National Electrical Code (NEC) Update

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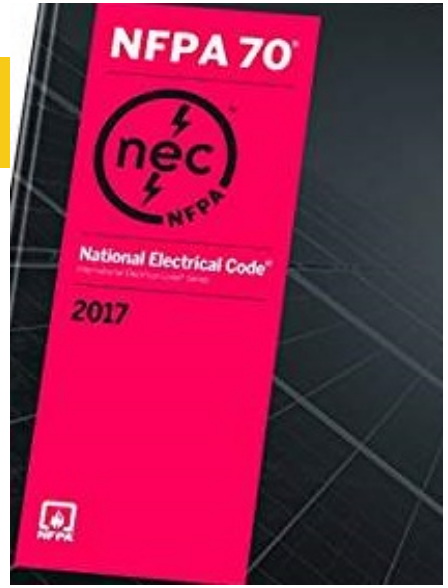
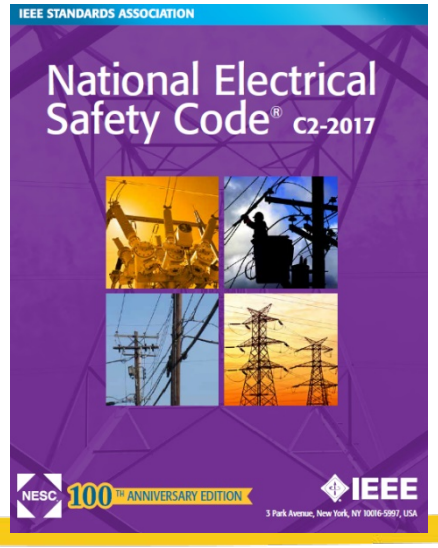
Codes in Context





National Fire Protection Association
The authority on fire, electrical, and building safety

IEEE
Advancing Technology for Humanity

California Public Utilities Commission

Overhead Electric Line Construction

Prescribed by the
PUBLIC UTILITIES COMMISSION

- **NFPA – NEC & NFPA 70E**
- **IEEE – NESC**
- GO-95….GO128….GO165
- OSHA 1910.268/269
- Internal M&Ps
- GRs and UL Listings
- Joint Use Agreements (JUA)
- UL
- GRs/SRs
- ATI

- **Industry Safety Codes and Standards**
- **Regulatory Rules…… Legal Mandates**
- **Internal Practices……Engineering Design**

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Purposes/Scopes

Inside and On Buildings → NEC

Purpose = The practical safeguarding of persons and property from hazards arising from the use of electricity

- NFPA = Fire Protection

Scope – covers installation of electrical and communications (electrical and fiber optic) conductors, equipment and raceways, for

- Public & private premises (homes, residences, buildings, similar properties) … inside
- Load side of the demarcation point
- Out of Scope (Exemption) = Exclusive control of Utility (Communications, Power….)

OSP → NESC

Purpose = The practical safeguarding of persons, utility facilities, and affected property during the installation, operation, and maintenance of electric supply and communication facilities.

- IEEE = Electrical Safety of Public and Workers

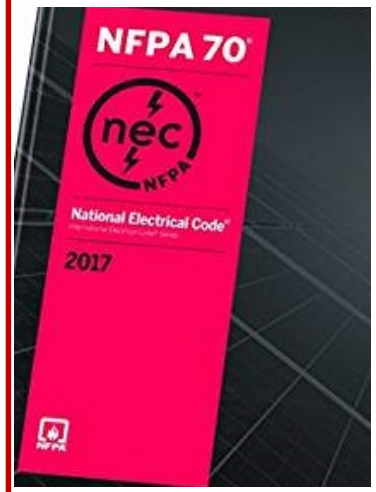
Scope - covers supply and communication facilities and associated work practices employed by a electric supply, communications, or railway in the exercise of its functions as a utility.

- Facilities = lines, equipment, and specified infrastructure (e.g., poles, distribution plant sub-stations, vaults…)
- The NESC covers similar systems under the exclusive control of the utility and being worked by qualified persons, such as those associated with an industrial complex or utility interactive system.

