BEST PRACTICES FOR WOOD UTILITY POLE STRENGTH AND LOADING

November 6-7, 2017
Santa Clara Marriott
Santa Clara, CA
OVERVIEW

When it comes to wood utility pole strength and loading, the experts say, “know the code!”, the National Electric Safety Code or California’s General Order 95 that is. In the everchanging world of electric utility and telecommunication companies, knowing the codes, regulations, and best practices, is vital to not only keeping the power on, but to ensure the safety of linemen and the public. With the advent of 5G on the horizon, telecommunication and wireless companies are eager to attach additional equipment to utility poles, thus making it more important than ever for electric utility and telecommunication companies to know and follow the codes!

In this symposium, attendees will hear from Nelson Bingel, the Chairman of the NESC and Chairman of the ASC O5 Wood Pole Committee. Pole strength capacities will be explained along with the loading criteria of the NESC and GO 95. An overview along with hands-on examples of basic pole loading calculations will help with understanding the important aspects and variables that impact how a pole is loaded. Variations of the third-party attachment processes around the country will be briefly explained and followed with an emphasis on the importance of wire and equipment clearances and the make ready process. Managing wood pole data including strength and loading details will also be discussed.

This symposium will include case studies from electric utility and telecommunication companies and the California Public Utilities Commission on their experiences with pole strength and loading, various software programs, and “best practices”. The goal of this program is to not only educate the attendees on the topic, but to also facilitate a discussion amongst the group to share their insights.

LEARNING OUTCOMES

• Explain ANSI O5.1 wood pole manufacturing and dimension standards
• Identify the NESC and/or GO 95 loading criteria
• Comparisons of NESC requirements to GO 95 requirements
• Identify clearance basics
• Discuss the process for third-party attachments
• Comparisons of pole loading software programs
• Discuss best practices for managing wood poles and the tremendous amount of related data

WHO SHOULD ATTEND

• Distribution engineers
• Operations managers
• Directors of operations and engineering
• Line staking engineers
• Consulting engineers
• Legal advisors
• Pole procurement specialists
• Asset/Investment recovery specialists
• Wireless carriers operations and engineering personnel
AGENDA
MONDAY, NOVEMBER 6, 2017

8:00 - 8:30 am           Registration and Continental Breakfast
8:30 am - 4:00 pm        Symposium Timing
12:00 - 1:00 pm          Group Luncheon

Wood Pole Management
• Early electrical systems
• Comparison of pole materials
• Expectations for safety, reliability and resiliency
• Effective asset management

Wood Pole Manufacturing and Strength
• ANSI O5.1 – Dimensions and Specifications for Wood Pole manufacturing
  o AWPA – American Wood Protection Association standards for treating wood poles

Pole Loading Basics
• Transverse, Longitudinal and Vertical Loading
• Bending Analysis
• Buckling Analysis
• Linear and non-linear analysis
• Deterministic and Probabilistic
• Load Resistance Factored Design
• Wire tensions
• Grade of Construction

NESC Loading & Strength Requirements

California GO 95 Loading & Strength Requirements

Wood Pole Decay & Strength loss
• Bending vs. Buckling

NESC/GO 95 Strength & Loading Comparisons

Nelson Bingel, Chairman of NESC and Chairman of the ASC O5 Committee, President of Nelson Research

High Level Overview of California’s Overhead Electric Supply & Communication Line Requirements per CPUC General Order (GO) No. 95
CPUC GO No. 95, Rules for Overhead Electric Line Construction applies to all overhead electric supply and communication lines within the CPUC’s jurisdiction. GO 95 was adopted in late 1941, superseding GO 64-A, with numerous revisions to the rules beginning in 1948 through 2016. The latest edition became effective January 1, 2017. This presentation will provide a high-level overview of select rules related to strength, loading, safety factors and clearances from the general provisions (Section I), requirements for all lines (Section III), and strength requirements for all classes of lines (Section IV).
Wendy al-Mukdad, P.E., Senior Utilities Engineer, Risk Assessment & Safety Advisory, Safety & Enforcement Division, California Public Utilities Commission
Pole Loading and SCE's Pole Remediation Program
A report from Southern California Edison on their comprehensive pole assessment and remediation program. This presentation will give an overview of SCE's program, discuss the driving factors behind the evolution of pole loading in California, and highlight the challenges the team has overcome in order to adapt to new pole loading rules and regulations.

