

Hands-On

# Noise Mitigation

Transmission, Bonding, Grounding & Inductive Interference



## BICSI CECs

This course has been approved for CEC credits by BICSI. Please read below for a breakdown of the credits that we offer for this course. For more information regarding BICSI please visit our website.

RCDD: 14	Inst: 14	Tech: 14	Cert. Trainer: 14
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## Course Description

Noisy lines are a major headache, which can be treated and eliminated. This course will train you how to measure, analyze and eliminate problem causing noise on telecommunications cable facilities. This is a Hands-On course that will show you, which test equipment to use, and how to use it. Problems with electrical power systems, radio transmission, and electric fences are just a few of the subjects that will be covered.

Its no secret the telecom industry has been in a hardship since 9-11 and when companies tighten their belts two things happen. First is reduction of force. Fortunately most of this is done by attrition and early retirement programs but however it happens its usually the most experienced people who leave.

The second thing which seems to happen with belt tightening is elimination of training.

The experienced technicians who took early retirement are replaced with younger less experienced folks who are not only expected to pick up the slack but in many cases to even improve productivity. Training is essential if these expectations are to be met.

Even with all the technological advances the copper pairs are still there, the power leads are

still there, loading problems are still there, bridged taps are still there and power usage has increased causing more and more trouble with transmission. And with the deployment of DSL the need for pair quality has increased greatly.

Over the past 30 years a number of new subjects have been added to these courses but the basics have remained the same and they are still essential and covered in this course.

## Students Will Learn

- Cable Pair Electrical Properties
- AC Power Distribution Systems
- Radio Transmission System
- Other Foreign Noise Sources
- Ground Measurements
- Bonding and Grounding
- Circuit Noise
- Power Influence
- Measurement Equipment
- And more

## Target Audience

This course was designed originally for repair technicians, however this course has proven to be extremely beneficial for anyone who has any responsibility for the quality of outside plant. Focused for but not limited to Repair Techs, Installers, OSP Engineers, Cable Splicers and hopefully their Supervisors.

## Prerequisites

Basic Telephony or Telecommunication Electronics or equivalent is highly recommended. An understanding of outside plant telephone cable plant facilities. This information can be obtained in our

- Basic Telephony & TeleCom Electronics
- TeleCom Fundamentals for Technical Personnel

## Course Outline

### Module I: Basics for the Telephone Technician

- The concept of electrical power
- Transformer action
- Distribution of AC power
- Frequency
- The Capacitor
- The inductor

### Module II: The Cable Pair as a Transmission Medium

- The voice grade pair
- The non-loaded pair
- The pair as a capacitor
- The loaded pair
- Standard pair specifications

### Module III: Problems in Loaded Cable

- The concept of loss
- Frequency response
- Loading irregularities
- Standard loading rules

### Module IV: Sources of Telephone Noise

- The MGN power system
- Effect of ground return currents
- Principles of magnetic shielding

#### Module V: The Basics of Circuit Balance

- Using the noise meter to evaluate balance
- Components of circuit balance

#### Module VI: Trouble Shooting with the Noise Meter

- Creating your own power influence
- Splitting the circuit
- Evaluating balance

#### Module VII: Radio Frequency Interference

- Sources of RFI
- The antenna
- The detector
- Mitigation techniques

#### Module VIII: Other Telephone Line Parameters

- Line current specifications
- Evaluating the station ground
- The 430 Ohm telephone
- Circuit loss requirements
- Theory of loop aids

#### Module IX: Harmonics in the Power System

- Shield factor
- The C Msg filter
- The decibel
- Sources of harmonic energy
- The Contel Chart

#### Module X: Bonding and Grounding of Sheaths

- Practices
- AC Clamp-on meters
- Grounding near Sub-stations
- Capacitor banks
- Bunching and grounding pairs
- Bond testing techniques
- Measuring Sheath Resistance
- Calculating proper sheath current
- Buried power considerations

#### Module XI: Troubles with 60 Hz Interference

- Isolation transformers
- Longitudinal chokes
- Neutralizing transformers
- INT installation considerations
- The INT and power influence

#### Module XII: Measuring and Tracking Harmonics

- Harmonic sources
- Resonance
- The odd triples
- Measuring harmonics
- Power exposures
- Power lead analysis
- The Triplett Mitigator

- Other spectrum analyzers

Extras:

#### Probe Wire Methods

- Frequency vs Induction
- (TIF) Telephone interference factor
- The Quick Probe method
- Evaluating probe wire measurements
- Talking with the power company

#### Modern Equipment Grounding Techniques

- The single point concept
- Central office grounding
- Ground potential rise

## Delivery Method

Instructor led with numerous Hands-On 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