Fiber Optic Splicing

W-6D-161 • ISBN 978-0-9754542-5-1 • 95 minutes • Released in December 2005

The LIGHT BRIGADE® Your Fiber Optic Resource.

An essential tool for today's fiber optic technician

Today's fiber optic networks require low-loss splicing for optimum performance. Since fiber splicing first appeared in the 1970s, the industry recognized that for fiber optics to become a viable transmission technology, reliable splicing techniques and equipment had to be developed. The ultimate goal was a process that did not require excessive skill or expense to perform, yet resulted in a low-loss, low-reflectance optical joint with high mechanical strength and long-term reliability.

Because of the growth of the fiber industry, better fibers, better tolerances and better equipment are now available to users through a multitude of splicing products and techniques designed to meet their specific needs. A variety of fusion and mechanical splicing products were introduced for applications in outside plant, premises, manufacturing or laboratory. Newer types of fusion splicers have been developed to handle the application-specific optical fibers used in optical sub-assemblies. These are addressed in the *Specialty Splicing* chapter.

The DVD covers PAS, LID and fixed V-groove fusion splicers for ribbon, FTTx and premise applications. Also discussed are the various types and applications for mechanical splicing, such as access for testing fibers and cables, emergency restorations and premises applications. The correct methods of preparing, cleaving, splicing and protecting optical fibers are also demonstrated.

Chapter Selections

Introduction – 5:58
Proper splicing is vital for all types of optical fiber. This chapter looks at the correct methods of preparing, cleaving, splicing and protecting optical fibers using a cross-section of splicing equipment and techniques.

Applications – 9:02
Fiber optic splicing is performed in the field, the factory and in the laboratory. Applications include outside plant, in-line, pigtail, emergency restorations and FTTx, in addition to premises and acceptance testing.

Fiber Preparation – 4:34
This chapter examines fiber preparation from the stripping of the optical coating from single strand and ribbon fibers through the cleaning process. It also covers safe handling of the fibers, coatings and tools.

Cleaving the Fiber – 9:42
For splice losses, fiber endfaces must be made perfectly flat, smooth and perpendicular to the fiber axis. Cleaving tools come in a variety of styles for single and ribbon fibers. Key points of review include length and angle control, blade types and tool/blade life.

Fusion Splicing Techniques – 17:55
The various methods of fusion splicing include manual, local injection detection, profile alignment and ribbon splicing. This chapter examines each and how it functions. Also included are splice protectors such as butterfly, heat shrink and recoaters.

Mechanical Splices – 18:34
Mechanical splices are simple, low-cost components designed to align a pair of fibers in three axes while also providing physical protection. They can be either permanent or temporary and are used in applications such as premises, FTTx, intelligent transportation systems (ITS) or emergency restorations.

Outside Plant Splicing – 10:05
Splicing is not just the physical joining of the optical fiber, but also the preparation of the work site, optical cable, closure, and patch panels. This chapter details splicing in OSP applications, including in-line and pigtail splicing.

Multimode Splicing – 5:37
Splicing in multimode applications offers lower insertion loss and reflection levels while providing a transition from indoor to outdoor cables in order to meet NEC requirements and easy access for acceptance testing. Multimode splicing is quicker and has a higher yield than connectorization techniques, providing cost benefits to installers.

Specialty Splicing – 5:21
Specialty fibers are developed and chosen with specific transmission benefits in mind. This chapter covers the splicing of various specialty fibers, including polarization maintaining, double-clad, high N.A., photosensitive, erbium and ytterbium-doped fibers.

Splice Optimization – 7:27
Obtaining optimum splice quality depends primarily on the quality of the fiber, the cleaves and the cleaning process. While many fusion splicers come programmed with a number of presets, environmental conditions also affect splice quality, especially for fibers with poor tolerances. This chapter covers the various issues a splicer may confront, how to identify them and recommendations on how to resolve them.

Bonus Materials – Quiz in Word format with both student and instructor versions.