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Change Proposal Numbers

- In the following slides, numbers shown in square brackets are Change Proposal numbers
  - i.e., [4567] would be CP 4567

Calls for Comment

- Various subcommittees have asked especially for comment on several proposals to make sure adequate input is available

New Definitions:

Communication Space [4556]

and Supply Space [4557]

- Rejected by both SC1 and SC4, but public comment is solicited on whether a definition is needed
  - The definition is used throughout the NESC

215C1 Note 2 [2579]

- SC4 wants comment as to whether all conductive non-current-carrying items in the communication space and communication worker safety zone that can be simultaneously touched should be:
  - Effectively grounded, and
  - Bonded together

Rules 215C2-C8 [4701]

- SC4 requests comment on the complete reorganization of the guy insulator rules


- SC4 requests comments on proposed changes dealing with relative levels of communication and supply on pole lines

230B [4683]

- SC4 is seeking documented cases where a line designed under previous editions has created a safety issue with road clearances due solely to extreme ice on conductors sagging the conductors down so low as to impede movement or create another type of hazard

233B1 [4593]

- SC4 is asking for comments regarding clearances between supply and communication or supply and light rail/trolley conductors on different supporting lines that run parallel to and at the same level as the supply conductors
  - Contact conductors of elevated light rail
  - Underbuilt communication on one line at the same level as power on another line on congested rights-of-way

233B1 [4593]

- Present Rule 233C (vertical clearances at crossings) has greater vertical clearances between power and communication or power and light rail/trolley contact conductors than between power and power
- Present Rule 233B has the same horizontal clearances for parallel lines, regardless of whether one is communication or contact conductors

234 [4668]

- SC4 wants comments on:
  - The need for specifying clearances to irrigation equipment
  - What irrigation equipment should be included

250C and 250D [4610]

- SC5 wants comment on proposals to eliminate the 60-ft exemption for extreme wind and extreme ice loading (wind speed would be limited for the lower lines to the speed which produces wind-blown debris)
  - The exemption came in when the average distribution pole was 35 ft.
  - Today’s poles place conductors/cables up where wind speed is higher

277 [4694]

- SC5 wants comment on whether the load factors of Table 253-1 should be used when selecting insulator strength

Major 2017 Changes in NESC Grounding Rules

Sections 90-99

094B1 [4696]

- For electrode purposes, stainless steel with appropriate non-corrosive properties is considered to be non-ferrous metal

94B2a [4058]

- This rejected proposal would have allowed zinc-coated ground rods to be 1/2-inch instead of the present 5/8-inch
  - Some studies support such a change; others do not
  - There are soil-specific issues that do make a difference in electrode coating life

096C [4262]

- New Exception 2 allows less than 4 ground connections per mile on underground cables that would require removal of the jacket for attachment of a ground lead
- New Exception 3 allows less than 4 grounds per mile if the neutral is of sufficient size & ampacity for the duty involved

Major 2017 Changes in NESC

Part 1—Electric Supply Stations

Sections 10-19

110A2(b) [4265]

- Where an impenetrable barrier is used in part of an electric supply station enclosure, the sum of the barrier height and distance to the energized part must be not less than R (from Table 110-1) + 5 ft.
  - The side and bottom edges are now specified to be not less than R

Table 110-1 [4267]

- The R value of clearance from the barrier to the energized part is now specified in feet and inches, rather than tenths of feet

114 [4269] & [4023]

- The rule on fire extinguishers was deleted by [4269]
- Objectors wanted clarification as in [4023]
  - NOTE: the votes conflict: [4269] took out the rule, but [4023] clarified it
  - This will need to be resolved

110A1 [4572]

- A supply station perimeter fence shall not be connected to or located within 6 ft. of another fence;
  - Unless a nonconductive section is inserted such that no conductive portion of the supply station fence meets the 6-ft. clearance

124A1 [4208]

- Atmospheric adders are now required for stations at elevations above 3300 ft.
  - Similar to the overhead rules
  - IEEE C37.100.1 is referenced
234B1a [4305]  
• This proposal will limit the 5 ft. clearance of passing conductors from a pole to which it does not attach to 22 kV and require a voltage adder above that value  
  – This moves 44 kV, 69 kV, further away  
  – A lineman on a pole (or in a bucket) can’t rubber up those voltages and would require de-energizing the lines

234C3d(2) [4310]  
• Will increase the horizontal clearance of supply service drops from 3 ft. to 5 ft. from porches, decks, fire escapes, or similar locations  
  – Recognizes available reach of persons leaning out over deck railings

234E1 [4073]  
• Requires the same clearances over above-ground pools as over in-ground pools

235C2b(1)(c) [4330]  
• Note 1 is added to make it clear that the wire temperature on the lower wire may be colder than the temperature of the upper wire when electrical loading line losses on the upper wire raise its temperature  
  – The basic question is: what is the coldest temperature at which line losses on the upper conductor cause it to reach the specified temperature

235H [4716]  
• Clarifies that clearances between facilities in the communication space are:  
  – Radial, and  
  – At the same ambient conditions

