



National Electric Safety Code (NESC) Update

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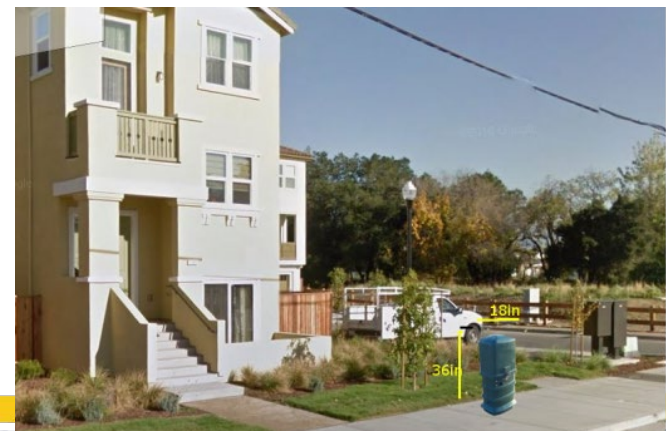
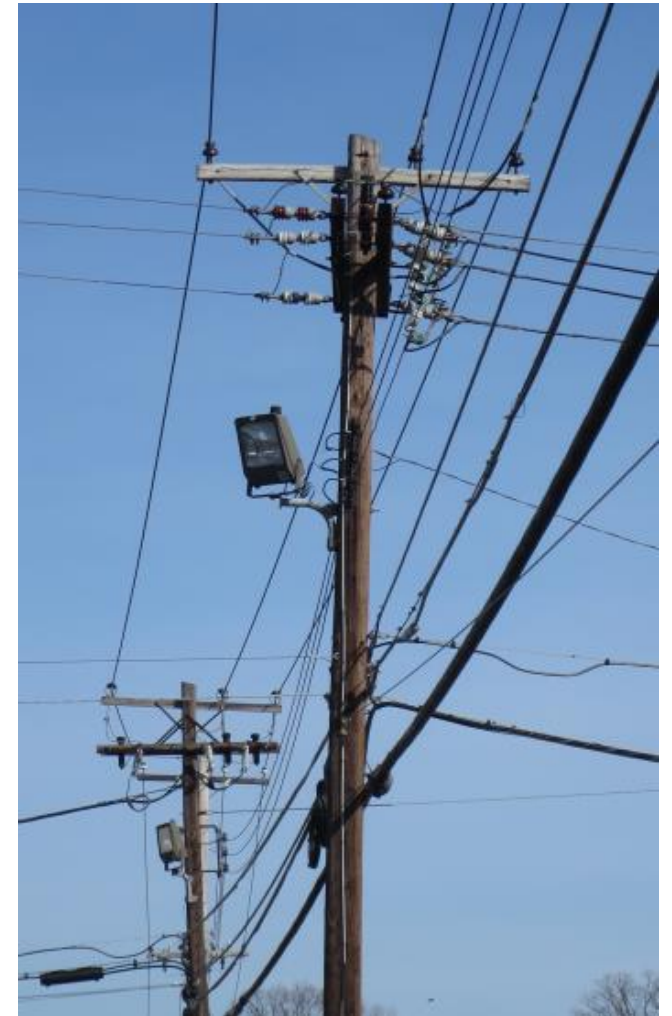
Electrical Protection of Communications Networks

March 5-7, 2019
Northbrook, IL

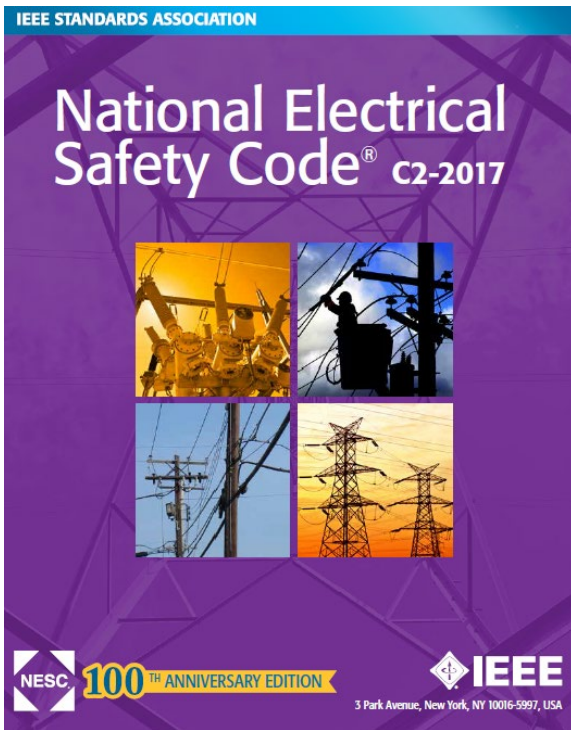


Overview

- **NESC Code Making Process**
 - **2018 Change Proposal Meetings**
- **Major Proposed Changes**
 - **Preview of Preprint**
- **Most Active Areas of Discussion**



CODES IN CONTEXT



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



California Public Utilities Commission

RULES
FOR
Overhead Electric Line Construction



Prescribed by the
PUBLIC UTILITIES COMMISSION

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

■ IEEE – NESC

- NFPA -- NEC
- GO-95....GO128....GO165
- OSHA 1910.268/269
- Internal M&Ps
 - GRs and UL Listings
- Joint Use Agreements (JUA)
- UL
- GRs/SRs
- ATIS
- etc.....

