

NESC Clearances & Grounding for Power & Communications Utilities

DA1

Featuring new discussions, new handouts
& new joint-use clearance exercises

2.4 CEU's

July 16-19, 2012

Myrtle Beach, SC

Instructors: Allen L. Clapp, PE,
and John B. Dagenhart, PE

Revised for
2012

3.5 Days — \$1545

Day 1

- ◆ Introduction
- ◆ Organization of the NESC
- ◆ Utility responsibilities
- ◆ How and when to use NESC "Grandfather Clause"
- ◆ Definitions and references
- ◆ Inspections
- ◆ Development of overhead clearances
- ◆ Structure location
- ◆ Vertical clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas

Day 2

- ◆ 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.
- ◆ Conductor to conductor clearances
- ◆ Climbing space clearances
- ◆ Working space clearances
- ◆ Clearances of vertical and lateral conductors and cables

Day 3

- ◆ Joint-use clearances
- ◆ How to determine correct joint-use cable position in the field to meet NESC design condition clearances
- ◆ Joint-use clearance exercises
- ◆ NESC and ANSI Z535 Safety Sign Requirements
- ◆ Guy insulation rules
- ◆ Supply stations clearances
- ◆ Overhead General
- ◆ Communication protection
- ◆ Underground installation clearances

Day 4

- ◆ Redesigning pole top assemblies to increase both safety and efficiency
- ◆ Grounding requirements of Parts 1, 2, & 3

About the seminar

The NESC® is the basis for your power and communication line construction standards and work procedures. Safe installations improve community relations and system reliability, while decreasing long-term costs. Your personnel need to understand how to correctly apply the National Electrical Safety Code in both usual and unusual situations, particularly on joint-use pole lines.

Attendees 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 attendees.

Who should attend

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

Important topics

- ◆ How to apply the NESC to power, telephone, CATV and railroad utility systems 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
- ◆ Responsibilities for meeting NESC requirements
- ◆ Rationale behind NESC requirements
- ◆ How to treat a situation not directly addressed by the NESC
- ◆ How to correctly determine clearances between power and communication facilities

In addition, you receive

- ◆ Current National Electrical Safety Code
- ◆ Current NESC Handbook
- ◆ Bound Student Workbook
- ◆ Excerpts from Practical Utility Safety
- ◆ Exercise/Answer sets
- ◆ CEUs and NC or FL PDHs awarded upon successful completion of workshop
- ◆ Plus continental breakfasts, lunches, & refreshments

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Note: Adjourn @ 11:00am; plan flights for 1:30pm or later.

For complete information on our seminars and products visit our website www.PCUTraining.com or call Toll free 1.877.502.8900

Investigating & Documenting Accidental Public Contacts with Power & Communication Utility Facilities

June 18-21, 2012
Myrtle Beach, SC

Instructors: Allen L. Clapp, PE,
and John B. Dagenhart, PE

The premier seminar on utility accidents

Revised for
2012

About the seminar

When there is an accident, you need to gather and analyze the appropriate data yesterday—before it goes away. You need to quickly

- (a) determine whether you met the appropriate requirements and
- (b) secure information concerning the actions, qualifications, tools and equipment of other parties.

Regardless of whether you are on the team gathering data and analyzing the accident or you are developing the appropriate litigation strategy, it is vital that you understand what data is required, how to use it, and how to make it be the most effective in litigation. Discussions by engineers who have investigated well over 1000 utility accidents will help you understand effective ways to investigate and document accidents in a manner that will aid and promote effective litigation decisions.

At the end of the seminar, attendees are divided into teams to review a real accident scenario and prepare (a) lists of measurements and other data to be gathered and (b) present arguments to be made for each side, based on information provided in class.

Who should attend

- ◆ investigators
- ◆ attorneys
- ◆ paralegals
- ◆ engineers
- ◆ risk managers
- ◆ claims managers
- ◆ claims agents

Important topics

- ◆ Responsibilities of utilities
- ◆ Responsibilities of others
- ◆ How to investigate the scene
- ◆ How to make measurements in the field with hand tools
- ◆ How to document and control evidence
- ◆ How to reconstruct accidents
- ◆ How to apply codes and standards
- ◆ How to determine whether you met the appropriate requirements
- ◆ How to consider the effects of electricity on the body
- ◆ OSHA regulations applicable to members of the public

In addition, you receive

- ◆ Current National Electrical Safety Code
- ◆ Current NESC Handbook
- ◆ Bound Student Workbook
- ◆ Excerpts from Practical Utility Safety
- ◆ Exercise/Answer sets
- ◆ CEUs and NC or FL PDHs awarded upon successful completion of workshop
- ◆ Plus continental breakfasts, complete lunches, & refreshments

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Note: Adjourn @ 11:00am; plan flights for 1:30pm or later.

