Hands-On

Noise Mitigation

Transmission, Bonding, Grounding & Inductive Interference

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