Relevance of NESC

NESC - Adopted by most States and municipalities in some format through legislative and/or regulatory (PUC) process after a review

Basis of Joint-Use, License and Pole Agreements & Inter-Company Contracts.

- Pole Attachments and Licensing Contracts
- Joint-Use Agreements (JUAs)
- Regulatory (PUCs, FCC) Rulings and Policy
- Safety Reviews (Internal and OSHA Related)
- Design/Engineering Considerations



Information added after PEG open mic discussion session

NESC is an ANSI approved standard

- Administered through IEEE as its secretariat using procedures and regulations as an ANSI approved process

Visit NESC web site such as the following for more information

<https://standards.ieee.org/products-services/nesc/index.html>

See next slide

Information in web site -

- [NESC – General Information](#)
- [Program & Structure](#)
- [Process, Procedures & Schedule](#)
 - [Interpretations, Errata, TIAs](#)
 - [Main & Sub-committees](#)
- [Products](#)
 - [Previous Editions](#)
 - [Education](#)
 - [NESC Mobile App](#)
- [Events](#)
 - [2015-to-2018 Workshops](#)
 - [2019 Event \(Kansas City Oct. 2019\)](#)
- [Resources](#)
 - [Videos](#)
 - [Courses](#)
 - [White papers](#)

Stakeholders and Interested Players

- Electric and Power Utilities – Private & Public
- Communications Utilities – Wireline/Wireless network designers and service providers
- Government & Regulatory Players –
 - State PUCs - NARUC (National Association of Regulatory Utility Commissioners)
 - OSHA ... FCC
 - USDA - Rural development (old REA/RUS)
 - DoT – infrastructure of roads, highways, traffic lights, sidewalks, bridges, waterways....
- Other utilities
 - Water and sewerage service providers
 - Railroads – Freight ... Amtrak light rail ... subway systems

NESC provides a vital safety baseline and design guideline (in some ways) to help manage the logistics, business and technical (design/engineering) complications that may arise.

2017 NESC Purpose & Scope

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

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, 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.

“NESC is Not a Design Guide or Instruction Manual “

Personal (unofficial) View – However, the code is used as defacto minimum baseline to build off for design/engineering calculations. Extra safety factors and clearances are added to provide the highly reliable and resilient networks desired. A network designed to just meet minimum safety, clearance and strength rules is not wise network and facility planning.

2017-2022 Revision - Multi-Step Process



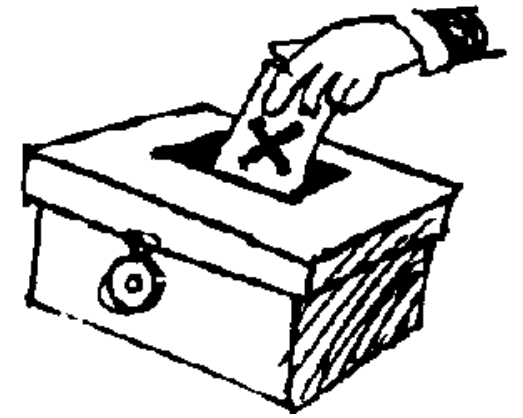
- 5-year revision schedule – Accelerated change process possible
- Administered by IEEE - Institute Electrical & Electronics Engineers
- Decisions made by Subcommittee (SCs) based on change proposals/public comments
- Correlation/Coordination – SC1, Main, Exec Committees, Standards Committee
- 2017 Edition (released August 2016 for Feb 1st 2018 Effective date)
- **Public change proposals (CPs) → SC meeting in Sept/Oct 2018 - 600 CPs with roughly 2/3 accepted, accepted in part or with modifications to create 159 new revisions to code.**
- **2022 NESC Preprint issued (Sept. 2019)**
- Public Comments (PCs) on Preprint → due by May 2020 → SC action on PCs by Oct 2020
- Review by Main & Exec. Committees Jan-March 2021
- Final Draft of 2022 NESC released May 2021 -> ANSI Approval →
Release of 2022 Code scheduled for August 2021 with Effective Date of Feb 1st 2022
- Applies on adoption by PUC, State legislative or local AHJ bodies



Committees

C2 Standards Committee - Oversight responsibility

- **SC1** – Purpose, Scope definitions (Section 01 and 02)
- **SC2** – Grounding (Section 09)
- **SC 3** – Generation Facilities (Sections 10-19) Part 1
- **SC 4** – Aerial Clearances (Rules 20-23) Part 2
- **SC 5** – Strength/Loading (Rules 24-26) Part 2
- **SC 7** – Underground/Buried (Rules 30-34) Part 3
- **SC 8** – Work Rules (Part 4- Rules 40-44) Part 4
- **Main and Executive** Committees





**Major Proposed Changes
from
2018 Change Proposal Meetings**

**-- A Preview of Preprint --
(None of these changes are final yet)**

MAJOR CHANGE ITEMS PROPOSED FOR 2017 CODE

- Traditional Safety Aspects Enhanced
- Explicit inclusion of grid-connected power generation facilities (solar farms)
- Definitions - Clarifications of *Lines* and *Joint Use*
- Grounding & Bonding – Rule 094B on ground rods
- Clearances – Refinements to 215, 232, 235H,
- Wireless Consolidations and Clarifications - 235I → 238, 420A6, 420Q
- Wind Map Modernization in Strength & Loading Section (Section 25 in flux)
- Work Rules - Arc Flash (410A3) - harmony with OSHA, Battery Work (420G) Rules, RF Exposure Levels (410A6, 420Q)

Purpose and Scope - Sections 01

Purpose (Rule 010) and Scope (Rule 011) – Follow **traditionist view of primarily safety code** and downplaying the secondary/tertiary roles influencing design, network reliability and resiliency in a revised 010C.