*Mel Stark, Principal Manager of Compliance Integration, Transmission & Distribution Safety, Training & Compliance, Southern California Edison*

Clearance Basics
- Vertical clearances over surfaces
- Clearances between wires on different supporting structures
- Clearances of wires from buildings, bridges, swimming pools, and others
- Clearances for wires carried on the same structure
- Climbing Space
- Working Space
- Edition of the Code

Pole Loading Examples
- Typical assumptions
- Tangent pole basics
- Angle pole basics
- Guying basics
- Calculation examples
  - Tangent poles
  - Angle poles
  - Un-guyed
  - Guyed
  - Junction poles
  - Dead end poles
  - Added Equipment

*Nelson Bingel, Chairman of NESC and Chairman of the ASC O5 Committee, President of Nelson Research*

Questions and Wrap-up
Third Party Attachment Processes
- California
- Pole owner in-house processes
- Pole owner subcontract all or part of the process
- Oregon Joint Use Association

Adding Attachments to Existing Poles
- Field processes for determining existing load
- Remaining strength if necessary
- Additional load added
- Make Ready – making the pole ready for an additional attachment

**Nelson Bingel, Chairman of NESC and Chairman of the ASC O5 Committee, President of Nelson Research**

**Seattle City Light’s Joint Use Application of IKE4 GPS and SpidaCalc Pole Loading Software**
The Joint Use team of Seattle City Light found the need for additional pole loading analysis tools in order to ensure safety and reliability of its distribution system. With the use of the IKE GPS and SpidaCalc pole loading software, the team has been able to accurately model pole field conditions to ensure additional joint use attachments will not cause pole failure and that the poles are in compliance with current NESC rules.

**Hillary Winchester, Electrical Engineer- Joint Use Team, Seattle City Light**

**Pacific Gas and Electric Pole Loading Database System**
PG&E will speak about our vision for the potential, high level structure of a shared pole loading system. We believe we are aligned with the ultimate goal of the CPUC for a statewide pole and conduit database. Our demonstration will use conceptual images and discussion to convey three points: (1) How could we give our end users and business partners self-service access to information about available pole capacity? (2) How would a view of available capacity transition to an electronic application or request to attach? (3) How could a user be profiled to be given visibility into a list of historical submissions and their statuses?

**John Birch, Manager, Engineering Center of Excellence, Pacific Gas and Electric**

**Pole Loading for Communications Attachments in California**
As customers demand more access and faster speeds from communications companies, the number and types of communications attachments to utility poles have increased. This presentation will provide information about the unique challenges in modeling these attachments to provide for valid pole analyses.

**Josh Mathisen, Senior-Tech Project Management- Construction & Engineering Department, AT&T California**

**End of Program**
INSTRUCTORS

Nelson Bingel
Chairman of NESC and Chairman of the ASC O5 Committee
President of Nelson Research

Nelson Bingel received a BSME degree from Purdue University and worked for 30 years at Osmose Utilities Services. Nelson was responsible for engineering and other technical aspects of wood, steel, concrete and fiberglass utility poles, and structures. This covers a wide range of activities such as inspection, maintenance, restoration, and repair along with mitigation of deterioration and corrosion.

Nelson has been active on the NESC for over 25 years and became chairman in 2016. The American Standards Committee O5 develops the standards for new wood poles and crossarms and is also chaired by Nelson.

John Birch
Manager, Engineering Center of Excellence, Pacific Gas and Electric Company

John Birch (“JB”) started with PG&E in 2011 through a rotational development program for engineers. With an Industrial Engineering degree from Cal Poly San Luis Obispo, he quickly became a resource for process and technology redesign that overhauled the generation interconnection process. His career from that point focused on various process improvement and technology advancement efforts that will help PG&E stay relevant in years like 2017 and beyond.

