounding of panelboards

EQUIPMENT FOR GENERAL USE—ARTICLE 400

- Review of Code changes
- Flexible Cords and Flexible Cables
- Luminaries Article 410
  - Luminaries locations
  - Flush and recessed fixtures
  - Electric-discharge equipment 1000 volts or less
  - Lighting track
- Receptacles, cord connectors and attachment plugs
  - Tamper resistant receptacles
  - Grounding and non-grounding receptacles
  - Isolated-ground receptacles
  - Hospital-grade receptacles
  - GFCI-type receptacles
- Appliances Article 422
  - Installation requirements
  - Disconnecting means
  - Safety provisions
  - Markings

MOTORS, GENERATORS, A/C & REFRIGERATION, AND FIRE PUMPS

- Motors Article 430
  - Review of Code changes
  - Ampacity and motor ratings
  - Markings on motors and multimotor equipment and controllers
  - Branch circuit—single motor
  - Motor control circuits and centers
  - Disconnecting means

MOTORS, GENERATORS, A/C & REFRIGERATION, AND FIRE PUMPS, CONTINUED

- A/C and Refrigeration Equipment Article 440
  - Single equipment
  - Disconnecting means
  - Branch-circuit fuses or circuit breakers
  - Room A/Cs—Part VII
- Fire Pumps Article 695
  - Power source to electric-motor driven fire pumps

TRANSFORMERS ARTICLE 450

- Transformer construction and types

ELECTRICAL SAFETY WITH HANDS-ON PRACTICAL SKILLS & 2014 NATIONAL ELECTRICAL CODE

NEC COURSE AGENDA, continued

- Transformer installation
- Transformer vaults

SPECIAL LOCATIONS ARTICLE 500 AND 600

- Electrified truck parking spaces

ARTICLE 626

- Review of Code changes
- Hazardous locations Article 500
  - Group classifications
  - Wiring methods
  - Conduit seals
  - Motors and generators
  - Grounding
- Intrinsically safe systems
- Service and Repair Garages Article 511
- Health care facilities
- Places of assembly