



Power & Communication Utility Training Center

In-House Seminars and Workshops

PCU Training Center is the premier trainer for the National Electrical Safety Code (NESC)[®]. Over 25,000 participants of the following types from utilities, contractors, and regulatory agencies have attended our in-house and public courses on NESC[®] and OSHA requirements.

- design engineers
- standards engineers
- staking technicians
- make-ready inspectors
- construction inspectors
- line workers
- maintenance personnel
- managers
- claims investigators

Our instructors are engineers who participate on NESC subcommittees & are USDOL authorized OSHA instructors.

Our public seminars make great business sense—especially when you only have a few people to train at a time or you want to train an in-house instructor. For larger number of participants or specialized instruction, in-house seminars are very cost-effective. The most common standard seminar formats are shown immediately below. These can be modified, as desired. Complete descriptions of all standard seminars follow.

1. Development and Application of the National Electrical Safety Code

- a. 3.5 day DA-1 is a general course, including complete coverage of grounding and clearances rules with selected coverage of other code rules (2 instructors)
- b. 2.5 day DA-1 concentrates on clearances and grounding course, including complete coverage of grounding and clearance requirements for overhead, underground and supply stations (1 or 2 instructors)
- c. 2.5 day DA-2 concentrates on clearances and grounding for *joint-use* overhead lines and substitutes detailed practical exercises on using sag data to determine vertical spacing of joint-use facilities for the instruction on underground and supply stations clearances from (b) above. (1 or 2 instructors)

2. Tutorial on Physical Design of Joint-Use Wood Poles

- a. 3.5 day: 1.5 days on clearance calculations and 2 days on loading, stress, and strength calculations. Suitable for both engineers and design technicians. Attendees perform NESC allowable stress design calculations in teams.

3. Utility Contact Accidents Investigation and Litigation

- a. 3.5 day UCA-1 covers actions required for successful investigations, analyzing and litigating of public and worker accidents. (4 instructors)
- b. 2.5 day UCA-1 includes most of the investigation instructions and team exercises from the full 3.5 day UCA-1 seminar on investigating and litigating utility contact accidents, but does not include instruction from the burn unit physician, human factors expert, or outside attorney.
- c. 2.5 day UCA-2 is an advanced continuation of UCA-1 that uses cases studies to emphasize the use of OSHA “Employee Misconduct” defense criteria and multi-employer work site citation policy to determine responsibility for any worker-related accident. Attendees should have attended UCA-1 or have extensive knowledge of its subjects.

Brief Seminar Descriptions (see PCUTraining.com for full descriptions)

1. DANESC™ Seminars on Development and Application of the National Electrical Safety Code

This seminar typically concentrates on clearances and grounding; longer seminars also address additional topics such as strength requirements, NESC and OSHA work rules, etc. Some versions are general and others concentrate on an area, such as joint-use pole clearances. The range and depth of coverage varies from the 1 day introduction to the NESC to 3.5 day versions that discuss and provide exercises on practical applications, including selected table footnotes and other detailed requirements.

Participants work in teams to solve exercises involving areas of the NESC that are most difficult to understand or most often involved in accidents. Participants receive a workbook, reference materials, and exercises and answers. The most popular length for in-house presentations is 2.5 days, the maximum length without requiring multiple instructors. For longer seminars with more depth and coverage, or for more than 35 participants, two instructors are required. This seminar is intended for standards engineers, design technicians, line workers, and inspectors for power, telephone, CATV, and railroad utilities, contractors, and regulatory agencies, as well as attorneys and investigators involved in litigation.

NESC® is a registered trademark of the Institute of Electrical and Electronics Engineers, Inc.
DANESC™ is a trademark of Clapp Research, Inc.

2. Tutorial on Physical Design of Joint-Use Wood Pole Distribution Lines

This popular 3.5 day tutorial on joint-use pole design addresses the increasing problem of line failure and clearance problems due to overloading distribution poles with larger sizes and numbers of conductors, cables, and equipment. Participants learn how to (a) properly space conductors and cables on poles and calculate required pole height, (b) calculate loads on structures and supported facilities, and (c) determine required pole strength—all using NESC allowable stress design calculations. Includes limited discussion of using pole loading software.

This workshop includes a workbook with code references, formulas and sample exercises; an appendix book of printed reference materials, “cheat sheets” and technical discussions; excerpts from *Practical Utility Safety*, and exercises and answers. This workshop is especially useful for standards engineers, design engineers, design technicians, make-ready inspectors and line inspectors for utilities, contractors, and regulatory agencies.

A special version of this seminar only discusses the loading and strength requirements and includes 1 full day of training on the use of O-Calc pole loading software.

3. Investigating, Documenting, Analyzing and Litigating Accidents on Power and Communication Utility Systems

This seminar includes investigation and litigation techniques, accident scenarios, applicable standards, etc. Two things are critical to successful litigation:

1. Appropriate information must be obtained and analyzed properly on a timely basis.
2. The litigation team must present evidence and arguments in a manner that can be both fully understood and believed.

In over 1,300 accident investigations, we have seen some of the best and worst investigations and litigation preparations imaginable. Both winning techniques and potential pitfalls are presented in our multiple-instructor 3.5 day public UCA-1 seminar covering applicable codes and regulations, investigation techniques, evidence control, presentation techniques, witness preparation and the human factors and medical issues related to electrical contact accidents. A one-instructor 2.5 day UCA-1 workshop on utility accident investigation is also available.

Participants receive a workbook containing discussions of various codes, standards and regulations; sample accident reports and calculation sheets; investigation “cheat sheets” for various kinds of accidents; accident investigation tips; examples of good and bad exhibits; and other useful materials; as well as exercises and answers and excerpts from *Practical Utility Safety*.

An advanced extension of the UCA-1 seminar, UCA-2, uses case studies to emphasize analysis and determination of responsibilities for public and worker accident litigation and OSHA citations.

4. Follow-Up Seminar for users of the DANESC™ Videotape Series

Special 1 day live seminars are available for users of the NESC Videotaped Training available from Clapp Research, Inc. Presentations structured around questions supplied in advance by participants are given in the morning. The actual questions and written answers are discussed in the afternoon.

5. Occupational Safety and Health Administration Regulations

Clapp Research personnel are authorized to teach OSHA 10-hour and 30-hour courses on construction regulations. Instruction on OSHA regulations applicable to electric or communication utility personnel is normally combined with NESC work rules in special seminars.

Customize Any Seminar

Any combination or customization can be made. For example, if you can't spare everyone at the same time for long enough to cover the desired material, we can split the seminar and run multiple sets of each session at different times or mix and match subjects to suit your needs.

Prices vary with length of instruction, the costs and time of travel to your site, and materials provided. Call (877) 502-8900 to discuss your needs and to get price quotes for your location(s).

The daily starting and ending times and lunch breaks are typically predetermined based upon normal work hours of participants, travel requirements for participants and instructors, available places for lunch, etc. The hours shown herein are typical and may be adjusted as needed. If desired, the total length and class content may also be adjusted.

Seminars typically end at 11:00 a.m. (or 4:00 p.m.) to facilitate travel.

Additional Information

Required Course Material

You will need to provide (or we can provide at extra cost) a copy of the *National Electrical Safety Code (2012 Edition)* for each student. Access to the *NESC Handbook (7th Edition)* is recommended but not required. These items are provided by Clapp Research in the public seminars, but are not provided in the participant materials for in-house seminars unless requested (at additional cost).

Planning For Effective Class Participation

Inviting your joint-use utilities and contractors to your in-house seminar is an excellent way to get all interested parties working together to achieve common goals. If you don't have enough appropriate personnel to fill a class, we recommend inviting participation by your neighboring and/or joint-use utilities to make your seminar even more economical.

We do not recommend more than 35 participants—a larger number increases the time required for breaks and exercises, and thus, reduces course content, as well as reducing the questions asked by participants.

Continuing Education Units

The Continuing Education Unit (CEU) is a nationally recognized unit of measure for continuing education programs. One CEU equals 10 class contact hours, which translates into 10 Professional Development Hours (PDH) for engineers or 10 Continuing Legal Education (CLE) for attorneys. We can provide CEU certificates and maintain permanent CEU records for participants upon completion of our seminars at additional cost.

