

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

April 25-28, 2016
Myrtle Beach, SC

Instructor: Allen L. Clapp, PE,

Revised for
2016

The premier seminar on utility accidents

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. You will learn how to use SAG-10 to determine conductor movement.

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
- ◆ **NEW!** How to use SAG-10 to determine conductor movement
- ◆ 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

Bring a PC laptop set up to be able to download and install software. Check with your IT folks to make sure you can install software on the laptop you bring. Software will not run on an iPad.

In addition, you receive

- ◆ 2012 National Electrical Safety Code
- ◆ Demo copy of Southwire's SAG-10 Software
- ◆ NESC Handbook 7th Ed
- ◆ Bound Student Workbook, with references to applicable NESC rules and OSHA regulations
- ◆ 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 — \$1,695

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
 - NESC Grandfather Clause
 - 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
 - NEC clearance/grounding
- ◆ 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
 - Conductor sag issues
 - SAG-10 Tutorial
 - Vertical sags
 - Horizontal wind deflection
 - 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

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

LOADING & STRENGTHS CALCULATIONS FOR WOOD POLE LINES

SW

Part I: Loadings & Strengths Part II: O-Calc Pole Analysis Software Tutorial

Revised for
2016

May 16–19, 2016
Myrtle Beach, SC

Featuring new discussions and new handouts

2.8 CEUs, 28 PDHs

Instructors: Allen L. Clapp, PE and Mike Rigney, PhD

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 wood pole class
- ◆ Properly use the NESC to develop standards and joint-use contracts for new construction or check compliance of existing construction
- ◆ Determine stress from guy loadings
- ◆ Increase pole life & reliability
- ◆ Responsibilities for meeting NESC requirements
- ◆ Rationale behind NESC requirements

Part II

- ◆ Setting up O-Calc Pro
- ◆ Basic pole modeling
- ◆ Analyzing a pole from top to bottom
- ◆ Advanced pole modeling
- ◆ Joint-Use attachment
- ◆ Digital measurement technology
- ◆ Creating pole templates
- ◆ Advanced tips and tricks

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 |
|---|--------|---------|
| 2012 National Electrical Safety Code and NESC Handbook, 7 th Edition | ✓ | |
| 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 (user guide for Part II) | ✓ | ✓ |
| Bound Resource 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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LOADING & STRENGTHS CALCULATIONS FOR WOOD POLE LINES

All 4 Days — \$1,850

| <ul style="list-style-type: none"> • Part I only — \$1,225 • Part II only — \$735 | | <p style="text-align: center;">Part I: Loading & Strength Calculations 2.5 days 1.75 CEU's</p> | | <p style="text-align: center;">Part II: O-CALC Pro Pole Analysis Software Tutorial 1.5 days 1.05 CEU's</p> | |
|--|---|--|---|---|--|
| Day 1 (8 am - 5 pm) | Day 2 (8 am - 4:00 pm) | Day 3 (8 am - 5:00 pm) | Day 4 (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. | <ul style="list-style-type: none"> ◆ Required Grades of Construction, required loadings, and load factors ◆ Assumed loads, load factors & strength factors <ul style="list-style-type: none"> • NESC vs. California GO 95 ◆ Required strength factors ◆ Example calculations <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 | <ul style="list-style-type: none"> ◆ Calculating bending stresses caused by guys on poles ◆ Calculating the limitations on use of sidewalk street guys and pole push braces <p style="text-align: center;">Part I Ends at noon</p> | <ul style="list-style-type: none"> ◆ NESC Loading Districts & Grades of Construction ◆ Advanced pole modeling ◆ Joint use attachments and bundle editor ◆ Digital measurement technology | | |
| Lunch (noon - 12:30) | Lunch (noon - 12:30) | Lunch (noon - 12:30) | Lunch (noon - 12:30) | | |
| <ul style="list-style-type: none"> ◆ Using sag and tension calculations ◆ Strengths & loadings primer <ul style="list-style-type: none"> • Loads • Reactions ◆ Pole loading and strength calculations : <ul style="list-style-type: none"> • Simplified force calculations • Shear forces • Overturning & bending moments • Wind on poles & supported facilities • Force, moments, & shear diagrams • Stress calculations • Pole volume & weight • Pole strength • Reduced pole strength due to rot • Buckling <ul style="list-style-type: none"> ▫ Tangent ▫ Angles ▫ Deadends ◆ Calculating the strength of poles and crossarms <ul style="list-style-type: none"> ▫ At groundline ▫ At supply space ▫ At bolt holes ▫ At intermediate points ◆ Pole embedment depth | <ul style="list-style-type: none"> • Buckling strength for deadend, angle and transformer poles • Calculating maximum spans for various configurations • Adding cables or conductors to existing lines <ul style="list-style-type: none"> ▫ Effect of overlashed cables ◆ Determining appropriate clearance specifications and loading limits in joint-use contracts | <p style="text-align: center;">Part II Begins</p> <ul style="list-style-type: none"> ◆ Introduction to O-Calc Pro ◆ Program overview ◆ Program development history and newest features ◆ Detailed discussion on program layout and menus ◆ Basic pole modeling ◆ Understanding analysis results | <ul style="list-style-type: none"> ◆ Creating pole templates ◆ Advanced tips & tricks ◆ Presentation on upcoming O-Calc Pro features <p style="text-align: center;">Part II Ends at 4pm</p> | | |

