
1. DANESC Seminars on Development and Application of the 2012 National Electrical Safety Code

About these seminars

The NESC is the basis for your construction standards and work procedures. Safe installations improve community relations and system reliability, while decreasing long-term costs. In these days of having to work smarter with fewer people, it is good business to make sure that your personnel understand how to meet their responsibilities in correctly applying the National Electrical Safety Code in both usual and unusual situations, particularly on joint-use pole lines. Students will work practical exercises in teams. Written answers are given for each question, including rule references. Additional exercises and answers are provided for later use by students.

Who should attend

- ◆ design engineers
- ◆ staking technicians
- ◆ line workers
- ◆ standards developers
- ◆ contractors
- ◆ attorneys
- ◆ claims investigators
- ◆ training personnel
- ◆ make-ready and final and inspectors

Learn from the experts

- ◆ How to apply the NESC in practical situations
- ◆ How to properly use the NESC to develop clearances, grounding, and strength standards for new construction or check compliance of existing construction, including using the “grandfather clause”
- ◆ Responsibilities for meeting NESC requirements
- ◆ Rationale behind NESC requirements
- ◆ How to treat a situation not directly addressed by the NESC
- ◆ How to use ANSI Z535 to meet NESC safety sign requirements for public and worker safety

In addition

PCU Training Center will provide the following:

- ◆ Bound Participant Workbook
- ◆ Excerpts from *Practical Utility Safety*
- ◆ Exercise/Answer sets
- ◆ CEUs and NC PDHs awarded upon successful completion of workshop(optional; at extra cost)

Each student will need access to the following:

- ◆ National Electrical Safety Code – 2012 Edition (PCU Training Center can provide at extra cost)
- ◆ NESC Handbook – 7th Edition (optional; at extra cost)

Power & Communication Utility Training Center DANESC In-House Seminars

Topics	Clearances	Clearances & Grounding								Broad Coverage			
										Intro to NESC	Detailed Discussions of NESC		
Number of Seminar Days **	0.5	1.0	1.0	1.5	1.5	2.0	2.0	2.5	2.5	1.0	3.0	3.0	3.5
Seminar Code**	DA-1	DA-1	DA-2	DA-1	DA-2-JU	DA-1	DA-2-JU	DA-1 ¹	DA-2-JU	DA-1-IN	DA-1	DA-2-JU	DA-1
NESC Structure & General Rules	Sel	Sel	Min	Full	Full	Ext	Ext	Ext	Ext	Sel	Ext	Ext	Ext
Grounding Requirements		Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Grounding Methods		Min	Min	Sel	Min	Sel	Sel	Full	Full	Sel	Ext	Ext	Ext
Overhead Lines—General						Min		Min	Min	Sel	Sel	Sel	Sel
Overhead Clearances	Min	Sel	Full	Sel	Sel	Sel	Sel	Full		Sel	Full	Full	Ext
Supply Station Clearances								Full			Full		Full
Underground Clearances								Full			Full		Full
Exercises in Applying the NESC				Sel	Sel	Full	Sel	Full	Full		Ext	Ext	Ext
Exercises in Using Sag & Tension Charts for Loadings & Clearances					Min		Full		Full		Min	Full	Full
Information Required to Determine Joint Use Clearances					Full		Full		Full		Full	Full	Full
Pole Loading & Strength Calculation Exercises													Min
Overhead Strengths & Loadings										Sel			Sel
Overhead Line Insulation										Min			Min
Supply Stations													
Underground										Sel	Min		Sel
Work Rules										Sel	Sel		Sel
ANSI Z535 Utility Safety Signs													Sel
Continuing Education Units	0.35	0.60	0.60	1.00	1.00	1.35	1.35	1.70	1.70	0.60	2.05	2.05	2.40
Professional Development Hours	3.5	6.0	6.0	10.0	10.0	13.5	13.5	17.0	17.0	6.0	20.5	20.5	24.0

Legend	
Min	Minimal Coverage
Sel	Selected Rules
Full	Complete Rules
Ext	Expanded Discussion
SpTop	Plus Special Topics