Related Services

Standards and Systems Reviews

Many clients have specific concerns about particular construction situations or standards used on their system and wish to have specific questions answered in conjunction with training. If the client so desires, instructors may (at extra cost):

1. Review client standards for NESC compliance, constructability, reliability, commonality of parts, etc., and/or
2. Travel to the seminar site a day or more early to review portions of the system construction or site-specific problems. Normal consulting rates and charges for applicable instructors apply to the additional time required for these additional services. This information can then be blended into the seminar.

Please note that the Power & Communication Utility Training Center is not a professional corporation and does not perform consulting services requiring a licensed professional engineer or land surveyor. If such services are provided by instructor personnel in conjunction with (or separate from) training provided through PCU Training Center, they will be performed under separate contract and billing through the applicable instructor's employer.

Some Previous In-house Seminar Clients

Investor-Owned Electric Utilities

Alabama Power Company
 Alaska Electric Light & Power
 Alliant Energy
 Ameren CIPS
 AmerenUE
 Appalachian Power Company
 Arizona Public Service Company
 Atlantic City Electric Company
 Baltimore Gas and Electric Co.
 Boston Edison Co.
 Carolina Power and Light Company
 Centerior Energy Corporation*
 Central Hudson Gas & Electric
 Central Illinois Public Service
 Central Louisiana Electric Co./CLECO*
 Central Power and Light Company*
 Central Vermont Public Service
 Cincinnati Gas & Electric Company
 Cinergy Corp
 Citizens Utilities
 Cleveland Electric Illuminating Co.*
 Columbus Southern Power Co.*
 Commonwealth Edison Company
 Connectiv
 Consolidated Edison
 Consumers Energy
 Consumers Power
 CP National
 Dayton Power and Light Company*
 Delmarva Power and Light Co.
 Detroit Edison
 Duke Energy Corporation
 Duquesne Light Company
 El Paso Electric*
 Empire District Electric Company*
 Entergy Arkansas*
 Florida Power Corporation
 Florida Power and Light Company*
 Georgia Power Company
 Gulf Power Company*
 Gulf States Utilities
 Hawaiian Electric Company*
 Houston Lighting and Power Co.*
 Idaho Power Company
 IES Utilities
 Illinois Power
 Indiana-Michigan Electric Co.
 Indianapolis Power & Light Co.
 Kansas Power and Light Company
 Kansas City Power and Light
 Kauai Electric Company*
 Kentucky Utilities Company
 Louisiana Power and Light Co.
 Louisville Gas and Electric
 Massachusetts Electric

Midwest Power Systems*
 MidAmerican Energy
 Minnesota Power Co.*
 Mississippi Power Company*
 Mississippi Power and Light Co.
 Monongahela Power Company
 Montana-Dakota Utilities
 Montana Power Company*
 Nevada Power Company
 New England Power Service
 New York State Electric and Gas Co.
 Niagara Mohawk*
 North Carolina Power*
 Northeast Utilities
 Northern Indiana Public Service Co.
 Northern States Power Company
 Ohio Edison
 Ohio Power Company
 Oklahoma Gas & Electric*
 Orange & Rockland Utilities, Inc.
 Otter Tail Power Company
 Pacific Gas and Electric
 Pacific Power and Light Company*
 Pacificorp
 Pennsylvania Electric Company
 Pennsylvania Power Company
 Pennsylvania Power and Light Co.
 PECO Energy (Philadelphia Elec.)
 Portland General Electric
 Potomac Edison Company*
 Potomac Electric Power Company
 PPL Electric Utilities*
 Progress Energy Florida*
 Progress Energy Carolinas (Car. P&L)
 PSI Energy (Public Service of IN)*
 Public Service Company of CO
 Public Service Co. of NH
 Public Service Company of NM*
 Puget Sound Power and Light Co*.
 Rochester Gas and Electric
 San Diego Gas and Electric Co.
 Savannah Electric and Power Co.
 Sierra Pacific Power Company*
 South Carolina Electric and Gas Co.*
 Southern California Edison
 Southwest Public Service Company
 Southwestern Electric Power Co.
 Tampa Electric Company*
 Texas Power and Light Company
 Toledo Edison
 TU Electric*
 Tucson Electric Power
 Union Electric Company
 United Illuminating*
 Utah Power and Light Company
 Virginia Power Company*

West Penn Power Company
 West Plains Energy
 West Virginia Power
 West Texas Utilities
 Wisconsin Electric Power Company
 Wisconsin Power & Light Company
 Wisconsin Public Service Company

Cooperative Electric Utilities

Adams Electric Coop (IL)
 Alaska Village Electric Cooperative
 Amicalola EMC
 Anoka Electric Cooperative (MN)
 Baldwin EMC*
 Benton County REC (IA)
 Blue Ridge Electric Cooperative (SC)
 Brazos Electric Cooperative
 Buckeye Rural Electrical Coop. (OH)
 Cass County Electric Cooperative*
 Chugach Electric Association (AK)*
 Cimmaron Electric Cooperative (NM)
 Claverack REC (PA)
 Clay Electric Cooperative (FL)*
 Columbus Electric Cooperative (NM)
 Consolidated Electric Cooperative, Inc. (OH)
 Dairyland Power Cooperative (WI)
 Delaware Electric Cooperative
 Delta-Montrose Electric Association*
 Duck River EMC (TN)
 East Kentucky Power Cooperative
 Electric Cooperatives of S.C.*
 Electric Power Associations of MS*
 Florida Electric Cooperatives Asso.*
 Golden Valley Electric (AK)
 Haywood EMC (NC)
 Intermountain REA (CO)
 Jackson EMC (GA)*
 Kauai Island Utility Cooperative*
 Kootenai Electric Coop (WA)
 LaPlata Electric Association
 Lee County Electrical Cooperative (FL)*
 Lumbee River EMC (NC)*
 Magic Valley Electric Cooperative (TX)
 Meriwether Lewis electric Cooperative
 Mohave Electric Cooperatives
 Moonlake Electric Association (UT)
 NC Association of Electric Coop.*
 North Central Mississippi EPA
 North Dakota Association of REC*
 Okefenokee REMC (GA)
 Owen County REC (KY)
 Ozarks Electric Cooperative Corporation*
 Plateau Electric Coop (TN)

Rappahanock Electric Cooperative*
 Rural Electric Company (WY)
 Santee Cooper/SC Pub. Serv. Authority*
 Southside Electric Cooperative*
 Southwest Electric Cooperative
 SW Tennessee Membership Cooperative
 Sumter Electric (FL)*
 Three Notch Electric Cooperative
 The Middle Tenn. Elect. Membership Corp.*
 Tlingit-Haida REA (AK)
 Tri-County Electric Cooperative
 Virginia Association of Electric Coop.*
 Withlacoochee River EC (FL)
 Yampa Valley Electric (CO)

Municipal and Public Power

Alexandria Light and Power
 American Municipal Power (OH)
 Chelan County PUD (WA)
 City Electric System of Key West*
 City of Angoon, THREA, et al
 City of Cleveland, Ohio*
 City of Franklin (TN)
 City of Fremont, Nebraska
 City of Gainesville, Florida
 City of Gastonia, North Carolina
 City of Gillette, (WY)
 City of Huntsville, Alabama
 City of La Follette, Tennessee
 City of Lakeland, Florida*
 City of Lenior, Tennessee
 City of Naperville (IL)
 City of Petersburg, Alaska
 City of Rockwood Tennessee
 City of Smithville
 City of Springfield*
 City of Wrangell
 Colorado Springs Utilities*
 ElectriCities of North Carolina*
 Gainesville Regional Utilities
 Jacksonville Electric Authority*
 Kissimee Utility Authority
 Knoxville Utilities Board (TN)
 Los Angeles Dept. of Water and Power
 Moticello Electric Plant Board
 Owensboro Municipal Utilities
 Painesville Power Company (OH)
 Public Works Commission of Fayetteville (NC)
 San Antonio City Public Service Board*
 Seattle City Light*
 Tacoma (WA) Public Utilities Light Division
 Tennessee Valley Public Power Association*
 Tennessee Valley Authority*

Turlock Irrigation District
 U.S. Virgin Islands Dept. of Water and Power
 Village of Prospect, Ohio