Rule 013 – **NESC is not retroactive code** - clarify when work on an existing installation requires an upgrade to a new/latest code edition.

- Maintenance replacements will and should continue to be allowed.
- Rule 013 does not negate the proper and necessary review of loading and balance of a pole if a new cable or facility is added, or if an old cable is replaced.

Rule 017 - **Metric vs Customary Unit** debate

Currently proposed changes to Rule 010

010. Purpose

A. The purpose of the NESC is the practical safeguarding of persons ~~and utility facilities~~ during the installation, operation, and maintenance of electric supply and communication facilities, under specified conditions.

NOTE: NESC rules are globally recognized and intended to provide a practical standard of safe practices that can be adopted by public utilities, private utilities, state or local utility commissions or public service commissions, or other boards or bodies having control over safe practices employed in the design, installation, operation, and maintenance of electric supply, communication, street and area lighting, signal, or railroad utility facilities.

B. NESC rules contain the basic provisions, under specified conditions, that are considered necessary for the safeguarding of: ~~the public and utility workers (employees and contractors).~~

~~1. The public,~~

~~2. Utility workers (employees and contractors),~~

~~3. Utility facilities.~~

C. This Code is not intended as a design specification, ~~or as an instruction manual, nor or is it intended to provide design criteria~~ for abnormal events such as, but not limited to, actions of others or weather events in excess of those described herein.

Proposed revised 013B - Existing installations

1. Where an existing installation meets, or is altered to meet, the rules in this edition, such installation is not required to comply with any previous edition.
2. Existing installations, including maintenance replacements, that currently comply with prior editions of the Code, need not be modified to comply with the rules in this edition. When an existing installation is brought into compliance with a subsequent edition, earlier editions no longer apply.

EXCEPTION: When a structure is replaced, the current requirements of Rule 238C shall be met, if applicable.

3. Where conductors or equipment are added, altered, or replaced on an existing structure, the structure or the facilities on the structure need not be modified or replaced if the resulting installation will be in compliance with either:

- (a) the rules that were in effect at the time of the original installation, or
- (b) the rules in effect in a subsequent edition to which the installation has been previously brought into compliance, or
- (c) the rules of this edition in accordance with Rule 013B1

When an existing installation is brought into compliance with a subsequent edition, earlier editions no longer apply.

EXCEPTION: If taller and/or stronger supporting structures are required solely to meet the clearance and/or strength requirements of Rule 013B3, it is considered new construction and the rules in this edition shall apply.

4. For structures that currently do not comply with Rule 013B3, if adding a new item, or replacing or rearranging existing items would not in itself, either (1) create a structural, clearance, or grounding non-conformance, or (2) worsen an existing non-conformance, then the addition, replacement, or alteration may be performed prior to correcting existing non-compliance items. For existing non-compliance items, see Rules 214A4 and A5.

EXCEPTION: For safety reasons, the administrative authority may require compliance with the rules in this edition



Rule 017 - Metric vs Customary Unit debate

Rule 017 - Metric vs Customary Unit debate

- Metric units are not currently useful for the USA code users
- Can create confusion if the wrong table is mistakenly used – e.g., reading a metric clearance as feet
- Metric needs to remain in NESC to better correlate with IEEE policy to harmonize with rest of world and promote use of NESC internationally
- Single or similar code across USA (and world) would encourage uniformity, promote safety and lower costs – it may happen some day.

Definitions – Section 02

“*Lines*” – revised to better clarify between Communication, Supply, trolley signal, traffic circuits and lines

- Definition may need clarification in comment period to refine “*Lines used for signaling purposes*” and “*Signal lines*”.
- The reference to Rule 224A in item 1(b) of the communications lines definition will cover span powering and power-over-Ethernet applications.

“*Exclusive Control*” - were refined to match the newest technology and cover automated control systems and remote control systems that in current use.

“*Joint-Use*”, and “*Common Use*” – revised to better align definitions with current deployments of multiple types of services on a pole by a single utility.

1. communication lines.

a. located in the communication space. The conductors and their supporting or containing structures, equipment, and apparatus that are used for public or private signal or communications service, and which operate at potentials not exceeding 400 V to ground or 750 V between any two points of the circuit, and the transmitted power of which does not exceed 150 W. When operating at not more than 90 V ac or 150 V dc, no limit is placed on the transmitted power of the system. Under specified conditions, communication cables may include communication circuits exceeding the preceding limitation where such circuits are also used to supply power solely to communications equipment. Fiber-optic cables are considered as communication lines, regardless of whether they are installed in the communication space or supply space in accordance with applicable rules. Lines used for signaling purposes, but not included above, are considered as supply lines of the same voltage and are to be so installed.

NOTE: Public and private telephone, telegraph, railroad-signal, data, clock, fire, police-alarm, cable television, and other systems conforming with the above are examples of communication lines.