**This chart shows the standard seminar topics for different length seminars. The topics and the amount of coverage in each length seminar can be modified to fit the needs of any group. All desired modifications must be verified with the instructor. Class exercises are tailored to reinforce each subject.*

*** Full seminar code = Number of days followed by seminar code suffix, such as 2.5-DA-2-JU*

¹ DA-1A omits supply station clearances;
DA-1B omits underground clearance

Power & Communication Utility Training Center DANESC In-House Seminars

Topics	Targeted Coverage							
	Overhead Communication Clearances			Overhead Clearances Grounding Loadings & Strengths	Overhead Transmission Clearances & Grounding	Overhead & Underground Grounding & Bonding		Supply Stations
Number of Seminar Days **	1.0	1.5	2.5	2.5	2.5	1.0	1.5	0.5
Seminar Code**	DA-3-JUI	DA-3-JUI	DA-3-JUI	DA-4-OH	DA-4-TR	DA-5-GB	DA-5-GB	DA-6-SS
NESC Structure & General Rules	Full	Full	Ext	Ext	Full	Ext	Ext	Min
Grounding Requirements	Full	Full	Full	Full	(Parts 1&2)	Full	Full	
Grounding Methods	Min	Min	Sel	Full	Sel	SpTop	SpTop	
Overhead Lines—General			Min	Min	Min	Sel	Sel	
Overhead Clearances	Sel	Sel	Sel	Full	Full			
Supply Station Clearances								
Underground Clearances								
Exercises in Applying the NESC		SpTop	Full	Full	Full			
Exercises in Using Sag & Tension Charts for Loadings & Clearances	Min	Sel	Full	Full	Sel			
Information Required to Determine Joint Use Clearances	Full	Full	Full	Full	Full			
Pole Loading & Strength Calculation Exercises				Min	Min			
Overhead Strengths & Loadings				Sel	Sel			
Overhead Line Insulation				Min	Min			
Supply Stations					Sel			Full
Underground								
Work Rules						Sel	Sel	
ANSI Z535 Utility Safety Signs				Min	Min		Sel	
Continuing Education Units	0.60	0.95	1.70	1.70	1.7	0.60	1.00	0.35
Professional Development Hours	6.0	9.5	17.0	17.0	17.0	6.0	10.0	3.5

Legend	
Min	Minimal Coverage
Sel	Selected Rules
Full	Complete Rules
Ext	Expanded Discussion
SpTop	Plus Special Topics

**This chart shows the standard seminar topics for different length seminars. The topics and the amount of coverage in each length seminar can be modified to fit the needs of any group. All desired modifications must be verified with the instructor. Class exercises are tailored to reinforce each subject.*

*** Full seminar code = Number of days followed by seminar code suffix, such as 2.5-DA-2-JU*

¹ DA-1A omits supply station clearances;
DA-1B omits underground clearance

0.5-day Applying the 2012 NESC Clearances Rules

(one instructor unless over 35 people)
0.5-DA-1 [0.35 CEU; 3.5 PDH]

Day 1 (8:00 am – 12:00 pm)

Introduction
Structure Location
Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas
Building clearances

0.5-day Applying the 2012 NESC Electric Supply Stations

(one instructor unless over 35 people)
0.5-DA-6-SS [0.35 CEU; 3.5 PDH]

Day 1 (8:00 am – 12:00 pm)

Introduction
Protective arrangements: lighting, fence clearances, storage
Installation & maintenance: inspections, guarding & clearances to live parts, grounding
Rotating Equipment
Storage Batteries
Transformers & Regulations: location, fire hazard requirements
Conductors
Circuit breakers, reclosures, matches, fuses
Switchgear and metal-enclosed bus
Surge arresters

0.5-day Applying the 2012 NESC Underground Rules

(one instructor unless over 35 people)
0.5-UG-1 [0.35 CEU; 3.5 PDH]

Day 1 (8:00 am – 12:00 pm)