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LOADING & STRENGTHS CALCULATIONS FOR WOOD POLE LINES

SW

Part I: Loadings & Strengths Part II: SPIDAcalc Software Tutorial

Revised for
2016

April 4–7, 2016

Myrtle Beach, SC

Instructors: Allen L. Clapp, PE and Brett Willitt

Featuring new discussions and new handouts

2.8 CEUs, 28 PDHs

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 SPIDAcalc 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 SPIDAcalc to calculate loading & required pole strength
- ◆ Determine sags and tensions using SPIDAcalc

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 |
|---|--------|---------|
| 2012 National Electrical Safety Code and NESC Handbook, 7 th Edition | ✓ | |
| Demo copy of SPIDAcalc Software w/ 5% PCU Training Center licensing credit & 5% SPIDA Web licensing credit if SPIDAcalc is purchased from PCUtraining within 45 days of seminar: total of 10% SPIDAcalc licensing credits | ✓ | ✓ |
| Bound Student Workbook (user guide for Part II) | ✓ | ✓ |
| Bound Resource 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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LOADING & STRENGTHS CALCULATIONS FOR WOOD POLE LINES

All 4 Days — \$1,850

| <p>• Part I only — \$1,225 • Part II only — \$735</p> <p style="text-align: center;">Part I: Loading & Strength Calculations</p> <p style="text-align: center;">2.5 days 1.75 CEU's</p> | | | <p style="text-align: center;">Part II: SPIDACalc Software Tutorial</p> <p style="text-align: center;">1.5 days 1.05 CEU's</p> |
|--|---|---|--|
| Day 1 (8 am - 5 pm) | Day 2 (8 am - 4:00 pm) | Day 3 (8 am - 5:00 pm) | Day 4 (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. | <ul style="list-style-type: none"> ◆ Required Grades of Construction, required loadings, and load factors ◆ Assumed loads, load factors & strength factors <ul style="list-style-type: none"> • NESC vs. California GO 95 ◆ Required strength factors ◆ Example calculations <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 | <ul style="list-style-type: none"> ◆ Calculating bending stresses caused by guys on poles ◆ Calculating the limitations on use of sidewalk street guys and pole push braces <p style="text-align: center;">Part I Ends</p> | <p style="text-align: center;">General</p> <ul style="list-style-type: none"> ◆ Additional hands-on exercises <ul style="list-style-type: none"> • Span/Head Guying and Stub Pole Analysis • Sidewalk Analysis • Joint Use/Pole Attachment Remediation • Use of a utility's construction standards in the Framing Planner ◆ Attendees work a series of increasingly complex and challenging scenarios. |
| Lunch (noon - 12:30) | Lunch (noon - 12:30) | Lunch (noon - 12:30) | Lunch (noon - 12:30) |
| <ul style="list-style-type: none"> ◆ Using sag and tension calculations ◆ Strengths & loadings primer <ul style="list-style-type: none"> • Loads • Reactions ◆ Pole loading and strength calculations : <ul style="list-style-type: none"> • Simplified force calculations • Shear forces • Overturning & bending moments • Wind on poles & supported facilities • Force, moments, & shear diagrams • Stress calculations • Pole volume & weight • Pole strength • Reduced pole strength due to rot • Buckling <ul style="list-style-type: none"> ▫ Tangent ▫ Angles ▫ Deadends ◆ Calculating the strength of poles and crossarms <ul style="list-style-type: none"> ▫ At groundline ▫ At supply space ▫ At bolt holes ▫ At intermediate points ◆ Pole embedment depth | <ul style="list-style-type: none"> • Buckling strength for deadend, angle and transformer poles • Calculating maximum spans for various configurations • Adding cables or conductors to existing lines <ul style="list-style-type: none"> ▫ Effect of overlashed cables ◆ Determining appropriate clearance specifications and loading limits in joint-use contracts | <p style="text-align: center;">Part II Begins</p> <p style="text-align: center;">General</p> <ul style="list-style-type: none"> ◆ A general overview and introduction to SPIDACalc ◆ Screens, Views, Menu options, and operation. ◆ File creation, settings, and Load Cases. ◆ Creating a pole design. ◆ Analyzing designs and system outputs. | <p style="text-align: center;">Advanced</p> <ul style="list-style-type: none"> ◆ Using the Client Editor to configure and maintain a SPIDACalc client file, <ul style="list-style-type: none"> • Client Editor interface. • How to input specific structural and engineering data to build your explicit materials and construction standards. • Structural analysis options and settings. • How to configure custom forms ◆ Using SPIDACalc to evaluate in-service pole damage and determine its serviceability. ◆ Using the SPIDACalc Photo Measuring Tool to obtain pole measurements. ◆ How to create data forms in SPIDACalc. |