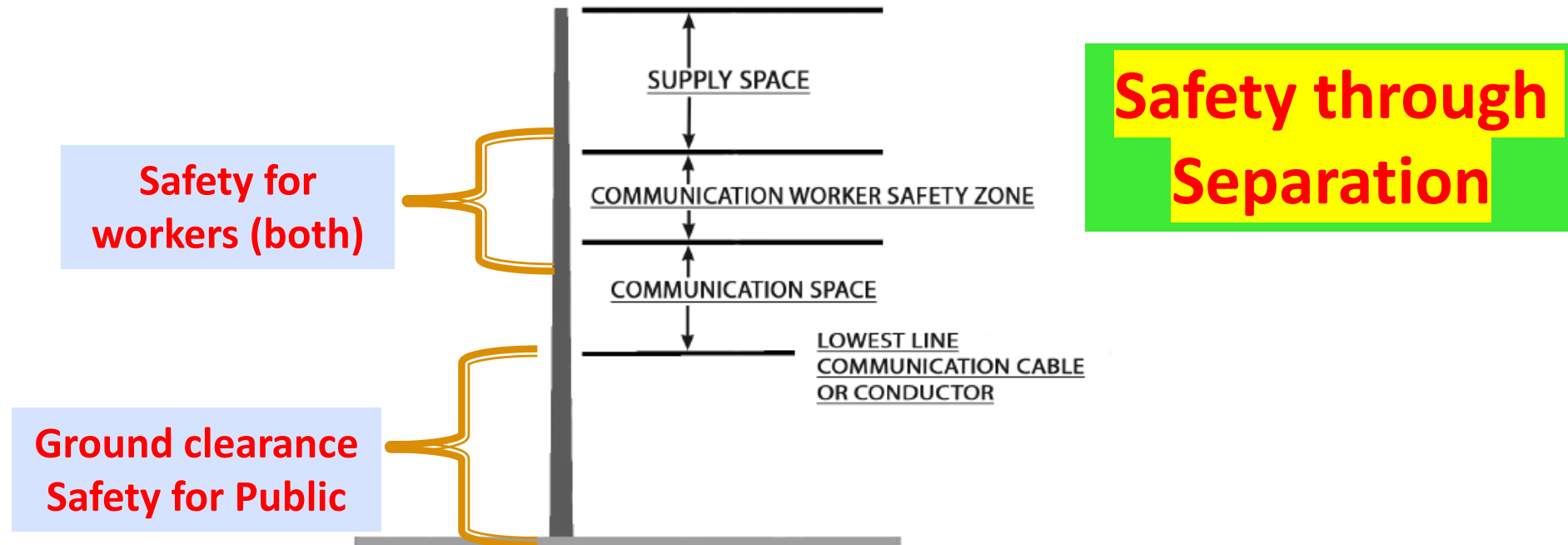
b. located in the supply space. Communication lines located in the supply space and meeting Rule 224A may (a) operate at any voltage, (b) include supply circuits of any voltage, or (c) be included within a supply conductor or cable operating at any voltage.

2. electric supply lines. Those wires, conductors, and cables used to transmit electric or light energy and their necessary supporting or containing structures, equipment, and apparatus that are used to provide public or private electric supply or lighting service.

Note: Signal lines of more than 400 V and traffic signal lines of any voltage are considered as supply lines within the meaning of the rules, and signal lines of less than 400 V may be considered as supply lines, if so run and operated throughout.

Space Definitions (added in 2017 NESC)

communication space. The space on joint-use structures where communication facilities are separated from the supply space by the communication worker safety zone. See Figure D-1.



supply space. The space on joint-use structures where supply facilities are separated from the communication space by the communication worker safety zone. See Figure D-5.

NOTE: Communication facilities may be located in the supply space (see Rule 224A).

Proposed Definitions of Exclusive Control

- **exclusive control.** ~~Generally, covers the installation, ownership, restricted access, operation (manual and/or automated), and maintenance of utility facilities by qualified and authorized persons.; or controlled by automated processes, established and maintained by the utility or its contractor, performing operations on utility facilities.~~
- **exclusive control of utility.** Where (a) energized facilities are separated from public access by a spatial or a physical barrier and accessible only to qualified personnel authorized by the serving utility, and (b) the utility is responsible for connection/disconnection of such facilities to/from energized sources of energy or signals.

Proposed Joint Use Definition

- **joint use.** *Simultaneous use by two or more utilities and/or installation of two or more types of service such as electricity supply, and lighting service or communication.*
- Adequate clearances are necessary for two different services on a single structure based on the relevant safety concerns centered on their voltage, power and electrical properties rather than who owns and operate them.
- It is not clear if this definition would require a single utility with two services on the pole would need to have a formal Joint-Use Agreement (JUAs) with itself.
- May cause confusion with traditional JUAs and the use of phrase “and/or” in the definition may further confuse rather than clarify.

Grounding Methods - Section 09

Ground Rods - Rule 094B - The requirements for ground rods were relaxed (incorrectly) in Rule 094B by removing material specific detail and permitting any rod to be 0.5-inch minimum diameter.

- The current 2017 Rule 094B2a(1) reflects the historical experience and field test data on ground rod performance as well as product specifications used by most utilities.
- Strongly recommend that communications companies maintain their current practices and product specifications to require **a 5/8-inch or ¾-inch diameter copper-clad stainless-steel ground rod as the primary choice rod material and size** - as it has been for over 70 years.

Grounding Intervals - Effective Grounding of MGN - Rule 096C - Rule 096C was modified for simplicity and clarity particularly within the exceptions. **4 grounds for each mile of line** remains the basic criteria for an effectively grounded MGN network.

Intersystem Bonding - Rule 097G - The previously revised (2017 edition) Rule 097G was re-affirmed – no CPs.

Customer Premises Intersystem Bonding – Rule 099 - A recommendation on restrictions for water pipe connection as a ground was upgraded to full rule text which is appropriate for safety and effective grounding. Bonding to a water pipe for grounding purposes should be a last resort and requires investigation to ensure metal pipe continuity exists all the way to earth contact.