Introduction
Grandfather Clause
Installation & maintenance reqmts
Inspection reqmts
Grounding reqmts
Conduit Systems: materials, clearances
Supply cable requirements
Cables in underground structures: manhole clearances; grounding, bonding
Direct-buried cables & cable in duct-not part of a conduit system: clearances, cable requirements; burial depths; deliberate separation versus random separation between cables
Risers for poles & padmounted installations
Supply cable terminations; clearances & grounding
Equipment: design; location; grounding & bonding
Installations in tunnels

0.5-day Applying the 2012 Strengths & Loadings Rules

(one instructor unless over 35 people)
0.5-SL-1 [0.35 CEU; 3.5 PDH]

Day 1 (8:00 am – 12:00 pm)

Introduction
Which NESC Edition applies; Grandfather Clause
Section 24: Grades of construction for conductors and line supports
Section 25: Loadings for Grades B and C
Rule 250B combined ice and wind loading
Rule 250C extreme wind loading
Rule 250D extreme ice (from freezing rain) and concurrent wind loading
Rule 251 conductor loading
Rule 252 loads on line supports
Rule 253 Load factors
Section 26: Strength requirements
Preliminary assumptions
Grades B & C construction: allowed strengths of different materials; Stress limits for different structural components, conductors, and cable messengers; Strength factors
Grade N construction
Section 27: Line insulation requirements
Stress limits

1.0-day Introduction to the NESC

(one instructor unless over 35 people)
1.0-DA-1-IN [0.60 CEU; 6.0 PDH]

Day 1 (8:00 am – 4:00 pm)

Applying the National Electrical Safety Code
Inspection of Utility Facilities
Grounding
Electric Supply Stations and Equipment
Underground Lines
Work Rules for the Operation of Electric Supply and Communication Lines and Equipment
Relations Between Various Classes of Overhead Lines & Equipment
Conductor Movement and Resulting Clearances
Lunch
Clearances Above Ground, Rails and Water
Clearances to Buildings and Other Installations
Crossing Clearances
Overhead Strengths and Loadings

1.0-day Applying the 2012 NESC Overhead Clearances

(one instructor unless over 35 people)
1.0-DA-2 [0.60 CEU; 6 PDH]

Day 1 (8:00 am – 4:00 pm)

Introduction
Utility responsibilities: How to use the code: Grandfather Clause
Inspections
Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas
Lunch
Clearances to other line structures, buildings, swimming pools, and grain bins
Cable to cable and cable to conductor clearances
Joint-use clearances: supply space, communication space, communication worker safety zone
Clearances of vertical and lateral conductors and cables
Antenna clearances
Cable and conductor crossing clearances

1.0-day Major Changes in the 2012 NESC

(one instructor unless over 35 people)
0.5-DA-1 [0.6 CEU; 6 PDH]

Day 1 (8:00 am – 4:00 pm)

Section 1-Introduction: American Nat'l Std, 010A,B,C, Fig 011-1, 011C1-C2, 013A2c, 013B2, 014A2, 015D, 016

Section 2-Definitions: Area lighting, delivery point, exclusive control of utility, premises wiring, service point, utility, utilization equip, public utility, private utility, authorized person, exclusive control, premises, supervised installation, clearance, vertical conductor, effectively grounded neutral conductor, communication line in supply space, joint-use lines, vault, lateral conductor, effectively grounded, supported facility

Section 9-Grounding Methods: 091, 093D, 094B7, 099B

Part 1-Electric Supply Stations: 110B2, 111A, Table 111-1, 114-Exception, 124A1, 124A3, 124D

Part 2-Overhead: 214A4-A5, 215C1-C6, 217A1a, 217A2b, 217A4, 218A1, 230A3, 230A4, 230B, Fig 230-1, Table 230-1, -2, Table 232-1, 233B, 234B-C, 234C3, Table 234-1 & Key FN, 235B1b, 235C, Table 235-5 FN, 235C2, 235G, 235G3, 235H2, Table 235-6, 238A, Table 242-1, 250B, Table 250-1, 250C2, 253, Table 253-1 & FN, Table 253-2, 260A1, 261B, 261H1b, Table 277-1, 279A1b

Part 3-Underground: Sect 32 Note 2, 323E5, 350F&G, 352A2, 352D1&2, Table 351-1, 354A2, 380D-Exception 2

