Hands-On

Fiber Optic - OSP

Splicing & Testing Outside Plant

Course Description

This Hands-On course provides more in-depth Hands-On Labs and focuses on a wider array of Singlemode fiber optic systems and components, installation, splicing, testing and maintenance techniques.

This training is geared for the voice, video and data technician, supervisors or engineers who require a more in-depth working knowledge of long distance communication using fiber optic technology.

The course material prepares each student to skillfully work with fiber optic splicing, testing and troubleshooting equipment in a wide variety of commonly found work conditions.

Students Will Learn

- **Fiber types and manufacturing methods**
- **Fiber optic Theory and Waveguide Functions**
- **The causes of Attenuation, Optical Reflection and Refraction**
- **Optical Dispersion and Pulse Spreading Issues**
- **The Three Basic Elements of fiber optic systems and their uses**
- **Various cables types and proper installation methods**
- **Safe Optical and Physical Work Practices**
- **The design of various Outside Plant Network Topologies.**
- **Singlemode Long Distance System Requirements**
- **The challenges for the Designer and Technicians**
- **Safe hand tool use**
- **Cable and fiber preparation techniques**
- **Closure Assembly Techniques**
- **Precision Cleaver Applications**
- **Fusion Splicing Operations**
- **Mechanical Splicing Operations**
- **Visual Fault Locator Techniques**
- **OTDR basic operation, Troubleshooting and Testing Methods**
- **And More**

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Target Audience

Contractors, union craftsman, outside plant technicians, installers, telecom managers and anyone involved in installing, maintaining, testing, troubleshooting and repairing OSP Fiber cables.

Prerequisites

Basic Telecommunications is suggested.

Course Outline

Module I: FIBER OPTIC GENERAL STUDIES REVIEW

INTRODUCTION

- Common Industry Terminology
- History of Fiber Optics
- Advantages/Disadvantages of Fiber Optics
- Basics of a Fiber Optic Communications System
- Fiber Types and Manufacturing Processes (VIDEO)
- Typical Transmission Rates for Voice, Video & Data Applications
- System Topologies
- Fiber Optic Standards

THEORY TOPICS

- Theory of Light
- Electromagnetic Spectrum
- Total Internal Reflection (Singlemode)
- Refraction (Multimode)
- Index of Refraction (Refractive Index)
- Light Sources (LEDs & LASERs)
- Wave Division Multiplexing (WDM)
- Optical Switching Fundamentals

FIBER TOPICS

- Optical Fiber Types
- Typical Fiber Specifications
- Multimode Optical Fibers
- Singlemode Optical Fibers
- Dispersion Characteristics
- Modal Dispersion
- Chromatic Dispersion

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FIBER CABLE TYPES

- Outside Plant
- Inside Plant
- Loose tube Gel Filled (OSP)
- Tight Buffered Distribution (ISP)
- Tight Buffered Breakout (ISP)
- Jumper Cables and Hybrids styles
- Reverse Oscillation Locator (OSP)
- Fiber Color Code

Module II: FIBER OPTIC SAFETY ISSUES

SAFETY FIRST

- LASER Safety and Warning labels
- Types of LASERs
- LASER Output Power Levels
- Eye Safety Precautions
- Safe Glass Disposal Practices
- Food and Drinks Not Safe
- Proper Person Cleanliness
- Safe Work Surroundings
- Confined Spaces Issues

Module III: FIBER OPTIC CABLE INSTALLATION

PROPER PLANNING

- Project Considerations
- Cable Pre-testing
- Cable Reels Identification and Handling
- Proper Cable Pulling Techniques
- Outdoor Cable Design Characteristics
- Direct Bury Cable Installation
- Directional Boring Methods
- Buried Cable Depths
- Man Holes and Vaults
- Cable Pulling Specifications
- Tensile Strength and Bend Radius
- Avoiding Installation Obstacles
- Grounding and Bonding Fiber Cables
- Identifying Cable Types
- Work Area Protection Issues

Module IV: FIBER OPTIC TESTING

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ADVANCED TESTING INFORMATION

- The dB Scale and Units of Loss
- OTDR Functions for Testing
- OTDR Testing for Splices, Distances and Back Reflection
- OTDR Trace Guidelines
- The Dead Zone
- Trace Events and Interpretation
- Testing at Various Wavelengths
- System Loss Parameters
- Calculating System Loss
- Total System OTDR Testing
- Optical Loss Test Sets (OLTS)
- Referencing the Test Set First
- Measuring Cable System Loss
- Documenting Test results

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

3 Days

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