Proposed change to Rule 094B

2. Driven rods, buried wire, strips, or plates

The following made electrodes are considered equivalent for the purpose of this rule:

EXCEPTION: Other made electrodes may be used if their suitability is supported by a qualified engineering study.

a. Driven rods

- (1) Driven rods may be sectional; the total length shall be not less than 2.45 m (8 ft) and the diameter shall be not less than 12.7 mm (0.5 in). ~~Iron, zinc-coated steel, or steel rods shall have a diameter of not less than 15.87 mm (0.625 in). Copper-clad, stainless steel, or stainless steel-clad rods shall have a diameter of not less than 12.7 mm (0.5 in).~~



Rule 097G - 2017 Language

G. Bonding of communication systems to electric supply systems

Where both electric supply systems and communication systems are grounded on a joint use structure and a single grounding conductor is present, the grounding conductor shall be connected to both systems. Where separate supply and communications grounding conductors are used, they shall be bonded together.

Exception 1: Where separation is required by Rule 097A.

Exception 2: Where the electric supply utility is maintaining isolation between primary and secondary neutrals, the communication system ground shall be connected only to the primary grounding conductor if it complies with the requirements of Rule 097C.

Rule 097 – Grounding & Intersystem Bonding

Rule 097 has 7 interlocking subsections with implicit/explicit links to other Rules (e.g., 096, 224, 344, 354, 384) applicable to intersystem bonds

- Rule 097A -- separate grounding conductors
- Rule 097B – permits a bond to the power ground where a MGN system is being used and providing Rule 097C (i.e., 4 grounds/mile) is met.
- Rule 097C - 4 grounds/mile criteria helps define an effective ground
- **Rule 097G** requires a single grounding conductor on structures except as required by Rule 097A
- **097G sets expectation that a bond to vertical ground should be made unless an explicit technical reason exists not to bond.**
- **Clarifies the relationship between 097G and other subsections of Rule 097 by placing the criteria in explicit Exceptions.**

Part 1 – Substations and Generation Facilities

Solar Farms & Distributed Generation Facilities – Part 1 NESC –

- Large effort to revise Part 1 sections to explicitly cover solar farms and other distributed generation facilities that are interconnected into the utility power grid.
- Such facilities will still need to be served with communications circuits for monitoring, alarm and control circuits. Having clear, consistent NESC rules for solar farms should be beneficial for communications companies that will need to serve the facility as well as for the power companies that need to connect the solar farm with the power utility grid.

Energy Storage and Large Battery Array

- New and revised battery rules in Section 14 and Work Rule 420G were developed to cover energy storage systems and different battery technologies.



Proposed 420G Batteries – Work Rules

1. Employees shall not handle energized parts of batteries unless necessary precautions are taken to limit the likelihood of **short circuits and electric shocks**.
2. Employees working in the vicinity of batteries should **avoid contact** and ensure protective barriers are in place. Refer to Rule 431 and rule 441.
NOTE 1: Guards may be used to protect battery terminals and busbars from inadvertent short circuits or accidental contact by employee working nearby.
NOTE 2: Solidly grounded systems may pose a greater electric shock risk than ungrounded or high-resistance ground systems, especially if the latter are in open racks.
3. For guidance on **arc flash risk** assessments and protection, refer to Exception 5, Notes 1, 2 and 5 of Rule 410A3.
4. Employees shall remove or render nonconductive all exposed **conductive articles** such as jewelry and chains when working on, or in the vicinity of, batteries.
5. Employees shall not **smoke, use open flames**, or use tools that may produce sparks in the vicinity of batteries.
6. When entering the battery area, employees shall verify that (a) any **sensors** present indicate safe entry is possible, (b) if present, **fans are operational**, and (c) all **vents** are clear of any obstructions.
7. Employees shall use **insulated tools** when working on batteries.
8. Employees working on batteries or with battery electrolytes shall use eye, face, hand and skin protection appropriate to the **electrolyte hazard**. This rule also applies to workers handling batteries denoted as sealed, gel, or maintenance-free batteries (e.g., VRLA batteries).
9. Employees whose work on batteries involves contact with battery lids, terminals or battery flame arrestors should **discharge any static charge** on their body or clothes prior to contact with battery components by touching a grounded surface.

Part 2 – Aerial Sections 21

- **Inspections and Tests** – Rule 214 (Aerial) and Rule 313 (Buried Plant)
 - minor revisions made.
 - Requires a practice for detecting and correcting defects and conditions.
 - Flexibility is provided within Rules 214/313 to utility in terms of formal inspection programs or tests/inspections as part of normal work practices.
 - Important for risk management and legal accountability to have documented internal practices (training records, work procedures, etc...).
- **Guy Insulators** - Rules 215C – active area of discussion to have telecom and power insulators placed in a practical and coordinated manner
 - The 8 foot minimum height for a guy insulator (when a guy becomes slack) is sufficient and can be increased at the discretion of the utility or facility designer if required by local conditions.
- **Markers on Guys** – Rule 217C - Various word changes refined several parts (e.g., established parking areas) and removed confusing terms (e.g., out-of-control vehicles). Despite these changes, Rule 217C remains unclear (but contains flexibility) on how to handle marking and protection for multiple guys on a single anchor or multiple anchors.