Part 4-Work Rules: 410A3, Table 410-2, -3, 420K8, 421A6, 422A2, 431C, Table 431-1, 441, 441A1, A4, Table 441-1, 444D, 445

Appendixes: Appendix A-1 Table, Appendix C, Appendix E

1.0-day Clearances for Communication Facilities on Joint-Use Lines Workshop

(one instructor unless over 35 people)
1.0-DA-3-JUI [0.60 CEU; 6 PDH]

Day 1 (8:00 am – 4:00 pm)

Introduction

Organization of the NESC

Utility responsibilities: How to use the code: Grandfather Clause

Definitions and References

Vertical clearances of lowest wires or cables above ground, rails, & water

Vertical and horizontal clearances between wires, conductors, & cables

- At the pole
- in the span

Lunch

Using sag and tension calculations

Effects of differences in sags and tensions on clearances and loads

Calculations of required clearances at poles for various spans, types, and sizes of power conductors and cables and telephone and CATV cables

- in the supply space
- in the communication worker safety zone

Special considerations for fiber-optic cables

Selection of pole heights for various spans and configurations

1.5 day Applying the 2012 NESC Clearances & Grounding Rules

(one instructor unless over 35 people)
1.5-DA-1 [1.00 CEU; 10 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction

Organization of the NESC

Utility responsibilities: How to use the code: Grandfather Clause

Definitions and references

Structure Location

Lunch

Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas

Conductor crossing clearances

Day 2 (8:00 am – 11:00 am)

Clearances to other line structures

Building clearances

Bridge clearances

Swimming pool clearances

Grain bin clearances

Joint Use clearances

- supply space
- communication worker safety zone

Selected grounding methods of Section 9

1.5 day Applying the 2012 NESC Clearances & Grounding Rules for Facilities on Joint-Use Lines Workshop

(one instructor unless over 35 people)
1.5-DA-2-JU [1.00 CEU; 10 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction

Organization of the NESC

Utility responsibilities: How to use the code: Grandfather Clause

Definitions and references

Structure Location

Lunch

Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas

Conductor crossing clearances

Day 2 (8:00 am – 11:00 am)

Clearances to other line structures

Building clearances

Bridge clearances

Swimming pool clearances

Grain bin clearances

Joint Use clearances

- supply space
- communication worker safety zone

Developing clearances for various span lengths

Selected grounding methods of Section 9

1.5 day Clearances Rules for Joint-Use Overhead Lines

(one instructor unless over 35 people)
1.5-DA-3-JUI [1.00 CEU; 10 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction
Utility responsibilities: How to use the code: Grandfather Clause
Definitions and references
Inspections
Structure Location

Lunch

Ground, Rail & Water clearances
Conductor to Conductor clearances
Joint-Use clearances: supply space, communication space, communication worker safety zone
Climbing space clearances
Working Space clearances
Clearances of vertical and lateral conductors and cables
Developing clearances for various span lengths

Day 2 (8:00 am – 11:00 am)

Exercises to determine required clearances using photographs of actual installations

2.0-day Applying the 2012 NESC Clearances & Grounding Rules

(one instructor unless over 35 people)
2.0-DA-1 [1.35 CEU; 13.5 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction
Organization of the NESC
Utility responsibilities: How to use the code: Grandfather Clause
Definitions and references
Structure Location

Lunch

Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas
Conductor crossing clearances

Day 2 (8:00 am – 4:00 pm)

Clearances to Other Line Structures
Building clearances
Bridge clearances
Swimming pool clearances
Grain bin clearances
Conductor to conductor clearances

Lunch

Joint Use clearances

- supply space
- communication worker safety zone
- communication worker safety zone

Climbing Space clearances
Working Space clearances
Clearances of vertical and lateral conductors and cables
Selected grounding methods of Section 9

2.0-day Applying the 2012 NESC Clearances & Grounding Rules for Facilities on Joint-Use Lines Workshop

(one instructor unless over 35 people)
2.0-DA-2-JU [1.35 CEU; 13.5 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction
Organization of the NESC
Utility responsibilities: How to use the code: Grandfather Clause
Definitions and references
Structure Location