Investor-Owned Commun. Utilities

Ameritech
 AT&T Communications
 Bell Atlantic (Verison)
 Cablevision (CT)
 Carolina Telephone
 Central Telephone Company of Virginia
 Chesapeake & Potomac Telephone Co.
 Chester Telephone Company*
 Comcast Cablevision of Philadelphia
 Cox Communications
 Entergy Louisiana, Inc.
 Entergy Mississippi, Inc.*
 General Telephone Company
 GTE Corp.
 Hawaiian Telecom*
 Hawaiian Telephone Company
 Illinois Bell Telephone Company
 Metricom, Inc.
 New England Telephone Company
 Ohio Cable Telecommunications
 Sitka (Alaska) Telephone Company
 South Central Bell Telephone Company
 Southern Bell Telephone Company
 South Western Bell Video Services, Inc.
 Sprint/United (FL)
 Telesat Cablevision Inc. (FL)
 Telescripps Cablevision (KY)
 Thomas Bay Power Authority
 United Telephone Company of Kansas
 US Cable
 US West
 Vision Cable
 Wisconsin Bell Telephone Company

Federal, State and Local Agencies

Attorney General, State of Hawaii
 Attorney General, State of Iowa
 Attorney General, State of Washington
 California Public Utility Comm.*
 Florida Department of Transportation
 Kentucky Public Service Commission*
 New York Power Authority*
 New York State Dept. of Public Service*
 Oregon Public Utility Commission
 Tennessee Valley Authority*
 Town of Garner (NC)
 Town of Smithtown (NY)
 US Army Corp of Engineers*

US Attorney General, (AZ, NC)
 USDA Rural Utilities Services*
 Virginia DOT

Industrial/Commercial

Aluminum Company of America (TX)
 American Chrome & Chemical
 AMFAC [Pioneer Mills](HI)
 Amigo Stores (TX)
 AKRO Corp (Ohio)
 Boeing (TN)
 Burndy
 Burroughs Welcome (NC)
 Carver Boats (NC)
 Clearfield Conveyors
 Coast Catamaran (Hobie Cat) (CA)
 Commercial Companies
 Consolidated Electrical Distributors
 Cooper Power Systems
 Dingess Rum Coal Company (WV)
 Diversified Control Systems (NC)
 Dixie Yarns (NC)
 Eastern Lift Truck
 Edwards Crane (NC)
 Exxon (TX, WY)
 Furst-McNess
 General Injectibles
 Global Stone
 Hioki E.E. Corp. (MI)
 Hostert Fotomata (PA)
 IBM
 INCO (WV)
 Ingalls Shipbuilding
 Intalco (WA)
 International Power Devices
 Louisville Ladder (KY)
 LWG Corp.
 Mallinckrodt
 Maytag
 MESA Petroleum
 Mitsubishi Semiconductor America, Inc. (NC)
 Mobile Tool International, Inc., et al.
 Northern Telecom
 Optical World
 Osmose Wood Preserving (NY)
 Piezo Electric Products
 Pioneer Mills (HI)
 RJ Reynolds Industries, Inc. (NC)
 Royster-Clark, Inc. (NC)
 Sara Lee (PA)
 S&C Electric
 Springer Peterson Roofing (FL)
 St. Paul Fire & Marine Insurance
 TAURUS Exploration
 TEXACO
 Texasgulf (NC)
 Trane Company (PA)
 Triplett Corporation (WV)

Underwriter's Laboratories
US Cable
US Steel Mining Company
UTILX Corp.
Wayne Industries (AL)
Westex Roofing Company
Westinghouse Hanford (WA)
WNCT

Special NESC Seminars Sponsored by the Institute of Electrical and Electronics Engineers or the Power Engineering Society*

Over 60 public and in-house seminars in various cities since 1980

Contractors/Consultants

Accident Reconstruction Analysis (NC)
Alaska Construction - (AK)
Coastal Distribution Contractors
Dillard Smith Construction (TN)
Electric Line Company (WV)
Finley Engineering*
Fluor Daniel
FTI Corporation (MD)
Henkels & McCoy
Interstate Construction, Inc.
Itron, Inc.*
Kokosing Construction Company (MA)
Langley Construction
Lee Electrical Construction, Inc.
McCarter Electrical Company (NC)
Metric Constructors
Moore Electrical Construction (TX)
Mountain Power (MT)*
North Houston Pole Line (TX)
Parsons Brinckerhoff
Pike Electrical Contractors (NC, GA, OH, SC)*

Power Delivery Associates (GA)
Shaum Electric (NC)
Sumpter Builders (SC)
Utilicon
WakeMed
Williams Construction (MT)
WC Teas (TN)

Others

American Electric Power Service Corp.*
American Public Power Association*
Central & Southwest Services, Inc.
Cinergy Services, Inc.
Cuyahoga County (OH) Court of Common Pleas
Duke University
Electric Council of New England*
Federated Rural Electric Insurance Co.*
Georgia Electrification Council*
Georgia Electric Membership Corporation*
Georgia EMC Engineering Association*
Indiana Electric Association*
Joint Engineers Conference*
Kentucky Association of Electric Cooperatives*
Kentucky Telephone Association*
Midwest Electric Distribution Exchange*
Municipal Association of South Carolina*
National Rural Electric Cooperative Assoc.*
North Dakota Power Use Council*
Northwest Lineman College*
Oklahoma Power & Communications Assoc.*
Oregon Joint Use Association*
Progress Energy Service Corporation
United Telecom Council*
Wisconsin Utilities Association*

* NESC Seminar Clients

1. DANESC Seminars on Development and Application of the 2012 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 – 2012 Edition (PCU Training Center can provide at extra cost)
- ◆ NESC Handbook – 7th Edition (optional; at extra cost)

Power & Communication Utility Training Center DANESC In-House Seminars

Topics	Clearances	Clearances & Grounding								Broad Coverage			
										Intro to NESC	Detailed Discussions of NESC		
Number of Seminar Days **	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
Seminar Code**	DA-1	DA-1	DA-2	DA-1	DA-2-JU	DA-1	DA-2-JU	DA-1 ¹	DA-2-JU	DA-1-IN	DA-1	DA-2-JU	DA-1
NESC Structure & General Rules	Sel	Sel	Min	Full	Full	Ext	Ext	Ext	Ext	Sel	Ext	Ext	Ext
Grounding Requirements		Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full	Full
Grounding Methods		Min	Min	Sel	Min	Sel	Sel	Full	Full	Sel	Ext	Ext	Ext
Overhead Lines—General						Min		Min	Min	Sel	Sel	Sel	Sel
Overhead Clearances	Min	Sel	Full	Sel	Sel	Sel	Sel	Full		Sel	Full	Full	Ext
Supply Station Clearances								Full			Full		Full
Underground Clearances								Full			Full		Full
Exercises in Applying the NESC				Sel	Sel	Full	Sel	Full	Full		Ext	Ext	Ext
Exercises in Using Sag & Tension Charts for Loadings & Clearances					Min		Full		Full		Min	Full	Full
Information Required to Determine Joint Use Clearances					Full		Full		Full		Full	Full	Full
Pole Loading & Strength Calculation Exercises													Min
Overhead Strengths & Loadings										Sel			Sel
Overhead Line Insulation										Min			Min
Supply Stations													
Underground										Sel	Min		Sel
Work Rules										Sel	Sel		Sel
ANSI Z535 Utility Safety Signs													Sel
Continuing Education Units	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
Professional Development Hours	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

Legend	
Min	Minimal Coverage
Sel	Selected Rules
Full	Complete Rules
Ext	Expanded Discussion
SpTop	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 DA-1A omits supply station clearances;
DA-1B omits underground clearance

Power & Communication Utility Training Center DANESC In-House Seminars

Topics	Targeted Coverage							
	Overhead Communication Clearances			Overhead Clearances Grounding Loadings & Strengths	Overhead Transmission Clearances & Grounding	Overhead & Underground Grounding & Bonding		Supply Stations
Number of Seminar Days **	1.0	1.5	2.5	2.5	2.5	1.0	1.5	0.5
Seminar Code**	DA-3-JUI	DA-3-JUI	DA-3-JUI	DA-4-OH	DA-4-TR	DA-5-GB	DA-5-GB	DA-6-SS
NESC Structure & General Rules	Full	Full	Ext	Ext	Full	Ext	Ext	Min
Grounding Requirements	Full	Full	Full	Full	(Parts 1&2) Sel	Full	Full	
Grounding Methods	Min	Min	Sel	Full		SpTop	SpTop	
Overhead Lines—General			Min	Min	Min	Sel	Sel	
Overhead Clearances	Sel	Sel	Sel	Full	Full			
Supply Station Clearances								
Underground Clearances								
Exercises in Applying the NESC		SpTop	Full	Full	Full			
Exercises in Using Sag & Tension Charts for Loadings & Clearances	Min	Sel	Full	Full	Sel			
Information Required to Determine Joint Use Clearances	Full	Full	Full	Full	Full			
Pole Loading & Strength Calculation Exercises				Min	Min			
Overhead Strengths & Loadings				Sel	Sel			
Overhead Line Insulation				Min	Min			
Supply Stations					Sel			Full
Underground								
Work Rules						Sel	Sel	
ANSI Z535 Utility Safety Signs				Min	Min		Sel	
Continuing Education Units	0.60	0.95	1.70	1.70	1.7	0.60	1.00	0.35
Professional Development Hours	6.0	9.5	17.0	17.0	17.0	6.0	10.0	3.5

