

ELECTRIC DISTRIBUTION GROUNDING & STRAY VOLTAGE

September 24-25, 2020
Online | Central Time

“

“EUCI organized and coordinated a training class that was well put together and focused on attendees and content.”

Electric Utility Engineer III, City of Tallahassee

EUCI ONLINE COURSE

EUCI is pleased to offer this virtual course on its online interactive platform. Enjoy a valuable learning experience with a smaller impact on your time and budget. You will gain new knowledge, skills, and hands-on experience from the convenience of your remote location.



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EUCI is authorized
by IACET to offer
1.0 CEUs for the
course

OVERVIEW

The electric distribution ground system is a complex network of various paths and accommodates the return current back to the substation. Ohm's Law tells us that any current passing through an impedance creates a voltage. If we acknowledge that the ground path(s) is not a perfect a conductor, we know that stray voltage is inevitable.

This course provides insight into the workings of the grounding system from the end user back to the substation. Attendees learn the causes of high ground currents, how they can be minimized, and the techniques to mitigating stray voltage.

LEARNING OUTCOMES

- Identify the basic electrical formulas associated with grounding and stray voltage
- Review how transient events create hazards which may be dangerous to the public and utility personnel, as well as damage equipment
- Discuss Section 9 of the National Electric Safety Code and review acceptable grounding methods
- Define ommonly used terms such as "effectively grounded" and "bonded"
- Assess ground resistance measurement for both substations and the distribution system
- Discuss the effects of electricity on biological objects (animals and human beings)
- Define st ay voltage
- Review stray voltage trouble shooting and mitigation techniques
- Discuss various stray voltage scenarios

WHO SHOULD ATTEND

Electric Engineering professionals and technicians seeking a contemporary overview of distribution grounding practices and stray voltage issues.

“This is a good course is you are an engineer or in Power maintenance.”
Regional Safety Manager, Power Engineers

“They did a really good job explaining a difficult topic.”
District Engineer, Baldwin EMC

“Speakers were well-spoken and entertaining. Appreciated the joke slides between topics, really helped break it up between.”

Power Quality
Engineer, CenterPoint
Energy

AGENDA

THURSDAY, SEPTEMBER 24, 2020

8:45 – 9:00 am

Log In

9:00 am – 4:30 pm

Course Timing

12:30 – 1:15 pm

Lunch Break

Engineering Formulas Relevant to Grounding

- Ohm's Law
- Kirchhoff's Voltage and Current Laws
- Alternating Current
- Impedance Model
- Three Phase Power Systems

Transient Event on the Distribution System

- Lightning Events
 - o Surge Arrester Operation
- Line to Ground Faults
 - o Temporary Over Voltage (TOV)

Grounding Methods

- NESC 2017 Section 9
 - o Point of Connection
 - o Method of Connection
 - o Grounding Electrodes
 - o Separation of Ground Conductors

Grounding Definition

- Effectively Grounded – Per NEC
- Bonded – Per NEC
- Step/Touch

Common Grounding Practices

- Distribution System
 - o Ground Resistance Measurements
 - Earth Ground Clamp Meters
- Substation
 - o Ground Grids
 - Soil Resistivity

Effects of Electricity on Biological Objects

- Humans
- Animals
- Threshold of Perception
- Threshold of Fatality

AGENDA

FRIDAY, SEPTEMBER 25, 2020

8:45 – 9:00 am

Log In

9:00 am – 12:00 pm

Course Timing

Stray Voltage Definitio

- Per IEEE Working Group 1695
- Stray Voltage vs. Contact Voltage
- Influe tial Factors on Stray Voltage

Stray Voltage Mitigation Techniques

- Phase Balancing
- Power Capacitor Bank Issues
- Deteriorated Neutrals
- Neutral Isolators

Stray Voltage Scenarios

- Swimming Pools
- Shower and Faucets
- Farms
- Fences and Gates
- Marina and Boat Docks



“Both speakers are excellent and keep the topics interesting throughout the day.”

Principal Electrical Engineer,
Amazon

INSTRUCTORS



Jerry Josken

Senior Consultant, Pike Engineering

Jerry holds a BS in Electrical Engineering Technology from the Milwaukee School of Engineering and a MBA from North Central College. During his 30+ year career with Eaton’s Cooper Power Systems, Jerry served in a variety of engineering capacities. Past leadership positions include Chair of IEEE Rural Electric Power Conference (2012) and GLEMS Distribution Equipment /Controls (2013-2014). Presently, Jerry coordinates Pike Engineering Professional Development Program.



Keary Dosier

Director of System Planning and Grid Analytics Pike Engineering

Keary holds a BS degree in Electrical Engineering from NC State University. He is a Director for the System Planning and Grid Analytics division of Pike Engineering, where he has spent 16 years performing engineering studies and delivering solutions for large and small electric utilities across the United States. Keary has spent his career focused on distribution system planning, reliability, protection, DER integration and performance optimization engineering analysis. He has also performed several stray voltage mitigation studies, and in 2004 he co-authored an IEEE PES paper “Stray Voltage: Causes, Impacts, and Mitigation” on the subject.

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 AN-SI/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 AN-SI/IACET Standard.

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

REQUIREMENTS FOR SUCCESSFUL COMPLETION

You must be logged in for the entire presentation and send in the evaluation after the course is completed.

INSTRUCTIONAL METHODS

PowerPoint presentations, interactive group exercise, and group discussion will be used during this course.

ONLINE COURSE DELIVERY & PARTICIPATION DETAILS

We will be using Microsoft Teams to facilitate your participation in the upcoming event. You do not need to have an existing Teams account in order to participate in the broadcast – the course will play in your browser and you will have the option of using a microphone to speak with the room and ask questions, or type any questions in via the chat window and our on-site representative will relay your question to the instructor.

- You will receive a meeting invitation which will include a link to join the meeting.
- Separate meeting invitations will be sent for the morning and afternoon sessions of the course.
 - o You will need to join the appropriate meeting at the appropriate time.
- If you are using a microphone, please ensure that it is muted until such time as you need to ask a question.
- The remote meeting connection will be open approximately 30 minutes before the start of the course. We encourage you to connect as early as possible in case you experience any unforeseen problems.



"Very informative class, enjoyed it!"

Lineman, City of Tallahassee



"Kept the class engaged and interesting."

Global Electrical Engineer, Vadata

To Register Click Here, or

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Energize Weekly is EUCI's free weekly newsletter, delivered to your inbox every Wednesday. We provide you with the latest industry news as well as in-depth analysis from our own team of experts. Subscribers also receive free downloadable presentations from our past events.

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PLEASE SELECT

ELECTRIC DISTRIBUTION GROUNDING & STRAY VOLTAGE ONLINE COURSE:
SEPTEMBER 24-25, 2020: US \$1195 (Single Connection)

PACK OF 5 CONNECTIONS: US \$5,375

PACK OF 10 CONNECTIONS: US \$8,965

Online Course Delivery & Participation Details

See page 5 for information

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

Print Name

Job Title

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Address

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Zip/Postal Code

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Phone

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CREDIT CARD INFORMATION

Name on Card

Billing Address

Account Number

Billing City

Billing State

Exp. Date

Security Code (last 3 digits on the back of Visa and MC or 4 digits on front of AmEx)

Billing Zip Code/Postal Code

OR Enclosed is a check for \$ _____ to cover _____ registrations.

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 August 21, 2020 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. EUCI reserves the right to alter this program without prior notice.