3.5 Days — \$1595

Day 1

- ◆ Case studies: Using codes, regulations and standards
 - Accidents: #1 - Dump truck, #1A - Crane, #1B - Backhoe, #2 - Sailboat
- ◆ How to determine compliance with codes and standards
 - NESC vs. NEC and OSHA
 - Which NESC edition applies
 - Old vs. new NESC clearance system
 - Standard vs. nonstandard clearances
 - Effect of temperature, wind and ice loading on clearances
- ◆ Electric shock effects
- ◆ Responsibilities of contractor
 - OSHA & state regulations

Day 2

- ◆ Case studies cont: Accident #3 - Antenna mounting failure
- ◆ Electrical work accidents
 - Electricians
 - Power line workers
 - Communication line workers
 - Using the Employee Misconduct defense
- ◆ Electrical installations
 - Operation of fuses, breakers, reclosers
- ◆ Accident reference information
 - Scaffold accidents
 - Ladder accidents
 - Over-height vehicle accidents
 - Farm accidents
 - Off-road vehicle accidents
 - Tree-trimming & decorating accidents
 - Boating accidents
 - Aircraft accidents
 - Substation accidents
- ◆ Accident site investigation & analysis tools
 - Vertical clearances above ground
 - Using hand tools for estimations of wire clearances
 - Outdoor exercise in making measurements with hand tools
 - Vertical & horizontal clearances to buildings & other installations
 - Exercise in determining if wire clearances are met

Day 3

- ◆ Documenting and preserving evidence
 - Matching evidence marks
 - Photographs vs videos; film vs digital
 - Accident check list
- ◆ Case studies cont: Accidents
 - #4 - Roof Replacement, #5 - Antenna Removal, #5A - Gutter installation, #5B - Billboard, and #5C - Painting a metal gas station canopy
- ◆ Pole hits
- ◆ Improperly guyed structures
- ◆ Making effective exhibits for depositions & trials
- ◆ Making effective videos
- ◆ Maintenance & control of evidence
- ◆ Additional useful information
 - Analysis of construction fatalities
 - Relevant OSHA regulations
 - Relevant ANSI standards
 - Relevant industry association standards
 - National Safety Council Industrial Data Sheets

Day 4

- ◆ Putting it all together
- ◆ Investigation
 - Split into groups to investigate for plaintiff and defendants for selected accident scenarios
 - Develop information to get at site
 - Present to class for feedback
- ◆ Summary jury trial
 - Use data found at site (provided to groups after investigation presentations)
 - Develop trial strategy
 - Plaintiff group presents significant points
 - Defense groups present significant counterpoints
 - Plaintiff group rebuts defense
 - Feedback from class

JOINT-USE WEEK

JW1

Part I: Loadings and Strengths

Part II: O-Calc Pro Pole Analysis Software Tutorial

Part III: Required Clearances

Featuring new discussions, new handouts
& new joint-use clearance exercises

August 6-10, 2012

Myrtle Beach, SC

Instructors: Allen L. Clapp, PE and Matt Gardner

**NEW
SOFTWARE!**

3.44 CEU's

About the seminar

This special Tutorial Week on Physical Design of Joint-Use Wood Pole Distribution Lines addresses the increasing problem of accommodating larger numbers and sizes of cables and conductors on wood pole utility lines. Unfortunately, line failures and clearance problems have increased in recent years due to overloading poles.

Attendees will be divided into teams to work exercises in each part.

This course is particularly designed for engineers and technicians who want to add or increase expertise in facility placement and structural design of wood pole lines. Written answers are given for each question of the practical exercises worked in class, including rule references. Additional exercises and answers are provided for later use by attendees.