Legend	
Min	Minimal Coverage
Sel	Selected Rules
Full	Complete Rules
Ext	Expanded Discussion
SpTop	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 DA-1A omits supply station clearances;
DA-1B omits underground clearance

0.5-day Applying the 2012 NESC Clearances Rules

(one instructor unless over 35 people)
0.5-DA-1 [0.35 CEU; 3.5 PDH]

Day 1 (8:00 am – 12:00 pm)

Introduction
Structure Location
Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas
Building clearances

0.5-day Applying the 2012 NESC Electric Supply Stations

(one instructor unless over 35 people)
0.5-DA-6-SS [0.35 CEU; 3.5 PDH]

Day 1 (8:00 am – 12:00 pm)

Introduction
Protective arrangements: lighting, fence clearances, storage
Installation & maintenance: inspections, guarding & clearances to live parts, grounding
Rotating Equipment
Storage Batteries
Transformers & Regulations: location, fire hazard requirements
Conductors
Circuit breakers, reclosures, matches, fuses
Switchgear and metal-enclosed bus
Surge arresters

0.5-day Applying the 2012 NESC Underground Rules

(one instructor unless over 35 people)
0.5-UG-1 [0.35 CEU; 3.5 PDH]

Day 1 (8:00 am – 12:00 pm)

Introduction
Grandfather Clause
Installation & maintenance reqmts
Inspection reqmts
Grounding reqmts
Conduit Systems: materials, clearances
Supply cable requirements
Cables in underground structures: manhole clearances; grounding, bonding
Direct-buried cables & cable in duct-not part of a conduit system: clearances, cable requirements; burial depths; deliberate separation versus random separation between cables
Risers for poles & padmounted installations
Supply cable terminations; clearances & grounding
Equipment: design; location; grounding & bonding
Installations in tunnels

0.5-day Applying the 2012 Strengths & Loadings Rules

(one instructor unless over 35 people)
0.5-SL-1 [0.35 CEU; 3.5 PDH]

Day 1 (8:00 am – 12:00 pm)

Introduction
Which NESC Edition applies; Grandfather Clause
Section 24: Grades of construction for conductors and line supports
Section 25: Loadings for Grades B and C
Rule 250B combined ice and wind loading
Rule 250C extreme wind loading
Rule 250D extreme ice (from freezing rain) and concurrent wind loading
Rule 251 conductor loading
Rule 252 loads on line supports
Rule 253 Load factors
Section 26: Strength requirements
Preliminary assumptions
Grades B & C construction: allowed strengths of different materials; Stress limits for different structural components, conductors, and cable messengers; Strength factors
Grade N construction
Section 27: Line insulation requirements
Stress limits

1.0-day Introduction to the NESC

(one instructor unless over 35 people)
1.0-DA-1-IN [0.60 CEU; 6.0 PDH]

Day 1 (8:00 am – 4:00 pm)

Applying the National Electrical Safety Code
Inspection of Utility Facilities
Grounding
Electric Supply Stations and Equipment
Underground Lines
Work Rules for the Operation of Electric Supply and Communication Lines and Equipment
Relations Between Various Classes of Overhead Lines & Equipment
Conductor Movement and Resulting Clearances
Lunch
Clearances Above Ground, Rails and Water
Clearances to Buildings and Other Installations
Crossing Clearances
Overhead Strengths and Loadings

1.0-day Applying the 2012 NESC Overhead Clearances

(one instructor unless over 35 people)
1.0-DA-2 [0.60 CEU; 6 PDH]

Day 1 (8:00 am – 4:00 pm)

Introduction
Utility responsibilities: How to use the code: Grandfather Clause
Inspections
Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas
Lunch
Clearances to other line structures, buildings, swimming pools, and grain bins
Cable to cable and cable to conductor clearances
Joint-use clearances: supply space, communication space, communication worker safety zone
Clearances of vertical and lateral conductors and cables
Antenna clearances
Cable and conductor crossing clearances

1.0-day Major Changes in the 2012 NESC

(one instructor unless over 35 people)
0.5-DA-1 [0.6 CEU; 6 PDH]

Day 1 (8:00 am – 4:00 pm)

Section 1-Introduction: American Nat'l Std, 010A,B,C, Fig 011-1, 011C1-C2, 013A2c, 013B2, 014A2, 015D, 016

Section 2-Definitions: Area lighting, delivery point, exclusive control of utility, premises wiring, service point, utility, utilization equip, public utility, private utility, authorized person, exclusive control, premises, supervised installation, clearance, vertical conductor, effectively grounded neutral conductor, communication line in supply space, joint-use lines, vault, lateral conductor, effectively grounded, supported facility

Section 9-Grounding Methods: 091, 093D, 094B7, 099B

Part 1-Electric Supply Stations: 110B2, 111A, Table 111-1, 114-Exception, 124A1, 124A3, 124D

Part 2-Overhead: 214A4-A5, 215C1-C6, 217A1a, 217A2b, 217A4, 218A1, 230A3, 230A4, 230B, Fig 230-1, Table 230-1, -2, Table 232-1, 233B, 234B-C, 234C3, Table 234-1 & Key FN, 235B1b, 235C, Table 235-5 FN, 235C2, 235G, 235G3, 235H2, Table 235-6, 238A, Table 242-1, 250B, Table 250-1, 250C2, 253, Table 253-1 & FN, Table 253-2, 260A1, 261B, 261H1b, Table 277-1, 279A1b

Part 3-Underground: Sect 32 Note 2, 323E5, 350F&G, 352A2, 352D1&2, Table 351-1, 354A2, 380D-Exception 2

Part 4-Work Rules: 410A3, Table 410-2, -3, 420K8, 421A6, 422A2, 431C, Table 431-1, 441, 441A1, A4, Table 441-1, 444D, 445

Appendixes: Appendix A-1 Table, Appendix C, Appendix E

1.0-day Clearances for Communication Facilities on Joint-Use Lines Workshop

(one instructor unless over 35 people)
1.0-DA-3-JUI [0.60 CEU; 6 PDH]

Day 1 (8:00 am – 4:00 pm)

Introduction

Organization of the NESC

Utility responsibilities: How to use the code: Grandfather Clause

Definitions and References

Vertical clearances of lowest wires or cables above ground, rails, & water

Vertical and horizontal clearances between wires, conductors, & cables

- At the pole
- in the span

Lunch

Using sag and tension calculations

Effects of differences in sags and tensions on clearances and loads

Calculations of required clearances at poles for various spans,

types, and sizes of power conductors and cables and telephone and CATV cables

- in the supply space
- in the communication worker safety zone

Special considerations for fiber-optic cables

Selection of pole heights for various spans and configurations

1.5 day Applying the 2012 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

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 safety zone

Selected grounding methods of Section 9

1.5 day Applying the 2012 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

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 safety zone

Developing clearances for various span lengths

Selected grounding methods of Section 9

2.5-day Applying the 2012 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

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 safety zone
 ■ communication space
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 2012 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

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 safety zone
 ■ communication space
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

2.5-day Joint-Use Overhead Line Clearances and Inspection

(one instructor unless over 35 people)
2.5-DA-3-JUI [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
Selected Clearances*

Lunch

Structure Location
Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas
Conductor crossing clearances

Day 2 (8:00 am – 5:00 pm)

Clearances to Other Line Structures*
Conductor to conductor clearances*
Joint Use clearances

- supply space
- communication worker
- communication space
- safety zone

Lunch

Climbing Space Clearances*
Working space Clearances*
Clearances of Vertical and Lateral Conductors and Cables*
Developing Clearances for Various Span Lengths

Day 3 (8:00 – 11:00 am)

Basic grounding and bonding requirements for overhead joint-use pole lines
Exercises to determine required clearances using photographs of actual installations