Lunch

Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas
Conductor crossing clearances

Day 2 (8:00 am – 4:00 pm)

Clearances to Other Line Structures
Building clearances
Bridge clearances
Swimming pool clearances
Grain bin clearances
Conductor to conductor clearances

Lunch

Joint Use clearances

- supply space
- communication worker safety zone
- communication worker safety zone

Developing clearances for various span lengths
Clearances of vertical and lateral conductors and cables
Selected grounding methods of Section 9

2.5-day Applying the 2012 NESC Clearances & Grounding Rules

(one instructor unless over 35 people)
2.5-DA-1 [1.70 CEU; 17.0 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction
Organization of the NESC
Utility responsibilities: How to use the code: Grandfather Clause
Definitions and references
Inspections

Lunch

Structure Location
Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas

Day 2 (8:00 am – 5:00 pm)

Conductor crossing clearances
Clearances to Other Line Structures
Building clearances
Bridge clearances
Swimming pool clearances
Grain bin clearances

Lunch

Conductor to conductor clearances
Joint Use clearances

- supply space
- communication worker
- communication space
- safety zone

 Climbing Space clearances
Working Space clearances
Clearances of vertical and lateral conductors and cables
Underground installation clearances

Day 3 (8:00 am – 11:00 am)

Supply Station Clearances
Grounding requirements of NESC
Parts 1, 2, and 3
Grounding methods of Section 9

2.5-day 2012 NESC Clearances & Grounding for Joint-Use Overhead Lines

(one instructor unless over 35 people)
2.5-DA-2-JU [1.70 CEU; 17.0 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction
Organization of the NESC
Utility responsibilities: How to use the code: Grandfather Clause
Definitions and references
Inspections

Lunch

Structure Location
Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas

Day 2 (8:00 am – 5:00 pm)

Conductor crossing clearances
Clearances to Other Line Structures
Building clearances
Bridge clearances
Swimming pool clearances
Grain bin clearances

Lunch

Conductor to conductor clearances
Joint Use clearances

- supply space
- communication worker
- communication space
- safety zone

 Climbing Space clearances
Working Space clearances
Clearances of vertical and lateral conductors and cables
Developing clearances for various span lengths

Day 3 (8:00 am – 11:00 am)

Developing clearances for various span lengths (continued)
Grounding requirements of NESC
Parts 1, 2, and 3
Grounding methods of Section 9

2.5-day Joint-Use Overhead Line Clearances and Inspection

(one instructor unless over 35 people)
2.5-DA-3-JUI [1.70 CEU; 17.0 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction
Organization of the NESC
Utility responsibilities: How to use the code: Grandfather Clause*
Definitions and references
Inspections
Selected Clearances*

Lunch

Structure Location
Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas
Conductor crossing clearances

Day 2 (8:00 am – 5:00 pm)

Clearances to Other Line Structures*
Conductor to conductor clearances*
Joint Use clearances
■ supply space ■ communication worker
■ communication space safety zone

Lunch

Climbing Space Clearances*
Working space Clearances*
Clearances of Vertical and Lateral Conductors and Cables*
Developing Clearances for Various Span Lengths

Day 3 (8:00 – 11:00 am)

Basic grounding and bonding requirements for overhead joint-use pole lines
Exercises to determine required clearances using photographs of actual installations

Adjourn

2.5-day Overhead Clearances Grounding Loadings & Strengths

(one instructor unless over 35 people)
2.5-DA-4-OH [1.70 CEU; 17.0 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction
Organization of the NESC
Utility responsibilities: How to use the code: Grandfather Clause*
Definitions and references
Inspections

Lunch

Structure Location*
Vertical clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas

Day 2 (8:00 am – 5:00 pm)

Vertical clearances cont'd
Cable and conductor crossing clearances*

Lunch

Clearances to other line structures*
Building clearances
Bridge clearances
Swimming pool clearances
Grain bin
Cable to cable and cable to conductor clearances*
Joint Use clearances
■ supply space ■ communication worker
■ communication space safety zone

