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 24,000 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 hand 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 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.

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 hand 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 Corporatioin
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
Louisianna 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 Telphone 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)

Topics	Clearances	Supply Stations	Clearances & Grounding								Broad Coverage				Targeted Coverage				
											Intro to NESC	Detailed Discussions of NESC			Overhead Communication Clearances			Overhead & Underground Grounding & Bonding	
Number of Seminar Days **	0.5	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	1.0	1.5	2.5	1.0	1.5
Seminar Code**	DA-1	DA-2	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	DA-3	DA-3	DA-3	DA-4-GB	DA-4-GB
NESC Structure & General Rules	Sel	Min	Sel	Min	Full	Full	Ext	Ext	Ext	Ext	Sel	Ext	Ext	Ext	Full	Full	Ext	Ext	Ext
Grounding Requirements			Full	Full	Full	Full	Full	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	Min	Min	Sel	■ !	■ !
Overhead Lines—General							Min		Min	Min	Sel	Sel	Sel	Sel			Min	Sel	Sel
Overhead Clearances	Min		Sel	Full	Sel	Sel	Sel	Sel	Full	Full	Sel	Full	Full	Ext	Sel	Sel	Sel		
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		■ !	Full		
Exercises in Using Sag & Tension Charts for Loadings & Clearances						Min		Full		Full		Min	Full	Full	Min	Sel	Full		
Information Required to Determine Joint Use Clearances						Full		Full		Full		Full	Full	Full	Full	Full	Full		
Pole Loading & Strength Calculation Exercises														Min					
Overhead Strengths & Loadings											Sel			Sel					
Overhead Line Insulation											Min			Min					
Supply Stations		Full																	
Underground											Sel	Min		Sel					
Work Rules											Sel	Sel		Sel				Sel	Sel
ANSI Z535 Utility Safety Signs														Sel					Sel
Continuing Education Units	0.35	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	0.60	0.95		0.60	1.00
Professional Development Hours	3.5	3.5	6.0	6.0	10.0	100	13.5	13.5	17.0	17.0	6.0	20.5	20.5	24.0	6.0	9.5		6.0	100

Legend	
Min	Minimal Coverage
Sel	Selected Rules
Full	Complete Rules
Ext	Expanded Discussion
■ !	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 clearances

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
Development of Overhead Clearances
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-1 [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

1.0-day Applying the 2012 NESC Clearances & Grounding Rules

(one instructor unless over 35 people)
1.0-DA-1 [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
Development of Overhead Clearances
Structure Location

Lunch

Clearances above railroads, roadways, parking lots, driveways, farm areas, pedestrian areas, and water areas
Conductor crossing clearances
Building clearances
Swimming pool clearances
Grain bin clearances
Limited discussion of grounding methods of Section 9

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 Clearances for Communication Facilities on Joint-Use Lines Workshop

(one instructor unless over 35 people)
1.0-DA-3-CC [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
Development of Overhead Clearances
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 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
Development of Overhead Clearances
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 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
Development of Overhead Clearances (Selected)
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 space
- communication worker safety zone

Developing clearances for various span lengths
Selected grounding methods of Section 9

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
Development of Overhead Clearances
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 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
Development of Overhead Clearances (Selected)
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 space
- communication worker safety zone

Developing clearances for various span lengths
Selected grounding methods of Section 9

2.0-day Applying the 2012 NESC Clearances & Grounding Rules

(one instructor unless over 35 people)

2.0-DA-1 [1.35 CEU; 13.5 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
Development of Overhead Clearances
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 – 4:00 pm)

Clearances to Other Line Structures
Building clearances
Bridge clearances
Swimming pool clearances
Grain bin clearances
Conductor to conductor clearances

Lunch

Joint Use clearances

- supply space
- communication space
- communication worker safety zone

Climbing Space clearances
Working Space clearances
Clearances of vertical and lateral conductors and cables
Selected grounding methods of Section 9

2.0-day Applying the 2012 NESC Clearances & Grounding Rules for Facilities on Joint-Use Lines Workshop

(one instructor unless over 35 people)

2.0-DA-2-JU [1.35 CEU; 13.5 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
Development of Overhead Clearances
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 – 4:00 pm)