Adjourn

2.5-day Overhead Clearances Grounding Loadings & Strengths

(one instructor unless over 35 people)
2.5-DA-4-OH [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

Lunch

Structure Location*
Vertical clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas

Day 2 (8:00 am – 5:00 pm)

Vertical clearances cont'd
Cable and conductor crossing clearances*

Lunch

Clearances to other line structures*
Building clearances
Bridge clearances
Swimming pool clearances
Grain bin
Cable to cable and cable 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*
Overhead loading & strengths

Day 3 (8:00 – 11:00 am)

Overhead loading & strengths cont'd
Grounding requirements of parts 1 and 2
Grounding methods of Section 9*

Adjourn

2.5-day Overhead Transmission Clearances & Grounding

(one instructor unless over 35 people)
2.5-DA-4-TR [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

Lunch

Structure Location*

Vertical clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas

History of vertical clearance changes applicable to transmission line ratings

Day 2 (8:00 am – 5:00 pm)

Vertical clearances cont'd

Cable and conductor crossing clearances*

Clearances to other line structures*

Building clearances

Bridge clearances

Swimming pool clearances

Grain Bin clearances

Lunch

Cable to cable and cable to conductor clearances*

Joint-use clearances

- supply space
- communication worker
- communication space
- safety zone
- antennas, cameras, etc.

Climbing space clearances*

Working space clearances

Clearances of vertical and lateral conductors and cables*

Introduction to NESC strengths and loadings rules

Day 3 (8:00 – 11:00 am)

Supply station clearances

Grounding requirements of parts 1 and 2

Grounding methods of Section 9* applicable to transmission

Adjourn

3.0-day Applying the 2012 NESC

(two instructors required)
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
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 safety zone
- communication space

 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 2012 NESC Clearances & Grounding Rules for Joint-Use Overhead Lines

(two instructors required)
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

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 safety zone
- communication space

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

Lunch

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

3.5-day Applying the 2012 NESC (two instructors required) 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
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 safety zone
- communication space

 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-5-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 states
 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-5-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 states
 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 am)

Customer grounding problems - covering some aspects of the NESC and NEC.
 Temporary grounding requirements for line workers

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.

2. Tutorials on the Physical Design of Joint-Use Wood Pole Distribution Lines

About these seminars

The 3.5 day (3.5-JU-1) *Tutorial on Joint-Use Wood Pole Line Designs: Require Clearance, Loading & Strengths* addresses the increasing problem of accommodating larger numbers and sizes of cables, conductors and equipment on wood pole utility lines. Unfortunately, line failures and clearance problems have increased in recent years due to overloading poles. Attendees will calculate attachment heights for conductors and cables for various span lengths. Attendees will also calculate individual loads and strengths by using the NESC allowable stress methodology. Computer computations will be briefly discussed. This course is particularly designed for engineers, technicians and inspectors who want to add or increase expertise in facility placement and structural engineering of wood 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.

The Special Edition (3.5-JU-2-OC) concentrates only on Required Loadings & Strengths. It includes all the discussions and exercises on loadings and strengths from JU-1 plus a full day tutorial on using O-Calc pole loading software.

Who should attend

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

Learn from the experts

- ◆ Determine required attachment spacings to meet required clearances at the poles and midspan*
- ◆ Determine required wood pole height and class*
- ◆ Determine if available clearances allow new facilities to be added to existing wood poles*
- ◆ Determine required clearances between wires and cables at the pole and required pole height*
- ◆ Determine required Grade of Construction
- ◆ Calculate wind and ice loadings on structures and supported facilities
- ◆ Calculate stress on poles and cross arms
- ◆ Calculate strength of poles and cross arms
- ◆ Determine required pole class
- ◆ Determine if available strengths allows new facilities to be added to existing wood poles
- ◆ Properly use the NESC to develop standards and joint-use contracts for new construction or check compliance of existing construction
- ◆ Increase pole life and reliability
- ◆ Responsibilities for meeting NESC requirements
- ◆ Rationale behind NESC requirements
- ◆ 1 day tutorial on using O-Calc pole loading software**

* Included in JU-1 seminars only

** Included in JU-2-OC seminars only

In addition

PCU Training Center will provide the following:

- ◆ Bound Participant Workbook
- ◆ Bound Appendix Book of helpful charts, tables and technical discussions
- ◆ Excerpts from Practical Utility Safety
- ◆ Exercise/Answer sets
- ◆ CEUs and NC or FL PDHs awarded upon successful completion of workshop
- ◆ Demo copy of O-Calc pole loading software

Each participant will need access to:

- ◆ National Electrical Safety Code – 2012 Edition (PCU Training Center can provide at extra cost)
- ◆ NESC Handbook – 7th Edition (optional; at extra cost)
- ◆ Scientific calculator trigonometry and power root functions

2.5-day Loading & Strengths Calculations for Wood Pole Lines

(one instructor unless over 35 people)

2.5-JU-3 [1.70 CEU; 17.0 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction

Organization of the NESC

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.

Lunch

Using sag and tension calculations

Strengths & loadings primer: loads, reactions

Pole loading and strength calculation primer: simplified force calcs; shear forces; overturning & bending moments; wind on poles & supported facilities; force, moments, & shear diagrams; stress calcs; pole weight; pole strength; reduced pole strength due to rot; buckling: tangent, angles, deadends; Calculating the strength of poles and crossarms: at groundline, at supply space, at bolt holes, and at intermediate points; Pole embedment depth.

Day 2 (8:00 am – 5:00 pm)

Required Grades of Construction, required loadings, and load factors

Assumed loads and design loads

Required strength factors

Example calculations: calculating required pole strength class for various configurations; Guying for deadends and angles, including: required guy strength, effects on poles

Lunch

Buckling strength for deadend, angle and transformer poles

Calculating maximum spans for various configurations

Adding cables or conductors to existing lines

- Effect of overlashed cables

Determining appropriate clearance specifications and loading limits in joint-use contracts

Day 3 (8:00 am – 11:00 am)

Calculating bending stresses caused by conductor angles/deadends and guys on poles

Calculating the limitations on use of sidewalk street guys and pole push braces

Adjourn

3.5-day Tutorial on Joint-Use Wood Pole Line Design: Required Clearances, Loadings, & Strengths

3.5-JU-1 [2.40CEU; 24.0PDH]

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

Vertical clearances of lowest wires or cables above ground, rails, and water

Lunch

Vertical and horizontal clearances between wires, conductors, and cables

- At the pole
- In the span

Using sag and tension calculations

Effects of differences in sags and tensions on clearances and loads

Day 2 (8:00 am – 5:00 pm)

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
- communication space
- worker safety zone

Special considerations for fiber-optic cables

Selection of pole heights for various spans and configurations

Lunch

Required Grades of Construction

Calculation of wind, ice and weight loads on poles and supported facilities

Overload factors

Calculation of overturning moments from wind loads, weight loads, and transformer loads for various configurations

Effect of leaning poles and pole deflection

Day 3 (8:00 am – 5:00 pm)

Calculating the strength of poles and crossarms

- At groundline
- At bolt holes
- At intermediate points

Required strength factors

Calculating required pole strength class for various configurations

Lunch

Guying for deadends and angles

- Required guy strength
- Effects on poles

Buckling strength for deadend, angle, and transformer poles

Calculating maximum spans for various configurations

Day 4 (8:00 am – 11:00 am)

Adding cables or conductors to existing lines

- Effect of overlashed cables

Determining appropriate clearance specifications and 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.

Roundtable discussion of related problems and issues

Adjourn

3.5-day Tutorial on Required Loadings, & Strengths for Joint-Use Wood Pole Lines— with O-Calc Pro Tutorial

(two instructors required)

3.5-JU-2-OC [2.40CEU; 24.0PDH]

Day 1 (8:00 am – 5:00 pm)

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.