Who should attend

- ◆ designers and staking technicians
- ◆ engineering technicians
- ◆ make-ready and final inspectors
- ◆ electrical engineers
- ◆ standards developers
- ◆ contractors

Important topics

Part 1: Loadings & Strengths

- ◆ Determine if new facilities can be added to existing wood poles
- ◆ Determine required Grade of Construction
- ◆ Calculate wind & ice loadings on structures & supported facilities
- ◆ Calculate stress on poles & crossarms
- ◆ Calculate strength of poles & crossarms
- ◆ Determine required pole class
- ◆ Properly use the NESC to develop standards and joint-use contracts for new construction or check compliance of existing construction
- ◆ Increase pole life & reliability
- ◆ Responsibilities for meeting NESC requirements
- ◆ Rationale behind NESC requirements
- ◆ Determine required wood pole class

Part 2: O-Calc Pro

- ◆ How to use the new O-Calc Pro wood pole analysis software to calculate loading and required pole strength
- ◆ Determine if new facilities can be added to existing wood poles
- ◆ Calculate stress on poles & crossarms
- ◆ Calculate strength of poles & crossarms
- ◆ Determine required pole class
- ◆ Increase pole life & reliability
- ◆ Determine required wood pole class

Students must bring a laptop computer to use the software in class for Part II.

Part 3: Clearances

- ◆ Determine required wood pole height
- ◆ Determine if new facilities can be added to existing wood poles
- ◆ Determine required clearances between wires & cables at the pole & required pole height
- ◆ Properly use the NESC to develop standards and joint-use contracts for new construction or check compliance of existing construction
- ◆ Responsibilities for meeting NESC requirements
- ◆ Rationale behind NESC requirements

It is recommended that students bring a scientific calculator to Parts I & III.

In addition, you receive

	Part 1	Part 2	Part 3
Current National Electrical Safety Code and NESC Handbook	✓		✓
Demo copy of O-Calc Pro Pole Analysis Software w/ 5% PCU Training Center discount coupon & 5% Osmose discount coupon if O-Calc is purchased from PCUtraining within 45 days of seminar; total of 10% O-Calc discounts	✓	✓	
Bound Student Workbook	✓	✓	✓
Bound Appendix Book of helpful charts, tables and technical discussions	✓		
Excerpts from Practical Utility Safety	✓		✓
Exercise/Answer Sheets	✓		✓
CEUs and NC or FL PDHs awarded upon successful completion on workshop	✓	✓	✓
Plus continental breakfasts, lunches & refreshments	✓	✓	✓

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JOINT-USE WEEK SCHEDULE

All 5 Days — \$1845

- **Parts I & II only — \$1595**
- **Parts II & III only — \$1565**
- **Parts I & III only — \$1695**
- **Part I only — \$1075**
- **Part II only — \$785**
- **Part III only — \$1045**

Part I: Loading and Strength Calculations (1.37 CEU's)		Part II: O-Calc Pro Pole Analysis Software Tutorial (0.7 CEU's)		Part III: Clearances on Joint-Use Pole Lines (1.37 CEU's)	
Mon (8 am - 5 pm)	Tues (8 am - 3:30 pm)	Wed (8 am - 4 pm)	Thurs (8 am - 5 pm)	Fri (8 am - 3:30 pm)	Fri (8 am - 3:30 pm)
<ul style="list-style-type: none"> ◆ Introduction ◆ NESC Organization ◆ Application of the Grandfather Clause ◆ Practical consideration of: effects of difficulties in obtaining desired sag/tensions and guying tensions, long spans next to short spans, etc. ◆ Using sag & tension calculations ◆ Required Grades of Construction 	<ul style="list-style-type: none"> ◆ Calculating required pole strength class for various configurations ◆ Guying deadends and angles, including: <ul style="list-style-type: none"> • Required guy strength • Effects on poles ◆ Buckling strength for deadend, angle & transformer poles ◆ Calculating maximum spans for various configurations 	<ul style="list-style-type: none"> ◆ O-Calc fundamentals ◆ Program overview ◆ Review functions & features ◆ Create groups & poles ◆ Basic design inputs ◆ How to model a pole ◆ Adding wires & attachments ◆ Guying ◆ Understanding loading results ◆ How to determine sag and tension 	<ul style="list-style-type: none"> ◆ Introduction ◆ Organization of the NESC ◆ Utility responsibilities: How to use the Grandfather Clause ◆ Definitions and references ◆ Development of overhead clearances ◆ Vertical clearances of lowest wires or cables above ground rails and water 	<ul style="list-style-type: none"> ◆ Calculations of required clearances at poles for various spans, types & sizes of power conductors & cables and telephone & CATV cables <ul style="list-style-type: none"> • supply space • communication space • communication worker safety zone ◆ Special considerations for fiber-optic cables 	<ul style="list-style-type: none"> ◆ Calculations of required clearances at poles for various spans, types & sizes of power conductors & cables and telephone & CATV cables <ul style="list-style-type: none"> • supply space • communication space • communication worker safety zone ◆ Special considerations for fiber-optic cables
Lunch (noon - 12:30)	Lunch (noon - 12:30)	Lunch (noon - 12:30)	Lunch (noon - 12:30)	Lunch (noon - 12:30)	Lunch (noon - 12:30)
<ul style="list-style-type: none"> ◆ Calculating the strength of poles and crossarms <ul style="list-style-type: none"> • At groundline • At supply space • At bolt holes • At intermediate points ◆ Required strength factors 	<ul style="list-style-type: none"> ◆ Adding cables or conductors to existing lines <ul style="list-style-type: none"> • Effects of overlashed cables ◆ Determining appropriate clearance specifications & loading limits in joint-use contracts ◆ Calculating bending stresses caused by guys on poles ◆ Calculating the limitations on use of sidewalk street guys & pole push braces 	<ul style="list-style-type: none"> ◆ Compare results using a variety of pole classes, NESC loading districts & grade of constructions ◆ O-Calc – Advanced ◆ Exercise: Angle pole ◆ Exercise: Deadend pole ◆ Exercise: Joint-use pole ◆ Use O-Calc to demonstrate & understand the impact of joint-use attachments ◆ Advanced tips & tricks ◆ How to set up pole templates ◆ How to share pole loading results 	<ul style="list-style-type: none"> ◆ Vertical & horizontal clearances between wires, conductors & cables <ul style="list-style-type: none"> • At the pole • In the span ◆ Using sag & tension calculations <ul style="list-style-type: none"> • Effects of differences in sags & tensions on clearances & 	<ul style="list-style-type: none"> ◆ Selection of pole heights for various spans & configurations ◆ Adding cables or conductors to existing lines <ul style="list-style-type: none"> • Effects of overlashed cables ◆ Determining appropriate clearance specifications & loading limits in joint-use contracts ◆ Practical consideration of: effects of difficulties in obtaining desired sag/tensions and guying tensions, long spans next to short spans, etc. 	<ul style="list-style-type: none"> ◆ Selection of pole heights for various spans & configurations ◆ Adding cables or conductors to existing lines <ul style="list-style-type: none"> • Effects of overlashed cables ◆ Determining appropriate clearance specifications & loading limits in joint-use contracts ◆ Practical consideration of: effects of difficulties in obtaining desired sag/tensions and guying tensions, long spans next to short spans, etc.

