Hands-On

Central Office DC Power & Grounding Virtual Live

Virtual Live Instructor-led or Available On-Site

Course Description

This extensive 2-day "Live" Instructor-Led (On-Site or Virtual) course is designed for Central Office Technicians or others with the responsibility for the installation, maintenance, troubleshooting, and repair of Central Office power equipment. The course provides a well rounded basic study of Central Office power that most technicians work with on in their regular duties. Theory is effectively combined with a practical hands-on approach that enhances the students' learning experience.

Upon successful completion of the course, students will have a solid foundation in how all CO power systems are interconnected, safety around those systems, how to locate key type of equipment, and perform both routine and as needed maintenance and troubleshooting.

Topics include

- DC Rectifiers, Battery chemistries and their maintenance, DC Power Boards
- DC Inverters
- Ground Return Paths - within the CO and to the outside commercial power network
- Dangers including high-amperage paths, open grounds, lead reversals, etc.
- Breaker, Fuse, and Disconnect panels and their locations
- Interconnections to the commercial AC network including the transfer switch and generators
- Types of Test Equipment
- Testing for low or high voltages, ripple current, regulation
- Telcordia (formerly Bell-Core) best practices, plus common regulatory agencies
- And much more, including topics of particular interest to students.

Students Will Learn

- **CO Power concepts including electrical fundamentals of L, C & R**
- **Interconnected Grounds - How DC & AC grounds are related**

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- **Disconnects - AC & DC interrupts to halt current flow**
- **Breakers & Fuses - including primary & 'tell-tale'**
- **DC Wiring Schemes - A/B Feeds, Wire Gauges**
- **Batteries & Their Connections - including charging vs. equalizing**
- **DC Rectifiers - traditional vs. switching designs, features, load-sharing**
- **DC Grounding zones - bus bar types, isolated/IGZ, etc.**
- **DC volt & ammeters - high-current, clamp-on vs. in-circuit**
- **Safety - including opens, loose connections, return paths**
- **Test & Maintenance - battery maintenance, DC & grounding checks**
- **Troubleshooting by previous examples**
- **And much more**

Target Audience

Vendors and telecommunications personnel (incl. engineers, planners, supervisors and technicians) responsible for Central Office equipment installation, maintenance, troubleshooting & repair.

Prerequisites

An understanding of basic electrical concepts, telecommunications equipment terminologies and OSP Bonding & Grounding is recommended. BTS courses meeting these prerequisites include our
- Basic Electricity
- TeleCom I
- OSP Bonding & Grounding
- CO Bonding & Grounding

Course Outline

Module 1 : CO Power Concepts

Safety - What Could Go Wrong?

AC & DC Electrical Principles

Electricity & Grounding

- AC & DC returns

- Earth as a conductor

Voltage & Current

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- AC vs. DC
- Series & Parallel

Resistance, Capacitance, Inductance, Impedance

- Effects on Power
- Power Factor: Effective vs. Real Power

Decibel Measurements

- Electrical Noise

Module 2 : AC Power Interconnections

CO Power Components (supporting DC)

Conventions:

- Regulatory
- Circuits & their Returns
- MGN

Power Conversion

- Phases
- Rectification
- P-P, Average, RMS

Ground Potential Rise

Transfer Switch

- varieties
- problems

Generator Connections

Panel Types

Module 3 : DC Power Interconnections

CO Power Components (distribution)

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- Points of Failure

Rectifier-to-Battery

- Charge & Discharge Buses
- Rectifier Types
- Negative Voltage Systems
- Wiring Conventions

Battery Types

- LA, LC, VLRA

DC Power Boards

- LVD, Feeds
- Metering
- primary & secondary protection

Buses

- wired vs. bar
- bar types - Cu vs. Al, coated vs. non-coated

Fuse Types

Examples

Testing

- Reconciling Currents - potential & return leads
- Charge voltages
- Regulation & Ripple Current

Module 4 : Power & Grounding

CO Grounding Components

Ground Bar Types

Ground Zones

- PANI vs. AT&T wiring order

Isolated Grounds

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- Noise mitigation
- Importance of SPG
- Firewalls

Remote Site Example

Testing

- ground loop potentials
- leakage current
- CO grounds - required vs. measured
- field resistance

Module 5 : Power Routines

Battery String Maintenance

- Specific Gravity
- Electrolyte Level
- Common Problems & Solutions

Rectifier & Powerboard

- Voltage & Current Readings
- Baseline
- Floating vs. Equalizing
- Potential Problems & Solutions

Breakers & Fuses

- Primary vs. Monitor 'tell-tale'
- oxidizing contacts
- Unexpected Problems

Smoke & Fire

- Symptoms - What to do
- Firestopping

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Delivery Method

Virtual Live Instructor-led with numerous labs and exercises.

Equipment Requirements

(This apply's to our hands-on courses only)

BTS always provides equipment to have a very successful Hands-On course. BTS also encourages all attendees to bring their own equipment to the course. This will provide attendees the opportunity to incorporate their own gear into the labs and gain valuable training using their specific equipment.

Course Length

2 Days

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