Lunch

Using sag and tension calculations

Strengths & Loadings primer: loads and reactions

Pole loading & strength calculations primer:

- Simplified force calcs
- Pole weigh and strength
- Shear forces
- Reduced pole strength due to rot
- Overturning & bending moments
- Buckling: tangent, angles, deadends
- Wind on poles & supported facilities
- Calculating the strength of poles and crossarms: at groundline, supply space, bolt holes, intermediate points
- Force, moments, & shear diagrams
- Stress calculations

Pole embedment depth

Day 2 (8:00 am – 5:00 pm)

Required Grades of Construction, required loadings, and load factors

Assumed loads and design loads; Required strength factors

Example calculations

- Calculating req'd pole strength class for various configurations
- Guying for deadends and angles, including: req'd guy strength, effects on poles

Lunch

- Buckling strength for deadend, angle and transformer poles
- Calculating maximum spans for various configurations
- Adding cables or conductors to existing lines: effect of overlashed cables

Determining appropriate clearance specs and loading limits in joint-use contracts

Day 3 (8:00 am – 5:00 pm)

Calculating bending stresses caused by guys on poles

Calculating the limitations on use of sidewalk street guys & pole push braces

Lunch

O-Calc – Introduction, Program Overview

Program development history and newest features

Detailed discussion on program layout and menus

Basic pole modeling

Understanding analysis results

Day 4 (8:00 am – 11:00 am)

NESC Loading Districts & Grades of Construction

Advanced pole modeling

Joint use attachments and bundle editor

Digital measurement technology

Lunch

Creating pole templates

Advanced tips & tricks

Presentation on upcoming O-Calc Pro features

Adjourn

3.5-day Tutorial on Required Loadings, & Strengths for Joint-Use Wood Pole Lines—with SPIDAcalc Tutorial

(two instructors required) 3.5-JU-2-OC [2.4CEU; 24.0PDH]

Day 1 (8:00 am – 5:00 pm)

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.

Lunch

Using sag and tension calculations
 Strengths & Loadings primer: loads and reactions
 Pole loading & strength calculations primer:

- Simplified force calcs
- Shear forces
- Overturning & bending moments
- Wind on poles & supported facilities
- Force, moments, & shear diag
- Stress calculations
- Pole weigh and strength
- Reduced pole strength due to rot
- Buckling: tangent, angles, deadends
- Calculating the strength of poles and crossarms: at groundline, supply space, bolt holes, intermediate points

Pole embedment depth

Day 2 (8:00 am – 5:00 pm)

Required Grades of Construction, required loadings, and load factors
 Assumed loads and design loads; Required strength factors
 Example calculations

- Calculating req'd pole strength class for various configurations
- Guying for deadends and angles, including: req'd guy strength, effects on poles

Lunch

- Buckling strength for deadend, angle and transformer poles
- Calculating maximum spans for various configurations
- Adding cables or conductors to existing lines: effect of overlashed cables

Determine appropriate clearance specs & loading limits in ju contracts

Day 3 (8:00 am – 5:00 pm)

Calculating bending stresses caused by guys on poles
 Calculating the limitations on use of sidewalk street guys & pole push braces

Lunch

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

Day 4 (8:00 am – 11:00 am)

Additional hands-on exercises

- 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 series of increasingly complex and challenging scenarios

Lunch

Using client editor to configure & maintain a SPIDAcalc client file

- 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

Adjourn

3. Investigating, Documenting, Analyzing and Litigating Accidents on Power and Communication Utility Systems

About the seminars

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 analyze it, and how it should be presented most effectively in litigation.

All seminars include discussions by one or more forensic engineers with extensive experience in investigating and analyzing utility contact accidents and testifying in court. Some seminars also include discussions by a litigating attorney, OSHA human factors specialist, and/or a burn specialist help you to put allegations and facts into proper perspective.

Who should attend

- ◆ Attorneys
- ◆ claims agents
- ◆ investigators
- ◆ paralegals
- ◆ claims managers
- ◆ OSHA compliance officers
- ◆ engineers
- ◆ risk managers
- ◆ OSHA hearing officers

Learn from the experts

- ◆ Responsibilities of utilities
- ◆ Responsibilities of others
- ◆ How to investigate the scene
- ◆ How to document and control evidence
- ◆ How to reconstruct accidents
- ◆ How to apply codes and standards
- ◆ How to consider the effects of electricity on the body
- ◆ How to prepare and use witnesses effectively
- ◆ How to use exhibits effectively

In addition

PCU Training Center will provide the following:

- ◆ Bound Participant Workbook, including applicable OSHA regulations/ references
- ◆ Excerpts from Practical Utility Safety
- ◆ Exercise/Answer sets
- ◆ CEUs and NC PDHs awarded upon successful completion of workshop (optional; at extra cost)

Each participant will need access to:

- ◆ National Electrical Safety Code – 2012 Edition (PCU Training Center can provide at extra cost)
- ◆ NESC Handbook – 7th Edition (optional; at extra cost)

Standard UPCA-1 Seminars on Investigating and Litigating Utility Accidents

(See separate schedule at the end for the advanced course UCA-2)

Topics	1	1.5	2	2.5	3.5*
Seminar Code	1.0-UPCA-1	1.5-UPCA-1	2.0-UPCA-1	2.5-UPCA-1	3.5-UPCA-1
Construction Accidents	●	●	●	●	●
Farm Accidents			●	●	●
Tree Accidents			●	●	●
Boating and Aircraft Accidents			●	●	●
Climbing and Equipment Contact Accidents			●	●	●
Vehicle Accidents	☆	●	●	●	●
Electrical Work Accidents				●	●
Documenting and Analyzing of Evidence	●	●	●	●	●
Accident Site Investigation and Analysis Tools	☆	●	●	●	●
Accident report check list	☆	●	●	●	●
Burn mechanisms and treatment					●
Preparation of Fact Witnesses and Expert Witnesses				☆	●
Human Factors Issues and Considerations					●
Applicable Codes and Standards			●	●	●
Occupational Safety and Health Act		●	●	●	●
Relevant OSHA Industry Regulations			●	●	●
Relevant OSHA Construction Regulations	●	●	●	●	●
Building Connection/Wiring Standards		☆	☆	●	●
Relevant ANSI Standards	●	●	●	●	●
Relevant Industry Association Standards	●	●	●	●	●
Why High Voltage Overhead Lines Are Necessary				☆	●
Operation of Fuses, Breakers and Reclosers		☆	☆	●	●
Electric Shock Effects				●	●
OSHA Utility Worker Regulations			☆	☆	●
ANSI Z535 Safety Sign Standard			☆	●	●
Investigation Exercise and Mock Summary Trial				●	●
Continuing Education Units (CEUs)	0.65	1.00	1.35	1.70	2.40
Professional Development Hours (PDHs)	6.5	10.0	13.5	17.0	24.00

*The 3.5 day program requires 4 instructors

●● — full coverage

☆☆ — selected coverage

1.0-day Investigating Utility Accidents Involving Public Contact
 (one instructor unless over 35 people)
 0.5-UPCA-1 [0.65 CEU; 6.5 PDH]

Day 1 (8:00 am – 4:30 pm)

How to determine compliance with codes and standards

- ◆ Which NESC edition applies
- ◆ Required inspections
- ◆ Standard vs. nonstandard clearances
- ◆ Effect of temperature, wind, and ice loading on clearances

Case Studies: Using codes, regulations, and standards

Accident #1—Dump truck

- | | |
|---------------------------------|----------------------------------|
| ◆ Responsibilities of Utilities | ◆ Responsibilities of contractor |
| ■ Applicable NESC edition | ■ OSHA regulations |
| ■ Required vertical clearance | ■ State regulations |

Accident #1A—Crane

- | | |
|---------------------------------------|--|
| ◆ Required vertical clearance | ◆ OSHA regulations |
| ◆ Responsibilities of crane operators | ◆ Insulating or grounding nearby lines |

Accident #1B—Backhoe

- ◆ Responsibilities of equipment operators
- ◆ OSHA regulations

Lunch

Case Studies cont.