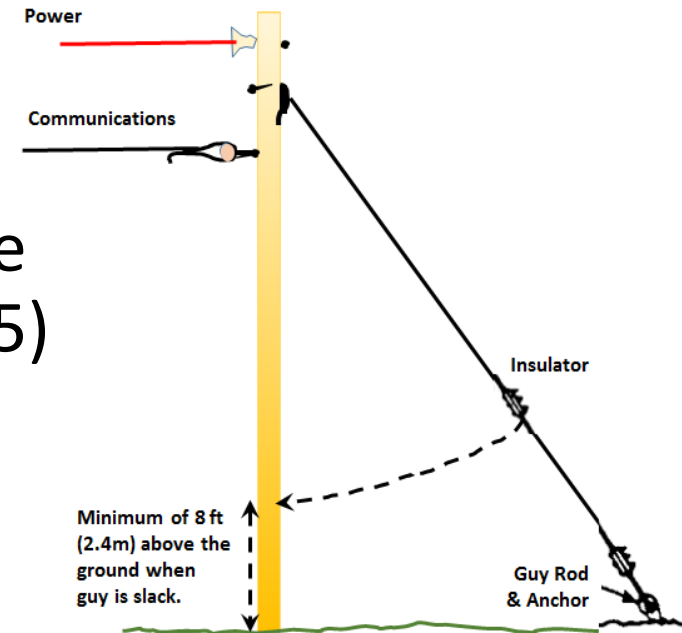


Clearance and Separation



Part 2 – Aerial Sections 20-23

- Clearances above the Ground (Rule 232) for Service Drops over Driveways and Guy Insulators (Rule 215)
 - Practical lower limit should be a minimum of 11.5 or 12 feet for communications which would place the power drop at 12.5 or 13 feet,
 - Providing there is a clear restriction on activity and vehicle height underneath these lines to permit reduction in height over the driveway.
 - Useful specific clearances (9 feet) were added to Rule 234C4 for communications cables installed near or over porches and balconies.



Proposed Rule 235H

235. Clearance for wires, conductors, or cables carried on the same supporting structure

H. ~~Clearance~~ Vertical clearance and spacing between communication conductors, ~~lines, wires, and~~ cables and equipment in the communication space ~~cable, and equipment~~

- 1. The vertical spacing, at the structure, between messengers supporting communication cables should be not less than 300 mm (12 in) except by agreement between the parties involved including the pole owner(s).*
- 2. The vertical clearances between the conductors, ~~and~~ cables, and equipment of one communication utility to those of another, anywhere in the span, ~~shall~~ should be not less than 100 mm (4 in), except by agreement between the parties involved including the pole owner(s). To determine this clearance, use the ambient temperature of 15°C (60°F), without wind loading.*

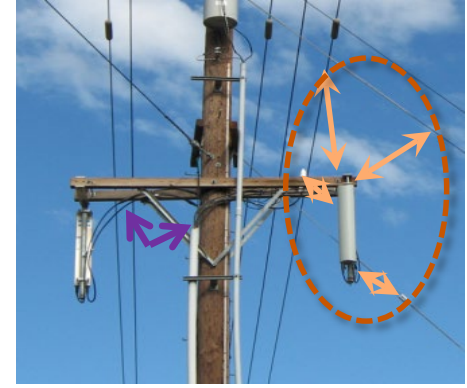
Added specific weather or temperature condition to the rule (60 °F, without wind loading) for clearances along the span.

Provides a more precise definition, clarity and consistency for application of the rule.

Consistent with the “straight line” requirement of existing Rule 235C2b(3).

The rule is primarily aimed at preventing physical abrasion damage since close proximity or contact does not lead to significant electrical hazards for typical communications applications.

Some Wireless Related Rules



- **Powering Circuits in Communications Cables – Rules 224 and 344**

- Word changes in Rule 224 were editorial with no technical change.
- Rule 344A modified by adding a depth requirement for higher voltage or higher power circuits.
- The powering cables or circuits that feed new 5G antenna equipment are often buried using micro-trenching methods where ducts are less than 24 inches deep containing shielded cables. These installation methods typically use ducts or conduits to provide additional mechanical protection and therefore can meet the exception criteria of 352D.
- Service buried drop cables are often placed at lesser depths (12-18 inches). If these cables contain power circuits meeting the criteria in 344A then they should be protected against accidental contact with a duct, conduit or added mechanical protection.

- **New Rule 238F – Communication antenna clearances** – proposed to consolidate clearances for wireless components from 235I as well as incorporating information from Rules 238 and 239 so that the Code treats antennas as communication equipment consistently throughout the Code

- There are other design/engineering complications about wireless deployments in general and about 5G installations in particular, that will need further actions possible within the NESC but more likely in industry forums, product specification documents, IEEE initiatives, and inter-utility agreements. - e.g., IEEE Joint-Use Alliance

IEEE Joint-Use Alliance - Work Group Structure

Work Group 1 – Consistency

Help to establish the requirements of a “complete application”

Encourage common terminology in engineering requirements and guidelines

Work Group 2 – Facilities

Identifying ways to share public information regarding facility availability.