235I [4346]  
• Antenna clearances are radial  
• Antennas located in the supply space must have a 40-inch clearance to communication located in the communication space  
  – Antennas in the communication space must have a 40-inch clearance to items in the supply space

Table 235-6 [4113]  
• When calculating clearance values within this table, use phase-to-phase values of the circuit involved, unless otherwise directed by footnotes

236D [4666]  
• Requires photovoltaic panels and power supplies to be located outside of the climbing space  
  – The proposed (rejected) new Exception would have allowed such items to be located in the climbing space if that orientation was necessary for operation AND it could be tilted or swung out of the way for climbing

237G [4665]  
• Will prohibit equipment in the working space required for other equipment, conductors, or cables  
• The proposed (rejected) new Exception would have allowed such items to be located in the working space if that orientation was necessary for operation AND it could be tilted or swung out of the way for working

238A [4664]  
• In addition to antennas, photovoltaic panels, power supplies, loading coils, etc., are also now to be considered as equipment for purposes of Rule 238

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Table 238-2 [4139]
- All span wires and brackets supporting luminaires, traffic signals, or trolley contact conductors that are NOT grounded must now be located 40 inches above the top communication cable
  - Clearances for grounded items are not changed

**Major 2017 Changes in NESC Part 2—Overhead**

**Sections 24-27: Loadings and Strengths Rules**

**241B [4603], Table 242-1 [4606]**
- These CPs would have removed Grade N Construction completely and replaced it with Grade C
- Complete removal was rejected
  - Communication was moved from Grade N to Grade C to recognize recent problems and harmonize with action on CP 4652 for Table 242-1

**Table 242-1 [4652]**
- Communication conductors and cables above common or public rights-of-way are moved from Grade N to Grade C
  - Both the loads and the load and strength factors of Grade C were already used for joint-use structures
  - It is also appropriate to use them for tension on messengers, guys, and anchors

**241C [4605]**
- The explanation of what is considered to be at crossing was simplified for clarity
- An additional condition was added: if the item could fall into the following, it would be considered to be at crossing:
  - Rail of a railroad track
  - Traveled way of a limited access highway
  - Navigable waterway requiring crossing permits

**250B, C, & D [4611]**
- This rejected CP would have eliminated
  - Rule 250B traditional loadings, and
  - The 60-ft height exemption for application of Rules 250C (extreme wind) and 250D (extreme ice)
- 250B was kept because it covers some types of ice loadings not in 250D
- The height exemptions were modified in another CP

**250C & D [4610]**
- Eliminates the 60-ft height exemption from 250C (extreme wind) and 250 D (extreme ice from freezing rain)
  - For 250C only, the wind pressure was limited where structures or wires, conductors, or cables are 60 ft. or less above ground
  - Wind pressure limits vary with Loading District and Grade of Construction

**250D [4360]**
- Clarifies that wind and weight forces are to be applied to:
  - Structures without ice
  - Wires, conductors, and cables with extreme ice loading

**Figures 250D [4641]**
- New Figures 250-4a and 250-4b are added to specify temperatures at which extreme ice tensions are calculated.

**Figure 250-1 [4678]**
- This rejected proposal would have revised the basic loading district map—essentially moving Heavy Loading down to meet Light Loading and eliminating Medium Loading in many areas
  - Supporting information indicates the potential need for change
  - Rejected as not being a finished product

**251B3 & 261H1b [4651] [4501]**
- These rejected proposals would have eliminated the so-called “k factor” that essentially increases wind loading for conductor tension/angle/deadend purposes
  - Rejected for unintended consequences and the need for more work
  - May be considered again after comments
  - See extensive SC member comments

**251B1, B3, & B4 [4364]**
- Span length (B4) and angle (B3) rules were deleted and B1 was revised to include new specifications
  - The term “design wind span” is added
  - See new Definition of wind span
  - Also added was a NOTE allowing engineering judgment for appropriate wind spans on large angles

**252A [4659]**
- A NOTE warning of the effect of eccentric loads on bending and overturning forces was added
  - Eccentric loading can be especially critical where structures carry power multiple primary or transmission circuits locate center conductors on the same side as street lights, communication cables, etc.

**Table 253-1 & Rule 260A [4506]**
- Table 253-1 was split into two tables:
  - 253-1A contains new load factors for traditional linear calculations
  - 253-1B contains new load factors for nonlinear calculations
- 260A language was revised accordingly

**261B [4060]**
- This rejected CP would have required reliability-based design for foundations, settings, and guy anchors
  - Rejected as inappropriate to require RBD methods at this time
  - Some requirements were difficult to understand
  - This subject will return as RBD methods become in general use

**261H1 [4495]**
- Rule 261H1 was replaced in entirety to better specify conductor tension requirements and inform users of Aeolian vibration issues and mitigation techniques

**261K2 [4374]**
- A new NOTE was added to warn users that normal tension limits for messengers may exceed operational limits of self-supporting fiber-optic cables
  - MRDT—maximum rated design tension
  - MRCL—maximum rated cable load
  - MAT—maximum allowed tension