Accident #2—Sailboat

- ◆ Required vertical clearance

Accident #3—Antenna removal

- | | |
|---------------------------------------|-----------------------------------|
| ◆ NEC antenna requirements | ◆ Wind displacement of conductors |
| ◆ NESC antenna clearance requirements | ◆ Sag & tension effects |

Accident #3A—Gutter installations

- | | |
|---------------------------|--------|
| ◆ Clearances to buildings | ◆ OSHA |
|---------------------------|--------|

Accident #3B—Billboard

- ◆ “Building” vs. “Other Installation”

Documenting & preserving evidence

- ◆ Matching evidence marks
- ◆ Measurements
- ◆ Photographs vs. videos
- ◆ Accident report check list
- ◆ Accident site investigation & analysis tools

Brief discussion of pole hits

- ◆ NESC pole location requirements
- ◆ Site information to record

Brief comments on other types of accidents

- ◆ Scaffold accidents
- ◆ Ladder accidents
- ◆ Over-height vehicle accidents

Adjourn

1.5-day Investigating Utility Accidents Involving Public Contact
 (one instructor unless over 35 people)
 1.5-UA-1 [1.00 CEU; 10.0 PDH]

Day 1 (8:00 am – 5:00 pm)

How to determine compliance with codes and standards

- ◆ Which NESC edition applies
- ◆ Required inspections
- ◆ Standard vs. nonstandard clearances
- ◆ Effect of temperature, wind, and ice loading on clearances

Case Studies: Using codes, regulations, and standards

Accident #1—Dump truck

- | | |
|---------------------------------|----------------------------------|
| ◆ Responsibilities of Utilities | ◆ Responsibilities of contractor |
| ■ Applicable NESC edition | ■ OSHA regulations |
| ■ Required vertical clearance | ■ State regulations |

Accident #1A—Crane

- | | |
|---------------------------------------|--|
| ◆ Required vertical clearance | ◆ OSHA regulations |
| ◆ Responsibilities of crane operators | ◆ Insulating or grounding nearby lines |

Accident #1B—Backhoe

- ◆ Responsibilities of equipment operators
- ◆ OSHA regulations

Lunch

Case Studies cont.

Accident #2—Sailboat

- ◆ Required vertical clearance

Accident #3—Antenna removal

- | | |
|---------------------------------------|-----------------------------------|
| ◆ NEC antenna requirements | ◆ Wind displacement of conductors |
| ◆ NESC antenna clearance requirements | ◆ Sag & tension effects |

Accident #3A—Gutter installations

- | | |
|---------------------------|--------|
| ◆ Clearances to buildings | ◆ OSHA |
|---------------------------|--------|

Accident #3B—Billboard

- ◆ “Building” vs. “Other Installation”

Accident #3C—Painting a metal gas station canopy

- | | |
|---------------------------------------|-------------------|
| ◆ “Building” vs. “Other Installation” | ◆ Moving a ladder |
| | ◆ OSHA |

Accident #4—Antenna mounting failure

- ◆ NEC clearance requirements
- ◆ NEC grounding requirements
- ◆ Ground fault protection

Pole hits

- ◆ NESC pole location requirements
- ◆ Site information to record

Brief comments on other types of accidents

- | | |
|----------------------|---------------------------------|
| ◆ Scaffold accidents | ◆ Over-height vehicle accidents |
| ◆ Ladder accidents | |

Day 2 (8:00 am – 11:00 am)

Requirements for Safety Signs

- | | |
|-------------------------------------|-----------------------------------|
| ◆ NESC Rules requiring safety signs | ◆ Applicable ANSI standards |
| | ◆ Attributes of good safety signs |

Documenting & preserving evidence

- | | |
|---------------------------|--|
| ◆ Matching evidence marks | ◆ Accident report check list |
| ◆ Measurements | ◆ Accident site investigation & analysis tools |
| ◆ Photographs vs. videos | |

Adjourn

2.0-day Investigating Utility Accidents Involving Public Contact

(one instructor unless over 35 people)

2.0-UPCA-1 [1.35 CEU; 13.5 PDH]

Day 1 (8:00 am – 5:00 pm)

How to determine compliance with codes and standards

- ◆ Which NESC edition applies
- ◆ Required inspections
- ◆ Old vs. new NESC clearance system
- ◆ Standard vs. nonstandard clearances
- ◆ Effect of temperature, wind, and ice loading on clearances
- ◆ Examples of conductor movement

Case Studies: Using codes, regulations, and standards

Accident #1—Dump truck

- ◆ Responsibilities of Utilities
 - Applicable NESC edition
 - Required vertical clearance
- ◆ Responsibilities of contractor
 - OSHA regulations
 - State regulations

Accident #1A—Crane

- ◆ Required vertical clearance
- ◆ Responsibilities of crane operators
- ◆ OSHA regulations
- ◆ Insulating or grounding nearby lines

Accident #1B—Backhoe

- ◆ Responsibilities of equipment operators
- ◆ OSHA regulations

Lunch

Case Studies cont.

Accident #2—Sailboat

- ◆ Required vertical clearance

Accident #3—Antenna removal

- ◆ NEC antenna requirements
- ◆ NESC antenna clearance requirements
- ◆ Wind displacement of conductors
- ◆ Sag & tension effects

Accident #3A—Gutter installations

- ◆ Clearances to buildings
- ◆ OSHA

Accident #3B—Billboard

- ◆ “Building” vs. “Other Installation”

Accident #3C—Painting a metal gas station canopy

- ◆ “Building” vs. “Other Installation”
- ◆ Moving a ladder
- ◆ OSHA

Accident #4—Antenna mounting failure

- ◆ NEC clearance requirements
- ◆ NEC grounding requirements
- ◆ Ground fault protection

Electrical work accidents

- ◆ Electricians
- ◆ Power line workers
- ◆ Communications line worker
- ◆ Using the Employee Misconduct defense

Day 2 (8:00 am – 4:00 pm)

Requirements for Safety Signs

- ◆ NESC Rules requiring safety signs
- ◆ Applicable ANSI standards
- ◆ Attributes of good safety signs

Electric shock effects

- ◆ Electrical phenomena
- ◆ Resistance to electrical flow through the body
- ◆ Effects of current flow
- ◆ Ventricular fibrillation

Documenting & preserving evidence

- ◆ Matching evidence marks
- ◆ Measurements
- ◆ Photographs vs. videos
- ◆ Accident report check list
- ◆ Accident site investigation & analysis tools

Lunch

Documenting & preserving evidence (cont.)

Pole hits

- ◆ NESC pole location requirements
- ◆ Site information to record
- ◆ AASHTO & related documents
- ◆ Example affidavit
- ◆ Practical pole placement constraints
- ◆ Breakaway poles

Case Studies cont.

- ◆ Scaffold accidents
- ◆ Ladder accidents
- ◆ Over-height vehicle accidents
- ◆ Farm accidents
- ◆ Off-road vehicle accidents
- ◆ Tree-trimming & decorating accidents
- ◆ Boating Accidents
- ◆ Aircraft accidents
- ◆ Substation accidents

Adjourn

2.5-day Investigating Utility Accidents Involving Public Contact

(one instructor unless over 35 people)

2.5-UPCA-1 [1.70 CEU; 17.0 PDH]

Day 1 (8:00 am – 5:00 pm)

Introduction

How to determine compliance with codes and standards

- ◆ NESC vs. NEC & OSHA
- ◆ Required Inspections
- ◆ Which NESC edition applies
- ◆ Old vs. new NESC clearance system
- ◆ Standard vs. nonstandard clearances
- ◆ Effect of temperature, wind, and ice loading on clearances
- ◆ Examples of conductor movement

Case Studies: Using codes, regulations, and standards

Accident #1—Dump truck

- ◆ Responsibilities of Utilities
 - Applicable NESC edition
 - Required vertical clearance
- ◆ Responsibilities of contractor
 - OSHA regulations
 - State regulations

Accident #1A—Crane

- ◆ Required vertical clearance
- ◆ Responsibilities of crane operators
- ◆ OSHA regulations
- ◆ Insulating or grounding nearby lines

Accident #1B—Backhoe

- ◆ Responsibilities of equipment operators
- ◆ OSHA regulations

Lunch

Case Studies cont.

Accident #2—Sailboat

- ◆ Required vertical clearance

Accident #3—Antenna mounting failure

(not used in this seminar)

Accident #4—Antenna removal

- ◆ NEC antenna requirements
- ◆ NESC antenna clearance requirements
- ◆ Wind displacement of conductors
- ◆ Sag & tension effects

Accident #4A—Gutter installations

- ◆ Clearances to buildings
- ◆ OSHA

Accident #4B—Billboard (NESC)

- ◆ “Building” vs. “Other Installation”

Accident #4C—Painting a metal gas station canopy

- ◆ “Building” vs. “Other Installation”
- ◆ Moving a ladder
- ◆ OSHA

Electrical work accidents

- ◆ Electricians
- ◆ Power line workers
- ◆ Communication line workers
- ◆ Using the Employee Misconduct defense

Electrical installations

- ◆ Operation of fuses, breakers, reclosers

Day 2 (8:00 am – 5:00 pm)

Requirements for Safety Signs

- ◆ NESC Rules requiring safety signs
- ◆ Applicable ANSI standards
- ◆ Attributes of good safety signs

Electric shock effects

- ◆ Electrical phenomena
- ◆ Resistance to electrical flow through the body
- ◆ Effects of current flow
- ◆ Ventricular fibrillation

Documenting & preserving evidence

- ◆ Matching evidence marks
- ◆ Measurements
- ◆ Photographs vs. videos
- ◆ Accident report check list
- ◆ Accident site investigation & analysis tools

Lunch

Documenting and Preserving Evidence (cont'd)

Pole hits

- ◆ NESC pole location requirements
- ◆ Site information to record
- ◆ AASHTO & related documents
- ◆ Example affidavit
- ◆ Practical pole placement constraints
- ◆ Breakaway poles

Improperly guyed structures

- ◆ Effect of guy tension on line clearances
- ◆ Clearances to other structures

Case Studies cont.

