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## 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**  
**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 |
| ◆ NEC 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**  
**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 |
| ◆ NEC 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

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

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

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 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

## 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

- ◆ 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

**Adjourn**