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STRENGTHS & LOADINGS for WOOD POLE UTILITY LINES

Part I: Loadings & Strengths; Wood Pole Design

Part II: O-Calc Pole Analysis Software Tutorial

SL2



NEW!

March 7-9, 2012

Las Vegas, NV

Instructors: Allen L. Clapp, PE, and Matt Gardner

Featuring new discussions and new handouts

3 days \$1595, 2.0 CEUs

About the seminar

This special Tutorial Week on Required Strengths & Loadings for Wood Pole Utility Lines addresses the increasing problem of accommodating larger numbers and sizes of cables and conductors on wood pole utility lines. Unfortunately, line failures have increased in recent years due to overloading poles.

Attendees will be divided into teams to work exercises in each part.

This course is particularly designed for engineers and technicians who want to add or increase expertise in and structural design of wood pole lines. Written answers are given for each question of the practical exercises worked in class, including rule references. Additional exercises and answers are provided for later use by attendees.

Who should attend

- ◆ designers and staking technicians
- ◆ engineering technicians
- ◆ make-ready and final inspectors
- ◆ electrical engineers
- ◆ standards developers
- ◆ contractors

Important topics

Part I

- ◆ Determine if new facilities can be added to existing wood poles
- ◆ Determine required Grade of Construction
- ◆ Calculate wind & ice loadings on structures & supported facilities
- ◆ Calculate stress on poles & crossarms
- ◆ Calculate strength of poles & crossarms
- ◆ Determine required pole class
- ◆ Properly use the NESC to develop standards and joint-use contracts for new construction or check compliance of existing construction
- ◆ Increase pole life & reliability
- ◆ Responsibilities for meeting NESC requirements
- ◆ Rationale behind NESC requirements
- ◆ Determine required wood pole class

Part II

- ◆ How to use the new O-Calc Pro Wood Pole Analysis Software to determine if new facilities can be added to existing wood poles
- ◆ Calculate stress on poles & crossarms
- ◆ Calculate strength of poles & crossarms
- ◆ Determine required wood pole class
- ◆ Increase pole life & reliability
- ◆ How to use O-Calc to calculate loading & required pole strength
- ◆ Determine sags and tensions using O-Calc

It is recommended that students bring a scientific calculator to Part I.

Students must bring a laptop computer to use the software in class for Part II.