Josh Mathisen
Senior-Tech Project Management- Construction & Engineering Department, AT&T California

Josh Mathisen is currently Senior-Tech Project Management in the Construction & Engineering Department for AT&T California. Josh has held a variety of positions in the 17 years that he has been at AT&T California. Over the last 13 years, his work has been focused on pole design and inspection. Josh chairs the Joint Facilities Committee of the General Order 95/128 Rules Committee.
INSTRUCTORS

Wendy al-Mukdad, P.E.
Senior Utilities Engineer, SED Risk Assessment & Safety Advisory Section, California Public Utilities Commission

Wendy al-Mukdad, P.E., has sixteen years of experience working on a multitude of electric and natural gas regulatory technical issues, including pole loading issues, in an advisory role in the Safety & Enforcement Division (SED) and Energy Division of the California Public Utilities Commission. Ms. Al-Mukdad previously performed engineering analysis of electric investor-owned utilities (IOUs) Smart Grid capital projects, technical engineering analysis related to Volt/VAR Optimization; Short Term Demand Forecasting Modeling; Line Sensors; Fault Location, Isolation and Service Restoration (FLISR); Outage Management Systems; SCADA for Distribution Substations and Feeder Equipment including communications protocols; Distribution Management Systems (DMS); Distribution Generation Interconnection; Electric Energy Storage and Advanced Metering Infrastructure (AMI). Prior to the CPUC, Ms. Al-Mukdad worked for the U.S. General Services Administration as a project manager for energy efficiency and security projects and for the U.S. Navy on undersea surveillance and navigational systems including integration of Global Positioning System (GPS) receivers into existing navigational systems. Ms. Al-Mukdad is an active IEEE and Power & Energy Society (PES) member and has served on the San Francisco (SF) PES Chapter Administrative Committee including as Chair and Vice-Chair. Ms. Al-Mukdad received the 2015 IEEE PES SF Chapter Outstanding Engineer Award and was Vice-Chair for our SF PES Chapter 2015 Large Chapter Award.

Mel Stark
Principal Manager of Compliance Integration, Transmission & Distribution Safety, Training & Compliance, Southern California Edison

Mel Stark is currently the Principal Manager of Compliance Integration in the Transmission & Distribution (T&D) Safety, Training & Compliance organization for Southern California Edison (SCE). During his 30 years at SCE he has held various positions in the areas of Finance, Energy Supply, Regulatory Policy & Affairs, Substation Construction & Maintenance, T&D Maintenance & Inspections, and Compliance.

Hillary Winchester
Electrical Engineer, Joint Use Team, Seattle City Light

Hillary Winchester is an electrical engineer in Seattle City Light’s Joint Use team. For the past three years, she has actively worked with the utility to improve processes and update standards. She has also worked to train consultants and develop a consultant submittal review process for the Joint Use team. Hillary has extensive experience with the NESC as it relates to joint use and distribution. In 2013, Hillary completed her Bachelors of Science in Engineering from James Madison University and is halfway through her Masters of Business Administration program.
INSTRUCTIONAL METHODS

Case Studies, classroom exercises, open discussion will be used at this event.

REQUIREMENTS FOR SUCCESSFUL COMPLETION

Participants must sign in/out each day and be in attendance for a minimum of four hours to be eligible for any continuing education credit.

IACET CREDITS

EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

EUCI is authorized by IACET to offer 1.0 CEUs for the symposium.

EVENT LOCATION

A room block has been reserved at the Santa Clara Marriott, 2700 Mission College Blvd, Santa Clara, CA 95054, for the nights of November 5-6, 2017. The room rate is $239 single occupancy plus applicable taxes. Call 1-408-988-1500 for reservations and mention the EUCI event to get the group rate. The cutoff date to receive the group rate is October 5, 2017 but as there are a limited number of rooms available at this rate, the room block may close sooner. Please make your reservations early.

REGISTER 3, SEND THE 4TH FREE

Any organization wishing to send multiple attendees to this event may send 1 FREE for every 3 delegates registered. Please note that all registrations must be made at the same time to qualify.
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Substitutions & Cancellations
Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before October 6, 2017 in order to be refunded and will be subject to a US $195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of course cancellation, EUCI’s liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices at (201) 871-0474.