Not a Design Guide or Instruction Manual (*)

Not a Design Manual

NEC & NFPA 70E



NEC = NFPA 70 - 3-year revision schedule

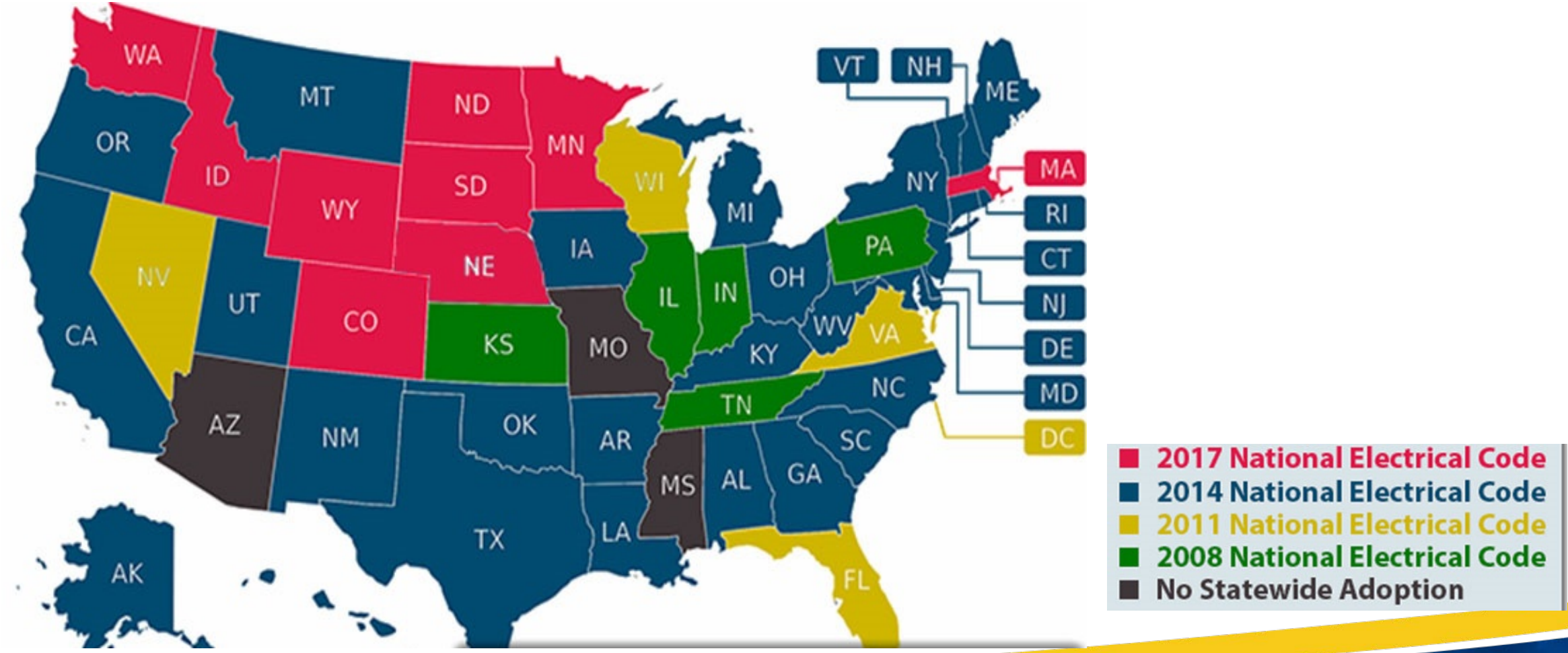
NEC is adopted by PUCs, legislative and regulatory bodies

NFPA 70E

2018 - Consensus standard for *Workplace safety for protection against Electrical Hazards*

- Electrical Shocks
- Arc Flash
- Harmonize with OSHA 1910 Part-S & OSHA 1926 Part-K

NEC Adoption – August 2017



NEC (NFPA 70) Representation

Correlating Committee (CC) and 3 NEC Technical Committees (CMPs)

- **CMP 1** – Purpose and Scope (Arts. 90, 100 and 110),
- **CMP 5** – Grounding (Arts. 200, 250, 280 and 285),
- **CMP 16** – Communications Systems (Arts. 770, 800, 810, 820, 830 and 840),
- **NEC CC** - Oversight responsibility for the entire Code-making process, i.e., ensuring due process and correlating the technical committee (CMP) actions

2020 National Electrical Code

- **Highlights**
  - Independence of Chapter 8, *Communications Systems*, remains intact
  - Exclusion from coverage of communications equipment under the exclusive control of communications utilities remains intact
  - Chapter 8 reorganized
    - Article 800 rewritten as a general article
      - Contains general requirements applicable to Articles 805, 820, 830 and 840
    - New Article 805 created for communications circuits
      - Contains requirements specific to communications circuits
  - Mechanical execution of work requirements is now in both Chapter 8 and Article 110