Work Group 3 – Clearance and Loading

Guidelines on Clearances and Loading Analysis

Work Group 4 – Installation and Worker Safety

Installation and Maintenance Procedures and Work Rules

Work Group 5 – Radio Frequency (RF)

RF Emissions and Interference guidelines

Inter-carrier as well as between Wireline and Wireless components

CONGESTION AND COMPETITION FOR SPACE



Other Wireless Issues

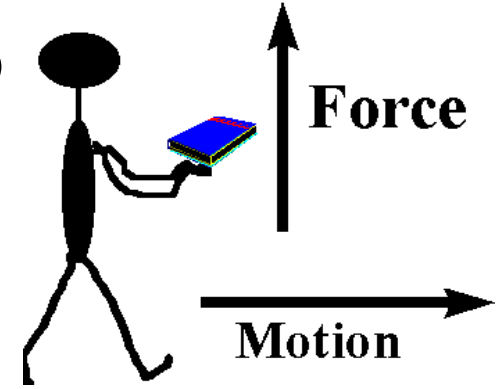
1. Powering Cable to the Antenna –

- a. Do they meet the NESC definition of *communications cables*, If so, do they meet NESC Rules 224B and/or 344
- b. Can be complicated because of the configuration of the powering cables that may travel up/down the pole, through power and/or communications space and along the strand.
- c. May require different configurations to effectively bond and ground the powering and communications circuits.

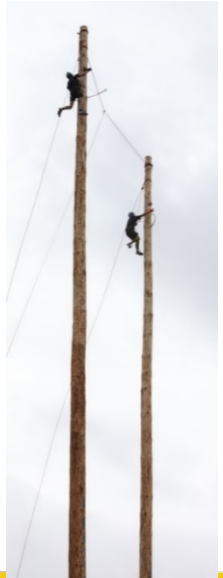
2. Strand mounted equipment - antennas, powering transformers and backhaul equipment - is growing in popularity to circumvent the lack of available attachment space on the pole among the many competing communications service providers.

- a. Place design and engineering challenges on strand mounting loads including point loadings on lines as well as functional performance issues about the reliability of the various components - attachment hardware, electronic equipment operating under outside plant conditions, etc..., and
- b. Clearance requirements between communications lines, utility power lines and the ground (parts of section 23).
- c. Need to resolve any RF exposure level and work practices for workers

SC5 - Strength & Loading – Sections 24-25



- **Strength & Loading – k-factor** – Section 23, 25, and Appendices -
 - Clearance Section 23 - Retained
 - Strength/Loading Section 25 = 16 to delete, 15 to retain → remains open issue at present
- **Wind maps (Extreme winds)** –
 - Existing referenced maps in the NESC are outdated and will no longer be available → use 50 and 100-MRI (mean-return-interval) from 2016 ASCE 7 and/or future ASCE 74
 - Close votes in SC5 meeting and ballots – remains active discussions for workshops - Two main proposals →
 - 100-MRI for Grade B and 50-MRI for Grade C with load factor of 1.0 for both
 - 100MRI with load factor of 0.87 for Grade B and 1.0 for Grade C
 - The consequences of changes to 250C/D should be small for communications plant (i.e., less than $\pm 5\%$) but further verification calculations are necessary and ongoing.
- **60-foot limit** – Rule 250C and 250D – The 60-foot criteria was retained (17 vs 15) with a revision to correct a mischaracterization of the rule as a 60-foot “exception”. The extreme wind effect only affects the taller structures. This issue will continue to arise in the future.
- **Construction Grades** - Table 242-1 – Reformatting of Table 242-1 continues from previous code cycle to help clarify the proper choice of construction grade (B or C or N) required for a given joint-use situation.





Pole Loading Construction Grades

- **Construction Grades** – Reorganized & Clarified (Table 242-1)
 - More clearly define where and when each Grade is applicable
 - Grade N used for temporary & emergency work, private rights of way and service drops
 - Grade B = highest grades – for joint use & railroad crossings
 - Grade C = most often used for communications lines and poles

Part 3 – Sections 30-3

- Inspections and Tests – Rule 214 and Rule 313 – discussed earlier.
- Duct, Conduit and Conduit System – Several changes where “conduit or duct” or “conduit and duct” is used.

conduit. -- A structure containing one or more ducts.

conduit system. --Any combination of duct, conduit, conduits, manholes, handholes, and/or vaults joined to form an integrated whole.

duct. -- A single enclosed raceway for conductors or cable

Part 4 – Sections 40-44

Rule 410A3 - Arc Flash Hazard - Modifications to the default table

Laboratory studies of short circuits created in bypass meters, CT Cabinets, transformers and switchgear of 208/240V and 480 V systems

IEEE 1584 Analysis and Arc Pro Software Simulations



Rule 421A6 - Job Briefing – The revised 421A6 rule is acceptable and does not conflict with standard work practices within the communications industry.

A job briefing for each case is impractical for routine installation, service and maintenance work performed by communications employees.

Most circumstance or conditions that are found or experienced by the worker are covered in their training and through compliance with the requirements of Rule 420A.

If a circumstance arises outside that which is normal or expected, then a call to a supervisor would be warranted, which is presently covered by the employee training.

Rule 410A6 and 420Q - RF Exposure – Added the text “...provide radio-frequency (RF) safety training to all employees who work in the vicinity of antennas ...” to Rule 410A6, and adding a note to reference to IEEE Std 1654, are useful additions for safety guidance.

Resistance to requiring a formal and documented RF safety program.