In addition, you receive

	Part I	Part II
Current National Electrical Safety Code and NESC Handbook	✓	
Demo copy of O-Calc Pro Pole Analysis Software w/ 5% PCU Training Center discount coupon & 5% Osmose discount coupon if O-Calc is purchased from PCUtraining within 45 days of seminar: total of 10% O-Calc discounts	✓	✓
Bound Student Workbook	✓	✓
Bound Appendix Book of helpful charts, tables and technical discussions	✓	
Excerpts from Practical Utility Safety	✓	
Exercise/Answer Sheets	✓	
CEUs and NC or FL PDHs awarded upon successful completion on workshop	✓	✓
Plus continental breakfasts, lunches & refreshments	✓	✓

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STRENGTHS & LOADINGS for WOOD POLE UTILITY LINES

All 3 Days — \$1545



- **Parts I & II — \$1595**
- **Part I only — \$1075**
- **Part II only — \$785**

Part I: Loading & Strength Calculations (1.37 CEU's)		Part II: O-CALC Pro Pole Analysis Software Tutorial (0.7 CEU's)
Day 1 (8 am - 5 pm)	Day 2 (8 am - 4:00 pm)	Day 3 (8 am - 4 pm)
<ul style="list-style-type: none"> ◆ Introduction ◆ NESC Organization ◆ Application of the Grandfather Clause ◆ Practical consideration of: effects of difficulties in obtaining desired sag/tensions and guying tensions, long spans next to short spans, etc. ◆ Using sag and tension calculations ◆ Required Grades of Construction 	<ul style="list-style-type: none"> ◆ Calculating required pole strength class for various configurations ◆ Guying for deadends and angles, including <ul style="list-style-type: none"> • Required guy strength • Effects on poles ◆ Buckling strength for deadend, angle and transformer poles ◆ Calculating maximum spans for various configurations 	<ul style="list-style-type: none"> ◆ O-Calc Fundamentals ◆ Program Overview ◆ Review functions and features ◆ Create groups and poles ◆ Basic design inputs ◆ How to model a pole ◆ Adding wires and attachments ◆ Guying ◆ Understanding loading results ◆ How to determine sag and tension
Lunch (noon - 12:30)	Lunch (noon - 12:30)	Lunch (noon - 12:30)
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NESC Clearances & Grounding for Overhead Joint-Use Power & Communications Utilities

DA2
1.7 CEU's

Featuring new discussions, new handouts
& new joint-use clearance exercises

March 12-14, 2012

Las Vegas, NV

Instructor: Allen L. Clapp, PE.

Revised for
2012

About the seminar

The NESC® is the basis for your power and communication line construction standards and work procedures. Safe installations improve community relations and system reliability, while decreasing long-term costs. Your personnel need to understand how to correctly apply the National Electrical Safety Code in both usual and unusual situations, particularly on joint-use pole lines.

Attendees 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 attendees.

Who should attend

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

Important topics

- ◆ How to apply the NESC to overhead joint-use power and communication lines in practical situations
- ◆ How to properly use the NESC to develop clearances and grounding standards for new construction or check compliance of existing construction
- ◆ Responsibilities for meeting NESC requirements
- ◆ Rationale behind NESC requirements
- ◆ How to treat a situation not directly addressed by the NESC
- ◆ How to correctly determine clearances between power and communication facilities on overhead pole lines

In addition, you receive

- ◆ Current National Electrical Safety Code
- ◆ Current NESC Handbook
- ◆ Bound Student Workbook
- ◆ Excerpts from Practical Utility Safety
- ◆ Exercise/Answer sets
- ◆ CEUs and NC or FL PDHs awarded upon successful completion of workshop
- ◆ Plus continental breakfasts, lunches, & refreshments

2.5 Days — \$1195

Day 1

- ◆ Introduction
- ◆ Organization of the NESC
- ◆ Utility responsibilities
- ◆ How and when to use NESC "Grandfather Clause"
- ◆ Definitions and references
- ◆ Inspections
- ◆ Development of overhead clearances
- ◆ Structure location
- ◆ Vertical clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas

Day 2

- ◆ 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.
- ◆ Conductor to conductor clearances
- ◆ Climbing space clearances
- ◆ Working space clearances
- ◆ Clearances of vertical and lateral conductors and cables

Day 3

- ◆ Joint-use clearance exercises
- ◆ How to determine correct joint-use cable position in the field to meet NESC design condition clearances
- ◆ Grounding requirements of Parts 1, 2, & 3

Note: Adjourn @ 11:00am; plan flights for 1:30pm or later.