

GROUNDING & PROTECTION OF COMMUNICATION SITES

Course Summary

This 1 day course is designed for the communications professional whose job responsibilities include working with AC and DC power systems located at but not limited to Cell, Central Office, MTSO, and GPS sites. A high-integrity grounding system is the single most effective means of assuring quality power distribution with a minimum of interference from transient over voltages, noise and lightning. The course describes how all of the key elements of a communications site grounding system function with emphasis on single point grounding techniques.

All session topics are tailored specifically to the distinct requirements of the communications industry. Sections include Basics of Grounding, the Grounding Electrode System, Site Grounding, Equipment and Enclosure grounding, DC Grounding Practices, Grounding of Signal Carrying Cables and an introduction to Surge Protective Devices.

The course is led by an experienced instructor. Our instructors have many years of experience consulting in power, grounding and lightning protection issues and are active in numerous professional organizations including: IEC, IEEE, ANSI, NEMA, UL Advisory, LPI and PEG. They have also been featured speakers to many national telecommunications conventions such as the International Wireless Communications Expo (IWCE) and the National Association of Broadcasters (NAB). Each student will receive a text specific manual, including figures, tables and graphs discussed during the presentation.

Publicly sponsored classes meet from 8 am to 5 pm with complimentary catered continental breakfast, lunch and refreshment breaks to give extra time for student-faculty interaction. A Prerequisite for attendance is a basic knowledge of electrical theory including Ohm's Law.

Accredited for 0.8 CEU accreditation through the University of Idaho.

BICSI Certified

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Section 1: Basics of Grounding

- Purpose of Grounding
- Basic Grounding of AC and DC circuits
- Resistance and Impedance of Grounding Conductors
- Allowable Ground Current
- Purpose of Bonding
- Ground Loops

Section 2: Grounding Electrode System

- Earth Grounding
- Conductivity of Earth
- The Grounding Electrode
- The Ground Ring
- Ground Radials
- Concrete-Encased- Electrode
- Grounding Electrode System
- Sizing the Grounding Electrode Conductor
- Bending and Bonding of Grounding Electrode Conductor
- Compression and Exothermic Bonding
- Earth Ground Resistivity
- Earth Ground Resistivity Nomograph
- Earth Ground Resistance Testing
- Ground Continuity Measurement

Section 3: Site Grounding

- AC Service Grounding
- Telephone Service Grounding
- Tower Grounding
- Tower Guy Wires Grounding
- Transmission System Grounding and Bonding
- Ice Bridge/Cable Tray System Grounding and Bonding
- Equipment Grounding
- Fence Grounding
- Emergency Back Up System Grounding
- Grounding of Surge Protection Devices
- Grounding of Lightning Protection System
- Shelter and Building Grounding
- Grounding of Rooftop Mounted Structures
- Cellular Site Grounding

Section 4: Equipment and Enclosure Grounding

- Equipment Ground Conductor for AC Circuits
- Equipment Ground Conductor for DC Circuits
- Isolated Ground Systems
- Equipment Ground Conductor Bending
- Ancillary Equipment Grounding and Bonding
- Equipment Required to be Bonded
- Equipment Rack Grounding and Bonding
- Cable Tray System Grounding and Bonding
- Battery Racks Grounding and Bonding
- ESD Grounding
- Halo Ground
- Transmission Lines Protection and Grounding at Entry Points
- Grounding of Surge Protection Devices

Section 5: DC Grounding Practices

- Single Point Grounding Techniques of DC Equipment.
- Master Ground Bar (MGB)
- Frame/Logic Ground Bar
- Equipment Ground Bar
- Isolated Ground Bar
- Ancillary Ground Bar
- DC System Grounding
- Bonding to the MGB
- Location of the MGB
- Grounding of the MGB
- Typical Grounding of a Telecommunication Site

Section 6: Grounding of Signal Carrying Cables

- Low Frequency Shield Grounding for Multipair Data Cables
- Multiple Grounding of Shielded Multipair Cables
- High Frequency Shield Grounding for Multipair Data Cables
- RS 232 Pin Assignment Table
- Grounding for RS 232 Cables
- Low Frequency Shield Grounding for Coax Cables
- High Frequency Shield Grounding for Coax Cables
- Cable Grounding for Multiple Buildings
- Optical Fiber Cable Shield Grounding

Section 7: Surge Protection Devices (SPD)

- Sources of Transient Overvoltages
- Gas Tube Technology
- Metal Oxide Varistor Technology
- Silicon Avalanche Diode Technology
- Normal Mode Protection
- Common Mode Protection
- Primary Protection Methods
- Secondary Protection Methods
- AC Service SPD
- Telephone Service SPD
- Data Line SPD
- Transmission Lines SPD
- Tower Lighting SPD
- Typical SPD Protection for a Telecommunication Site