2020 National Electrical Code

- **Chapter 1, *General*, Revision Highlights**
- Article 90, *Introduction*
  - 90.2(A), expanded to include Installations used to export electric power from vehicles to premises wiring or for bidirectional current flow
  - 90.2(B)(1) revised to clarify that mobile homes and recreational vehicles are covered
- Article 100, Definitions
  - Added definitions
    - Dormitory Unit
    - Information Technology Room
    - Reconditioned

2020 National Electrical Code

- Revised definitions
  - “Attachment Plug (Plug Cap) (Plug)” revised to “Attachment Fitting” to better define the application of the device
  - “Fault Current” revised to “The current delivered at a point on the system during a short-circuit condition.”
  - “Fitting” revised to include a cable tray system
  - “Free Air (as applied to conductors)” is simplified to state: ” Open or ventilated environment that allows for heat dissipation and air flow around an installed conductor.”
- An informational note is added to the definition “Grounded Conductor” stating that “Although an equipment grounding conductor is grounded, it is not considered a grounded conductor.”

2020 National Electrical Code

- Article 110, *Requirements for Electrical Installations*
  - 110.5 revised to permit copper-clad conductors
  - 110.12(C) now contains mechanical execution of work requirements
    - The mechanical execution rules in Chapter 7 & 8 and Chapter 1 are in harmony
  - 110.21(A)(2) revised to require the removal of the original listing mark on reconditioned equipment
  - 110.31(A)(4) revised to require listed fire exit hardware on electrical vault doors
  - 110.33(A)(3) revised to require listed fire exit hardware on personnel doors

2020 National Electrical Code

- Chapter 8, *Communications Systems*, Reorganization
- Chapter 8 reorganized to simplify, eliminate redundancies
  - Objective: Condense repeated general requirements into single article
  - No technical change to requirements
- New Article 800, *General Requirements for Communications Systems*
  - Old Article 800 now new Article 805, *Communications Circuits*
    - Article 800 may be modified by Articles 805, 820, 830, 840

2020 National Electrical Code

- What was moved to new Article 800?
  - General information/requirements that apply across Articles 805, 820, 830, 840
    - Definitions
    - Requirement to help ensure continued independence of Chapter 8 (800.3)
      - “Only those sections of Chapters 1 through 7 referenced in Chapter 8 shall apply to Chapter 8.”
    - Mechanical Execution of Work" requirements remain in 830.24 and 840.24
    - General grounding and bonding requirements and methods
    - General requirements for overhead (aerial) wires and cables

2020 National Electrical Code

- What was moved to new Article 800?
  - General cable and primary protector and grounding block bonding and grounding requirements
  - General requirements for bonding and grounding at mobile homes
  - General requirements for installation methods within buildings
  - Applications of listed communications wires, cables, and raceways, and listed cable routing assemblies
  - Requirements specific to an article remain in that article

2020 National Electrical Code

Chapter 8, *Communications Systems*, Highlighted Revisions

- Article 800
  - 800.1, Scope, permits Articles 805, 820, 830 or 840 to modify general requirements of Article 800
  - Definition, *Communications Circuit*, the term “electrically” is deleted as it excludes optical fiber
  - Added requirement to 800.3, “Only those sections of Chapters 1 through 7 referenced in Chapter 8 shall apply to Chapter 8”, further reinforcing independence of Chapter 8
  - Added requirement 800.3(G) for reconditioned equipment
    - Must meet requirements of 110.21(A)(2)
  - Mechanical Execution of Work requirement now contained in both 800.24 and 110.12(C)"

2020 National Electrical Code

Chapter 8, *Communications Systems*, Highlighted Revisions

- Article 805
  - Optional cable marking permitted in 805.179(G)
- Article 820
  - 820.3 revised to reference general requirements of Article 800
  - 820.100(A) added to reference general cable grounding and bonding requirements of 800.100

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Chapter 8, *Communications Systems*, Highlighted Revisions

- Article 830
  - 830.3(A) added reference to general requirements of Article 800
  - 830.3(C) added requirement to meet physical protection requirements of 300.4
  - 830.179(A) added reference to general equipment and cable requirements of 800.179
  - Existing requirement that “Type BMU cables shall be jacketed and listed as suitable for outdoor underground use” now included in 830.179(B), (C).
- Optional cable marking permitted in 830.179(D)

