

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)			
<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)			
<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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