

Hands-On

Fiber Optics ISP/OSP - Advanced Combo-Tech



Course Description

This Hands-On 3-day course has been customized to provide technicians with a practical understanding of fiber optic theory and fiber applications in (ISP)Local Area Network, Security and Closed Circuit TV systems and more in-depth Hands-On focus on a wider array of (OSP) Fiber Optic systems and components, installation, splicing, testing and maintenance techniques and including additional Advanced Testing and Troubleshooting modules....

A Fiber Optic Installer has a general understanding of optical fiber installation, connectorization, splicing, and testing, is familiar with optical fiber, connector, and splice performance characteristics described in TIA/EIA-568B, ITU-T G.671, ITU-T G.652 and Telcordia GR-326 A Fiber Optic Installer can perform connector endface evaluation as described in TIA/EIA-455-57B, is proficient in optical loss testing as described in TIA/EIA-526-14A, and understands the installation requirements described in articles 770 and 250 of the National Electrical Code. A Fiber Optic Installer is proficient at the installation of connectors on various types fiber of optic cables using various types of epoxies, and can perform mechanical and fusion splicing and more...

Students Will Learn

- **The History Of Fiber Optics & Evolution Of Fiber Systems.**
- **Fiber Manufacturing Methods.**
- **Fiber Optic Theory And Waveguide Functions.**
- **Singlemode (OSP) And Multimode (ISP) Fiber Types.**
- **The Causes Of Attenuation, Optical Reflection And Refraction.**
- **Optical Dispersion Characteristics And Pulse Spreading Issues.**
- **Loose Tube And Unitube Style Trunk Cables**
- **Distribution And Feeder Cables.**
- **Fusion Splicer Applications And Fiber Alignment Systems**
- **Mechanical Splicing Uses And Applications**
- **Optical Connector Styles And Applications**
- **Back Reflection Issues And Angled Physical Contact Connectors**
- **Patch Panels And Functions For Distribution And Transmission**
- **ISP/OSP Style Splice Closure Styles And Function**
- **Cable Entry Methods And Splitter Configurations**
- **Drop Cable Connectivity And Security**
- **Cable Installation Methods As Direct Bury, Aerial And Ducted**
- **Emergency Restoration Issues, Future Planning, Restoration Kits**
- **Safety Practices**

- **Topologies For Urban And Rural Communities**
- **Splitters, ONTs/OLTs/ODNs**
- **Intro To Optical Testing And Troubleshooting.**
- **Visible Light Sources, OTDRs And Power Meters**
- **Testing Methods For ISP/OSP Systems**
- **Advanced Testing & Troubleshooting Modules**
- **And More...**

Target Audience

Inside Plant/Outside Plant technicians, contractors, union craftsman, electricians, technicians, installers, splicers, engineers, facilities managers, telecom managers and anyone involved in repairing, installing, maintaining, designing, evaluating, or provisioning Fiber Optic Cables and Optical Networks.

Prerequisites

A basic understanding of telecommunications.
 This information can be obtained in our courses below or equivalent knowledge
 TeleCom Networks Today "II"
 Basic Telephony & Telecom Electronics

Course Outline

MODULE I FIBER OPTIC GENERAL STUDIES
 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
 And More...
 THEORY TOPICS
 Theory of Light
 Electromagnetic Spectrum
 Total Internal Reflection (Singlemode)
 Refraction (Multimode)
 Index of Refraction (Refractive Index)
 Light Sources (LEDs & LASERs)

Power (dbm/watts)
Core/Cladding/Coatings
Numerical Aperture
Macro/Microbends
Wave Division Multiplexing (WDM, CWDM,DWDM, etc.)
Optical Switching Fundamentals
And More...
FIBER TOPICS
Optical Fiber Types
Typical Fiber Specifications
Multimode Optical Fibers
Singlemode Optical Fibers
Dispersion Characteristics
Modal Dispersion
Chromatic Dispersion
And More...
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
And More...

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 Issue
TOOLS:
Cable Jacket
Fiber Coating Strippers
Mid-Entry Tools
Ring Tools
Tube Splitters
Knives
Slitters
Scissors/Snips
Safety Tweezers
And More...

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
- And More...

MODULE IV FIBER OPTIC CONNECTORS

- Connector Types
- Different types
- Use of connectors
- ST Style Connector Assembly; Hand and/or Machine Polishing and Inspection
- SC Style Connector Assembly; Hand and/or Machine Polishing and Inspection
- Also Types: FC, LC, MIL-C Series, Biconic, etc.

FIBER OPTIC ENCLOSURES

- Applications
- Patch Panels
- Distribution of Fiber
- LAN
- Media outlets
- Fiber Management Bays

INSTALLING CONNECTORS

- Connector tools
- Each attendee will install connectors
- TESTING CONNECTORS AND JUMPER LOSS
- Measure loss of previously installed connectors
- Test loss of jumpers
- Fiber Testing Parameters
- Continuity Testing

MODULE V FIBER OPTIC SPLICING SPLICING

- Mechanical and Fusion Splicing
- Fusion Splicer Types and Operations
- Precision Cleaver Operation
- Set-up Fusion Splicer and Cleaver Work Stations

Practice Fiber Stripping, Cleaning and Cleaving
Practice In-Line Fusion Splicing
Practice Pigtail Fusion Splicing
Qualify Acceptable Splices
and More...

MODULE VI FIBER OPTIC TESTING

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
And more...

Module: VII Advanced Test Accepting and Troubleshooting Fiber Systems

Understanding attenuation
Causes of attenuation
Testing attenuation at different wavelengths
Understanding back reflection
Understanding return loss
APC (Angled Physical contact) connector verses UPC connectors back reflection
Optical dispersion characteristics and pulse spreading issues
Power testing levels for FTTH
And more...

Module: VIII Advanced Testing & Meters Used in Fiber Systems

OTDR use
Setup of the OTDR
Identifying OTDR traces
2 point and 4 point OTDR test
Testing at different wavelengths
Measure fiber length, loss and back reflection
Measure to events and how to add landmark events
Setup of the Power meter and light source
Interpreting PM and Light source results
Using the visible light sources
And more

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