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Overhead Line Design: Conductor Sags, Tensions and Clearances

Featuring a Tutorial on SAG10 sag & tension software

March 14–17, 2016 — Myrtle Beach, SC

Instructor: Allen L. Clapp, PE

2.4 CEUs, 24 PDHs

About the seminar

This special 3.5 day seminar on Overhead Line Design: Conductor Sags, Tensions and Clearances 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 improper attachments.

Attendees will (1) learn and complete exercises on National Electrical Safety Code clearances, and (2) learn and use Southwire's SAG10 sag and tension program to determine sags for clearance design (including inclined spans, marker balls, and overlashed cables) and tensions for pole, guy, and anchor design.

This course is particularly designed for engineers and technicians who want to add or increase expertise in facility placement and clearance determination on overhead 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

- ◆ Use SAG10 program to determine sags and tensions
- ◆ Determine required clearances on pole lines and at line crossings
- ◆ Determine if new facilities can be added to existing poles
- ◆ Determine required clearances between wires and cables at the pole and 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

In addition, you receive

- ◆ 2012 National Electrical Safety Code
- ◆ NESC Handbook, 7th Edition
- ◆ Demo copy of Southwire's SAG10 sag and tension software
- ◆ Bound Student Workbook
- ◆ Bound Appendix Book of helpful charts, tables and technical discussions
- ◆ Excerpts from Practical Utility Safety
- ◆ Exercise/Answer sets
- ◆ CEUs and NC PDHs awarded upon successful completion of workshop
- ◆ Plus continental breakfasts, lunches, & refreshments

Bring a PC laptop set up to be able to download and install software. Check with your IT folks to make sure you can install software on the laptop you bring. No Mac or iPad devices.

It is recommended that students bring a scientific calculator.

3.5 Days — \$1,745

Day 1

- ◆ Introduction
- ◆ NESC Organization
- ◆ Utility Responsibilities and options
- ◆ How and when to use the Grandfather Clause
- ◆ Definitions and References
- ◆ Practical consideration of: effects of difficulties in obtaining desired sag/tensions and guying tensions, long spans next to short spans, etc.
- ◆ Using SW Rate to calculate conductor temperature
- ◆ Using sag and tension calculations
- ◆ Introduction to vertical clearances of lowest wires or cables above ground rails and water
- ◆ Vertical & horizontal clearances between wires, conductors & cables
 - At the pole
 - In the span
- ◆ Using sag & tension calculations
- ◆ Effects of differences in sags and tensions on clearances and loads

Day 2

- ◆ SAG10 Tutorial
 - Basic SAG10 menus
 - Setting up a project
 - Ruling spans
 - Calculating sags & tensions
 - Stringing Sags
 - Offset clipping
 - Catenary curve shape
- ◆ SAG10 Tutorial continued
 - Clearances at line crossings
 - Marker balls
 - Cable messengers
 - Inclined spans
- ◆ Overhead clearances continued

Day 3

- ◆ Overhead clearances continued
- ◆ Vertical clearances
- ◆ Crossing clearances
- ◆ How to determine correct joint-use cable position in the field to meet NESC design condition clearances
- ◆ Calculations of required clearances at poles for various spans, types and sizes of power conductors and cables and telephone and CATV cables
 - supply space
 - communication space
- ◆ communication worker safety zone
- ◆ Special considerations for fiber-optic cables
- ◆ Selection of pole heights for various spans and configurations
- ◆ Clearances to buildings, signs, tanks, and other installations

Day 4

- ◆ 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

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