

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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