2020 National Electrical Code

Chapter 8, *Communications Systems*, Highlighted Revisions

- Article 840
  - Definition “Communications Service Provider” deleted in 840.2, moved to 800.3
  - Definition “Premises Powered” added to 840.2
  - 840.3(A) added reference to general requirements of Article 800
  - 840.160 is revised to clarify that it is the current rating of the power source that determines whether 725.144 must be consulted

2020 National Electrical Code

- Chapter 2 - CMP5 has purview over Articles 200 and 250 that cover grounding/bonding practices related to the IBT, and generators that communications companies use for backup powering systems and on aerial bucket trucks. All the PIs, PCs, FRs and SRs were resolved in a manner acceptable to our prepared positions and in accord with current best practices used in the communications industry.
- IBT section 250.94 remains unchanged and remains harmonized and correlated with newly formatted/re-organized Chapter 8 and current best practices of communications industry related to grounding and bonding at the customer premises.

2020 National Electrical Code

- Article 250.34 and 250.26 on grounding of portable and vehicle mounted generators remain largely unchanged. The portable generators used by communications companies continue to be covered under Article 406 and these 250.34 .
  - Requirements to ground the frame of portable generators (Section 250.34(C) serving premises wiring systems were added in first draft meeting but reversed in second draft meeting to return to 2017 code language. Further actions will occur next cycle or possibly during NITMAN process.
  - The proposed changes in 250.34(C) would not have affected the vehicle-mounted generators used on aerial bucket trucks of carriers.

2020 National Electrical Code

The exception in 250.119 (*Identification of Equipment Grounding Conductors*) was modified to more clearly reflect the experience and use of green insulated conductors in communications cables and circuits.

2020 National Electrical Code

- Other issues not directly related to communications -
  - Efforts to clarify requirements concerning separately derived power systems with supply-side disconnects for installations such as solar panel installations and other distributed power systems were defeated for Sections 250.24. The work on rules around supply-side disconnects is expected to continue next cycle.
  - Suggestions to permit greater flexibility for different grounding configurations and table simplifications for the Equipment Grounding Conductors necessary for parallel circuits in raceways (section 250.122) was also defeated (i.e., left as is in 2017 code). Further discussions are expected to continue next cycle.

2020 National Electrical Code

Correlating revisions to Sections 250.64(A) and 250.120(B) were made to help refine and clarify the necessary limitations on aluminum conductors and splices located close to the ground where corrosion concerns increase because of combined presence of soil, contaminants and water can compromise the electrical or mechanical connection. Although communications companies do not typically use aluminum conductors, the use of aluminum and aluminum-clad copper conductors (or other conductor types) may become an option in the new services being deployed, new architectures being tested/deployed and pressures around the rising theft of copper ground wires.

NEC Processing Schedule

Process Step	Date
Public Input closing date	September 7, 2017
First Draft meeting	January 8-20, 2018
Posting of First Draft and panel ballot	March 9, 2018
Final date for receipt of First Draft ballots	March 23, 2018
Final date for receipt of ballot recirculation	March 30, 2018
Posting of First Draft for Correlating Committee	April 6, 2018
Correlating Committee meeting	May 8-11, 2018
Posting of First Draft and Correlating Committee ballot	June 15,2018
Final date for receipt of Correlating Committee First Draft ballot	June 22, 2018
Final date for receipt of Correlating Committee recirculation	June 29, 2018
Post final First Draft report	July 6, 2018
Public comment closing date	August 30, 2018
Second Draft meeting	October 22 – November 3, 2018
Posting of Second Draft and panel ballot	December 21, 2018
Final date for receipt of Second Draft ballots	January 11, 2019
Final date for receipt of recirculation	January 18, 2019
Posting of Second Draft for Correlating Committee	February 1, 2019
Correlating Committee meeting	February 19-22, 2019
Posting of Second Draft for Correlating Committee ballot	March 15, 2019
Final date for receipt of Correlating Committee Second Draft ballot	March 22, 2019
Final date for receipt of Correlating Committee recirculation	March 29, 2019
Post final draft for NITMAM review	April 5, 2019
NITMAM closing date	April 26, 2019
Posting of certified amending motions	May 17, 2019
NFPA Association meeting to approve 2020 NEC	June 17-20, 2019

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Questions ???