- ◆ Scaffold accidents
- ◆ Ladder accidents
- ◆ Over-height vehicle accidents
- ◆ Farm accidents
- ◆ Off-road vehicle accidents
- ◆ Tree-trimming & decorating accidents
- ◆ Boating Accidents
- ◆ Aircraft accidents
- ◆ Substation accidents

Day 3 (8:00 am – 11:00 am)

Putting it all together

Investigation

- ◆ Participants will be split into groups to investigate and develop trial presentation for plaintiff and defendant for selected accident scenarios (provided at start of course)
- ◆ Develop information to get at site
 - Present to class
 - Feedback from class

Summary jury trial

- ◆ Use data found at site (provided to groups after investigation presentations)
 - Develop trial strategy
 - Plaintiff group presents significant points
 - Defense group presents significant counterpoints
 - Plaintiff group rebuts defense
 - Feedback from class

Roundtable Discussion of Issues & Techniques Presented in Course

Adjourn

3.5-day Investigating and Documenting Utility Contact Accidents

(Two instructors required)

3.5-UPCA-1 [2.40 CEU; 24.0 PDH]

Day 1 (8:00 am – 5:00 pm)

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 (8:00 am – 5:00 pm)

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 (8:00 am – 5:00 pm)

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 (8:00 am – 11:00 am)

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

Adjourn

2.5-day Investigating and Litigating Utility Contact Accidents: Advanced Topics — Analyzing and Litigating OSHA Citations & Civil Actions

(one instructor unless over 35 people) **2.5-UPCA-2 [2.40 CEU; 24.0 PDH]**

Day 1 (8:00 am – 5:00 pm)

Introduction to Case Study 1: Worker injured constructing new building beside joint-use power & communication line

- ◆ History of building planning & construction
- ◆ Details of accident
- ◆ Entities involved at each stage of construction

Brief Review of NESC Clearances

- ◆ Clearances of conductors & cables above ground
- ◆ Clearances of conductors & cables to buildings, billboards
- ◆ Clearances of conductors & cables to tanks & other installations

Basic worker safety standards applying to work on a building construction site near overhead utility lines

- ◆ OSH Act of 1970
- ◆ Responsibilities of employers
- ◆ Responsibilities of employees
- ◆ Application of OSHA: number of employees
- ◆ • OSHA Construction Industry regulations in 29 CFR Part 1926
 - Rules of construction
- ◆ Accident prevention responsibilities
- ◆ Safety training & education
- ◆ Personal protective equipment
- ◆ Protection of employees from energized lines passing through or near job site
- ◆ Cranes & derricks
- ◆ Vehicles & Mechanized equipment
- ◆ Concrete & masonry construction
- ◆ Concrete pumps
- ◆ Fall protection
- ◆ State regulations
- ◆ High-Voltage Line Safety Acts
- ◆ State vs federal OSHA regulations
- ◆ American National Standards
- ◆ ANSI B30.5 Crane use
- ◆ Insulating or grounding nearby lines

Lunch

Using the OSHA Employee Misconduct Defense requirements as a tool to analyze the responsibilities of employers & employees

- ◆ Appropriate work rules addressing behavior and conditions
- ◆ Communication of work rules to employees
- ◆ Supervision of employees
- ◆ Enforcement of work rules

Using OSHA regulations and ANSI standards for multiemployer work sites to analyze employer responsibilities

- ◆ How OSHA views the responsibilities of multiple employers
- ◆ OSHA Directives to compliance officers
- ◆ How to meet OSHA regulations using ANSI A10.33

Day 3 (8:00 am – 11:00 am)

Introduction to Case Study 3: Power line worker injured while working on pole

- ◆ Work being performed
- ◆ Personnel at scene
- ◆ Initial testimony vs. final testimony

OSHA & NESC work rules applicable to supply line work

- ◆ Operation and maintenance

Day 2 (8:00 am – 5:00 pm)

OSHA investigations

- ◆ Accident investigation vs. general inspection
- ◆ Process of OSHA investigations
- ◆ Management interviews/rights
- ◆ Employee interviews/rights

Using injury information

- ◆ Electricity transmission injuries
- ◆ Arc flash injuries
- ◆ Ventricular fibrillation
- ◆ Blunt trauma
- ◆ Using injuries to analyze position/actions of injured

Analysis of responsibilities of parties in Case Study 1

- ◆ Power utility
- ◆ Communication utility
- ◆ Landowner
- ◆ General contractor
- ◆ Subcontractor
- ◆ Excavator
- ◆ Concrete pumper
- ◆ Concrete finisher
- ◆ Reinforcing rod crew
- ◆ Concrete form crew

How to train, instruct, supervise, and discipline employees to assure compliance with safe work practices:

- ◆ Human behavior & errors
- ◆ Remediation of errors
- ◆ Supervision
- ◆ Retraining
- ◆ Training responsibilities & requirements
- ◆ Developing training programs
- ◆ Personnel that should be trained
- ◆ Documenting training
- ◆ Evaluation of training

Lunch

Introduction to Case Study 2: Communication worker injured by contact with power lines on joint-use pole

- ◆ History of work at this site
- ◆ Details of accident
- ◆ Entities involved

OSHA & NESC work rules applicable to communication line work

- ◆ Communication operation, maintenance, & construction
- ◆ National Electrical Safety Code Sections 41-43

Analysis of responsibilities of parties in Case Study 2

- ◆ Power utility
- ◆ Communication utility
- ◆ Communication utility contractor
- ◆ Communication utility contractor employees

- ◆ Construction

- ◆ National Electrical Safety Code Sections 41, 42 & 44

Analysis of responsibilities of parties in Case Study 3

- ◆ Power utility

- ◆ Power utility contractor

- ◆ Power utility contractor employees

Additional Regulations often involved in construction site utility line contacts

- ◆ Use of ladders & ladder requirements

- ◆ Training for ladder use

- ◆ Excavations around power lines

- ◆ State call-before-you-dig programs

- ◆ Scaffold requirements

- ◆ Helicopter work near power lines

Additional standards often involved in construction site utility line contacts

- ◆ Using cranes around power lines

- ◆ Using equipment under power lines

- ◆ Ladder requirements

- ◆ Scaffold requirements

- ◆ Vegetation Management

- ◆ Concrete pumping — Am. Concrete Pumper Assoc. Certified Operator Study Guide

Adjourn

4. Follow-up Training for DANESC™ Videotape Users

PCU Training Center offers a series of videotapes on the DANESC™ Series. In response to client requests, Clapp Research, Inc. offers a personalized, on-site one-day follow-up session to address special concerns after personnel have watched the videotapes and worked the exercises. This seminar allows the client to explore code requirements of special interest in detail.

Prior to the seminar, participants provide specific written questions. The instructor prepares written answers for each question to be provided to all participants at the seminar. From these questions, the instructor prepares short presentations on the various areas of the code involved; these presentations generally take the full morning and early portion of the afternoon. In mid-afternoon, the individual questions and answers are reviewed. The late afternoon is reserved for additional questions that arise during these discussions.

Due to the special preparation time involved with this special one-day seminar, the fee for the normal 1.5 day seminar applies; this fee includes the time for preparation, travel, and teaching. Additional costs are charged for travel expense and for copying the questions and answers.

If the client needs to run two sessions of this special seminar to keep personnel available at all times, there are two options.

- ◆ **Option 1** is to delete the morning in-depth lecture session and repeat the normal afternoon session in the morning and afternoon. Often this is not cost-effective.
- ◆ **Option 2** is to run two full one-day sessions back-to-back on the same trip. This is usually the most cost-effective, because it allows time to fully explore the concerns in depth. The fee for the 2.5 day seminar applies to Option 2.