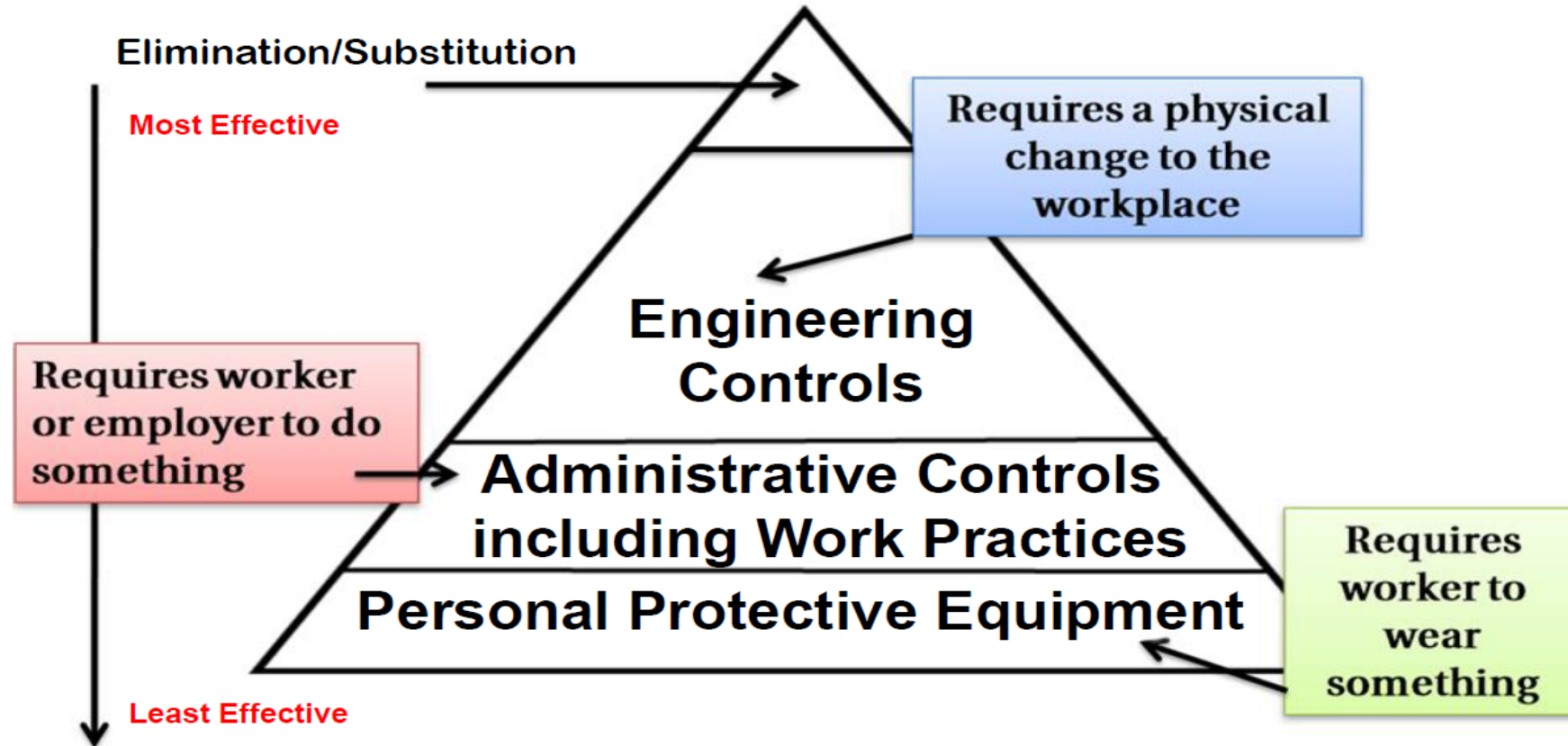
Retain flexibility for their training programs to match the risk level of the employee.

Proposed 420A6

6. The employer shall provide radio-frequency (RF) safety training to all employees who work in the vicinity of antennas operating in the range of 3 kHz to 300 GHz to recognize and mitigate exposure to radio-frequency sources that exceed exposure levels set forth by the regulatory authority having jurisdiction.

- NOTE: See OSHA 29 CFR 1910.97, Subpart G [B65]; OSHA 29 CFR 1910.268, Subpart R [B67]; FCC Bulletin No. 65 [B30]; IEEE Std C95.1-2005 [B60]; IEEE Std 1654.

Hierarchy of Controls

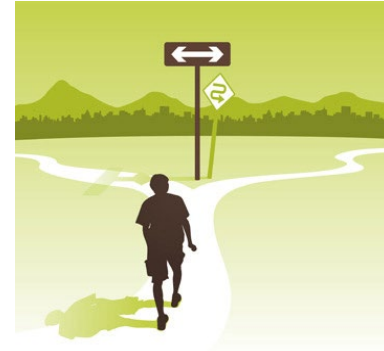


SUMMARY OF ITEMS OF INTEREST

- Traditional Safety Aspects Enhanced
- Explicit inclusion of grid-connected power generation facilities (solar farms)
- Definitions - Clarifications of *Lines* and *Joint Use*
- Grounding & Bonding – Rule 094B on ground rods
- Clearances – Refinements to 215, 232, 235H,
- Wireless Consolidations and Clarifications - 235I → 238, 420A6, 420Q
- Wind Map Modernization in Strength & Loading Section (Section 25 in flux)
- Work Rules - Arc Flash (410A3) - harmony with OSHA, Battery Work (420G) Rules, RF Exposure Levels (410A6, 420Q)

2019

- Users and readers of NESC need to discuss the preliminary accepted change proposals for 2022 code
 - Determine effects (positive & negative) of accepted CP through analysis, research and dialogue
 - Prepare and develop public comments (PC) if necessary.
- NESC Workshop – Kansas City MO in October 2019
- Participate and Track IEEE Joint-Use Alliance Working Groups
- Possible Revision to Construction Blue Book (SR-1421)





THE END



***Thanks for
Your Attention***



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