Clearances to Other Line Structures
Building clearances
Bridge clearances
Swimming pool clearances
Grain bin clearances
Conductor to conductor clearances

Lunch

Joint Use clearances

- supply space
- communication space
- communication worker safety zone

Developing clearances for various span lengths
Clearances of vertical and lateral conductors and cables
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
Development of Overhead Clearances

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 space
- communication worker safety zone

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
Development of Overhead Clearances

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 space
- communication worker safety zone

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

3.0-day Applying the 2012 NESC

(one instructor unless over 35 people)

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
Development of Overhead Clearances
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 space
- communication worker safety zone

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

(one instructor unless over 35 people)

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
Development of Overhead Clearances

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 space
- communication worker safety zone

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 **(one instructor unless over 35 people) 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
Development of Overhead Clearances
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 space
- communication worker safety zone

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-4-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-4-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 hand. 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 for both seminars:

- 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

3.5-day Tutorial on Joint-Use Wood Pole Line Design: Required Clearances, Loadings, & Strengths (one instructor unless over 35 people)

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 space
- communication 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 for power, telephone, CATV and railroad utilities (one instructor unless over 35 people)

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

Day 1 (8:00 am – 5:00 pm)

Introduction
Organization of the NESC
Utility Responsibilities: How and when to use the code: Grandfather Clause
Definitions and References
Practical consideration of: effects of difficulties in obtaining desired sag/tensions and guying tensions, long spans next to short spans, etc.
Using sag and tension calculations

Lunch

Brief review of pole clearances
Required Grades of Construction
Calculations of required clearances at poles for various spans, types and sizes of power conductors, cables, telephone & CATV cables
- supply space
- communication space
- communication worker safety zone

Day 2 (8:00 am – 5:00 pm)

Calculating the strength of poles and crossarms at groundline
- At groundline
- At bolt holes
- At supply space
- At intermediate points

Required strength factors

Lunch

Calculating required pole strength class for various configurations
Guying for deadends and angles, including
- required guy strength
- effects on poles

Buckling strength for deadend, angle and transformer poles
Calculating maximum spans for various configurations

Day 3 (8:00 am – 5:00 pm)

Adding cables or conductors to existing lines
- effect of overlashed cables

Determining appropriate clearance specifications and loading limits in joint-use contracts
Calculating bending stresses caused by guys on poles
Calculating the limitations on use of sidewalk street guys & pole push braces

Lunch

O-Calc - Fundamentals
Program overview
Review functions and features
Create Groups and Poles
Basic design inputs
How to model a pole
Adding wires and attachments
Guying
Understanding loading results
Compare results using a variety of pole classes, NESC loading districts and grade of constructions

Day 4 (8:00 am – 11:00 am)

O-Calc - Advanced
Exercise: Angle pole
Exercise: Deadend pole
Exercise: Joint-use pole
Use O-Calc to demonstrate & understand the impact of joint use attachments
Advanced tips & tricks
How to setup pole templates
How to share pole loading results

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
- paralegals
- engineers
- claims agents
- claims managers
- risk managers
- investigators
- OSHA compliance officers
- 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

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
- Old vs. new NESC clearance system
- 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
  - 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

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
- AASHTO & related documents
- Example affidavit
- Practical pole placement constraints
- Breakaway poles

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

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
- Old vs. new NESC clearance system
- 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
  - 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

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

Brief comments on other types of accidents
- Scaffold accidents
- Ladder accidents
- Over-height vehicle 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
- Measurements
- Photographs vs. videos
- Accident report check list
- Accident site investigation & analysis tools

Adjourn

2.0-day Investigating Utility Accidents Involving Public Contact

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
- NESC vs. NEC & OSHA
- 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 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

Communication line workers
- Using the Employee Misconduct defense

Electrical installations
- Operation of fuses, breakers, reclosers

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

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

Adjourn

2.5-day Investigating Utility Accidents Involving Public Contact

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

(n*ot 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

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

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

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 pumpers
- 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

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
- Exca*va*tor
- 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

- ♦ Initial testimony vs. final testimony

OSHA & NESC work rules applicable to supply line work

- ♦ Operation and maintenance
- ♦ 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

Adjour*n*

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.