Climbing Space Clearances*
Working space Clearances*
Clearances of Vertical and Lateral Conductors and Cables*
Overhead loading & strengths

Day 3 (8:00 – 11:00 am)

Overhead loading & strengths cont'd
Grounding requirements of parts 1 and 2
Grounding methods of Section 9*

Adjourn

2.5-day Overhead Transmission Clearances & Grounding

(one instructor unless over 35 people)
2.5-DA-4-TR [1.70 CEU; 17.0 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction
Organization of the NESC
Utility responsibilities: How to use the code: Grandfather Clause*
Definitions and references
Inspections

Lunch

Structure Location*
Vertical clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas
History of vertical clearance changes applicable to transmission line ratings

Day 2 (8:00 am – 5:00 pm)

Vertical clearances cont'd
Cable and conductor crossing clearances*
Clearances to other line structures*
Building clearances
Bridge clearances
Swimming pool clearances
Grain Bin clearances

Lunch

Cable to cable and cable to conductor clearances*
Joint-use clearances

- supply space
- communication worker
- communication space
- safety zone
- antennas, cameras, etc.

Climbing space clearances*
Working space clearances
Clearances of vertical and lateral conductors and cables*
Introduction to NESC strengths and loadings rules

Day 3 (8:00 – 11:00 am)

Supply station clearances
Grounding requirements of parts 1 and 2
Grounding methods of Section 9* applicable to transmission

Adjourn

3.0-day Applying the 2012 NESC

(two instructors required)
3.0-DA-1 [2.05 CEU; 20.5 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction
Organization of the NESC
Utility responsibilities: How to use the code: Grandfather Clause
Definitions and References
Inspections
Structure Location

Lunch

Vertical Clearances above Railroads, roadways, Parking Lots, Driveways, Farm areas, Pedestrian Areas, and Water Areas

Day 2 (8:00 am – 5:00 pm)

Conductor Crossing Clearances
Clearances to Other Line Structures
Clearances to Buildings, Signs, Tanks and other Installations
Bridge Clearances
Swimming Pool Clearances
Clearances to Grain Bins, Coal Silos, etc.

Lunch

Conductor to conductor clearances
Climbing Space clearances
Working Space clearances
Clearances to vertical and lateral conductors and cables

Day 3 (8:00 am – 4:00 pm)

Joint Use clearances

- supply space
- communication worker safety zone
- communication space

 Overhead General
Vegetation Management
Grounding requirements of Parts 1, 2, and 3
Grounding methods of Section 9

Lunch

Supply Station clearances
Underground Installation Clearances
Selected Work Rules

3.0-day 2012 NESC Clearances & Grounding Rules for Joint-Use Overhead Lines

(two instructors required)
3.0-DA-2-JU [2.05 CEU; 20.5 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction
Organization of the NESC
Utility responsibilities: How to use the code: Grandfather Clause
Definitions and References
Inspections
Grounding Requirements of Parts 1, 2, and 3

Lunch

Grounding Methods of Section 9

Day 2 (8:00 am – 5:00 pm)

Vertical clearances continued
Conductor Crossing Clearances
Clearances to Other Line Structures
Building Clearances

Lunch

Bridge clearances
Swimming pool clearances
Grain bin clearances
Conductor to conductor clearances
Joint Use clearances

- supply space
- communication worker safety zone
- communication space

Day 3 (8:00 am – 4:00 pm)

Climbing Space clearances*
Working Space clearances*
Clearances of vertical and lateral conductors and cables*
Developing clearances for various span lengths*
Loadings & Strength considerations

- Grades of Construction

Lunch

- Required loadings
- Overload factors
- Strength factors
- Overlashed cables
- Abandoned cables
- Effect of unguyed service drops
- Sidewalk guys

3.5-day Applying the 2012 NESC (two instructors required) 3.5-DA-1 [2.40 CEU; 24.0 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction
Organization of the NESC
Utility responsibilities: How to use the code: Grandfather Clause
Definitions and References
Inspections
Structure Location

Lunch

Vertical Clearances above Railroads, roadways, Parking Lots, Driveways, Farm areas, Pedestrian Areas, and Water Areas

Day 2 (8:00 am – 5:00 pm)

Conductor Crossing Clearances
Clearances to Other Line Structures
Clearances to Buildings, Signs, Tanks and other Installations
Bridge Clearances
Swimming pool clearances
Clearances to Grain Bins, Coal Silos, etc.