**Table 261-1 [4660]**
- The strength factor for support hardware is reduced from 1.0 to 0.8 to reflect requirements of 261H2c and industry data
  - There is some concern that the limit needs to be reduced to 0.7

**263 [4699]**
- Rule 263 for Grade N construction is extensively revised
- In addition to Permanent Grade N installations, specifications are given for:
  - Temporary Grade N installations
  - Emergency Grade N installations

**Section 27 [4493] & [4467]**
- Extensive changes to insulator rules and strength ratings were proposed
- Extensive comments are included in support of various changes
  - See submitter comments and subcommittee member responses
  - Some principles were accepted as a part of action on CP 4694

**274 [4374]**
- An Exception for tests of guy insulators was added
  - Where manufactured to meet designs that have been validated, and where a valid quality assurance program is followed, each unit does not have to be tested
  - There are no tests that will not damage the units, so lot testing is allowed
Section 27 [4694]
- Table 253-1 & Rule 277 were revised to add load factors for insulators
- 271: supply insulators must be marked to meet applicable  C29 standards
- 272: new C29 stds added for flashover to puncture voltage requirements
- Table 277-1: New and revised C29 standards were added

Table 253-1 & Rule 277 were revised to add load factors for insulators
- 271: supply insulators must be made & marked to meet applicable  C29 standards
- 272: new C29 stds added for flashover to puncture voltage requirements
- Table 277-1: New and revised C29 standards were added

Major 2017 Changes in NESC Part 3—Underground Sections 30-39

314B [4378]
- The following were added to the list of items that must be grounded:  
  - Conductive lighting poles  
  - Conductive handhole covers on nonconductive lighting poles

3206 [4657]
- Conduits now must have appropriate separation from cryogenic lines as well as steam lines

320B5 [4386]
- A new Exception allows less than 12 in. clearance from gas & other flammable material lines for communication or supply cables <600 V  
  - By agreement  
  - Where a cable fault will not transfer detrimental heat to the flammable material line  
  - Supplemental protection may be needed

354D3a [4645]
- The requirement to have a half-size neutral when burying supply and communication in random lay (less than 12 inches separation) is deleted  
  - It limited application of larger sized cables where neutral size is of little consequence  
  - Still requires all parties to agree

354D1g & 354D3b [4722]
- An Exception to the bonding interval requirements was added where it would require removing the protective jacket only to install a ground connection

Major 2017 Changes in NESC Part 4—Work Rules Sections 40-46

410 [4724]
- 410A3 prohibits outer layers of clothing that could ignite and continue to burn
- 410A3b requires covering the entire body with arc-rated clothing and equipment  
  - Exceptions detail conditions under which hand, feet, or head does not require arc-rated equipment

410A3a [4421]
- For 50-250 V dc, 5 cal/cm2 clothing can be worn

410A6 [4041]
- Training is now required for all employees working in the vicinity of antennas  
  - To recognize and mitigate exposure to radio-frequency sources that exceed exposure levels set by regulatory authorities

420K [4725]
- 420K1 requires fall protection while climbing, transferring, or transitioning on poles and structures  
  - Unless not feasible or creates a greater hazard than doing so unattached  
  - Work positioning system must limit fall to 2 ft

420Q [4407]
- Employees working in the vicinity of antennas that exceed permissible exposure limits must use mitigation controls

423D5 [4046]
- If a line transporting flammable material is broken or damaged, recognized ignition sources must be eliminated where practical

Tables 431-1 [4726] & 441 [4728]
- The Minimum Approach Distance to most conductors of primary or greater voltage are increased by 1 to 2 inches in Tables 431-1 and 441-1  
  - Harmonizes with recent changes in 29CFR1910

432 [4047]
- Communication workers cannot position themselves above the level of supply equipment that is located in the supply space  
  - The rule previously only referred to conductors

432 [4679]
- This rejected rule would have given communication utilities and contractors 5 years to replace non-insulated aerial devices with insulated ones

441 [4048]
- For purposes of Minimum Approach Distances, reach and extended reach are defined and requirements are specified

441A1a [4051]
- An Exception now allows isolation to be used in lieu of grounding lines or parts below 600 V during work near them

441A1c [4413]
- A new sentence was added to define insulated lines and parts  
  - This change appears to have flaws that must be addressed, because some of the items are grounded and must be covered themselves with insulation if not being worked  
  - This should be carefully examined to prevent confusion

441A1-A4 [4727]
- Extensive revisions to language, particularly for voltages above 72.5 kV

441A4a(2) [4052]
- Automatic reclosing must be disabled for work, unless closing resistors or surge arresters (or a combination) are used to limit switching overvoltages

Tables 441-2, -3, & -4 [4729]
- New AC Distance to Employee MAD tables are added for altitudes < 900 m (3000 ft) where T determined by 441A4  
  - 441-2: Phase-to-ground work without tools  
  - 441-3: Phase-to-ground work with tools  
  - 441-1: Phase-to-phase work, in air, barehand

444C [4054]
- Specific minimum open-air gaps are specified when cutting jumpers to de-energize a line