
1. DANESC Seminars on Development and Application of the 2007 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 – 2007 Edition (PCU Training Center can provide at extra cost)
- ◆ NESC Handbook – 6th Edition (optional; at extra cost)

Power & Communication Utility Training Center DANESC In-House Seminars

Topics	Clearances	Supply Stations	Clearances & Grounding								Broad Coverage				Total Coverage		
											Intro to NESC	Detailed Discussions of NESC			Overhead Communication Clearances	Overhead & Underground Grounding & Bonding	
Number of Seminar Days **	0.5	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	1.0	1.0	1.5
Seminar Code**	DA-1	DA-2	DA-1	DA-2	DA-1	DA-2-JU	DA-1	DA-2-JU	DA-1	DA-2-JU	DA-1-IN	DA-1	DA-2-JU	DA-1	DA-3-CC	DA-4-GB	DA-4-GB
NESC Structure & Resp. of Utilities	⊕	○	⊕	○	●	●	■	■	■	■	⊕	■	■	■	●	■	■
Grounding			○	○	⊕	○	⊕	⊕	●	●	⊕	■	■	■		■!	■!
Overhead Lines—General							○		○	○	⊕	⊕	⊕	⊕		⊕	⊕
Development of Clearances	●		●		●	⊕	●	⊕	●	●	⊕	●	●	●	●	⊕	⊕
Overhead Clearances	○		⊕	●	⊕	⊕	⊕	⊕	●	●	⊕	●	●	■	⊕		
Supply Station Clearances									●			●	●	●			
Underground Clearances									●			●		●			
Exercises in Applying the NESC					⊕	⊕	●	⊕	●	●		■	■	■			
Exercises in Using Sag & Tension Charts for Loadings & Clearances						○		●		●		○	●	●	⊕		
Information Required to Determine Joint Use Clearances						●		●		●		●	●	●	●		
Pole Loading & Strength Calculation Exercises														○			
Overhead Strengths & Loadings											⊕			⊕			
Overhead Line Insulation											○			○			
Supply Stations		●															
Underground											⊕	○		⊕			
Work Rules											⊕	⊕		⊕		⊕	⊕
ANSI Z535 Utility Safety Signs														⊕			⊕
Continuing Education Units	0.35	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	0.60	0.60	1.00
Professional Development Hours	3.5	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	6.0	6.0	10.0

Legend	
○	Minimal Coverage
⊕	Selected Rules
●	Complete Rules
■	Expanded Discussion
■!	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*

1.5 day Applying the 2007 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
Development of Overhead Clearances
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
- communication space
- safety zone

 Selected grounding methods of Section 9

1.5 day Applying the 2007 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
Development of Overhead Clearances (Selected)
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
- communication space
- safety zone

 Developing clearances for various span lengths
Selected grounding methods of Section 9

2.0-day Applying the 2007 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
Development of Overhead Clearances
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
- communication space
- 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 2007 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
Development of Overhead Clearances
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
- communication space
- 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 2007 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
Development of Overhead Clearances

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 2007 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
Development of Overhead Clearances

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

3.0-day Applying the 2007 NESC
 (one instructor unless over 35 people)
 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
 Development of Overhead Clearances
 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
 ■ communication space safety zone

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 2007 NESC Clearances & Grounding Rules for Joint-Use Overhead Lines

(one instructor unless over 35 people)
 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
 Development of Overhead Clearances

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
- communication space safety zone

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

3.5-day Applying the 2007 NESC (one instructor unless over 35 people) 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
 Development of Overhead Clearances
 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
 ■ communication space safety zone

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-4-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 state
 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-4-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 state
 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 pm)

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.
 Temporary grounding requirements for line workers
 A review of IEEE, ANSI and other grounding standards

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.