Lunch

Conductor to conductor clearances
Climbing Space clearances
Working Space clearances
Clearances to vertical and lateral conductors and cables

Day 3 (8:00 am – 5:00 pm)

Joint Use clearances

- supply space
- communication worker safety zone
- communication space

 NESC and ANSI Z535 Safety Sign Requirements
Selected Strengths and Loadings
Selected Line Installation Rules

Lunch

Supply Station clearances
Underground Installation Clearances
Selected Work Rules

Day 4 (8:00 am – 11:00 am)

Overhead General
Vegetation Management
Grounding Requirements of Parts 1, 2, and 3
Grounding Methods of Section 9

1.0-day Grounding & Bonding Workshop

(one instructor unless over 35 people)
1.0-DA-5-GB [0.60 CEU; 6 PDH]

Day 1 (8:00 am – 4:00 pm)

Code compliance, emphasizing the requirements of the National Electrical Safety Code
 Different requirements of different states
 Grounding *requirements* for overhead and underground electric distribution systems, communication systems and electric supply stations
 Grounding *methods* and techniques on overhead and underground lines
 Required and recommended bonding
 Grounding analysis and calculations
 Grounding of communication messengers
 A comparison and analysis of multigrounded neutral distribution systems versus other types
 Requirements for connecting to customer-owned delta systems and single-grounded systems
 The interconnection of communication messengers and electric supply neutrals

Lunch

"Stray voltage"
 "Objectionable current"
 The relationship of grounding to corrosion
 Facts versus myths

- 25 ohm electrode impedance
- Using 40 ohms (and other values) as an assumed ground fault impedance

Customer grounding problems - covering some aspects of the NESC and NEC.
 Ground fault impedance values, system protection and reliability
 Transient overvoltages and grounding
 Short-term and long-term ampacity of made electrodes.
 A review of IEEE, ANSI and other grounding standards
 Code compliance, emphasizing the requirements of the National Electrical Safety Code
 Special considerations for fiber-optic cables

1.5-day Grounding & Bonding Workshop

(one instructor unless over 35 people)
1.5-DA-5-GB [1.00 CEU; 10 PDH]

Day 1 (8:00 am – 4:00 pm)

Code compliance, emphasizing the requirements of the National Electrical Safety Code
 Different requirements of different states
 Grounding *requirements* for overhead and underground electric distribution systems, communication systems and electric supply stations
 Grounding *methods* and techniques on overhead and underground lines
 Required and recommended bonding
 Grounding analysis and calculations
 Grounding of communication messengers
 A comparison and analysis of multigrounded neutral distribution systems versus other types
 Requirements for connecting to customer-owned delta systems and single-grounded systems
 The interconnection of communication messengers and electric supply neutrals

Lunch

"Stray voltage"
 "Objectionable current"
 The relationship of grounding to corrosion
 Facts versus myths

- 25 ohm electrode impedance
- Using 40 ohms (and other values) as an assumed ground fault impedance

Customer grounding problems - covering some aspects of the NESC and NEC.
 Ground fault impedance values, system protection and reliability
 Transient overvoltages and grounding
 Short-term and long-term ampacity of made electrodes.
 A review of IEEE, ANSI and other grounding standards
 Code compliance, emphasizing the requirements of the National Electrical Safety Code
 Special considerations for fiber-optic cables

Day 2 (8:00 am – 11:00 am)

Customer grounding problems - covering some aspects of the NESC and NEC.
 Temporary grounding requirements for line workers

Note: *When registering, please note if there are special topics you would like to be covered.*

The covered subjects will remove some of the mystery from this often-misunderstood area. Case studies of past experiences will be covered, along with discussions on techniques others have used successfully. Participants will leave this seminar with a greater confidence in their ability to handle unique situations.