

Loose Tube Cable Mid-Span Access for Splicing

This procedure details the necessary steps to access a Superior Essex Loose Tube Optical Fiber Cable mid-span for splicing. This procedure assumes that sufficient cable slack is available, and is not intended for taut-line access. The cable may be a “dry” type cable design or a gel flooded design. This procedure does not include methods to prepare and splice the fiber or to perform splice testing. Cable access and splicing must be performed by personnel trained and familiar with handling of optical fiber cable, cable components, and splicing accessories. Mishandling of fiber cable can cause damage to the fiber and result in cable length cuts or system degradation.

Materials Required

- Tape measure
- Yellow china marker (or equivalent) for marking cable jacket
- Cable knife or utility razor (a hook-blade razor is helpful)
- Rotary cable slitter
- Diagonal cutters
- Needle nose pliers (preferably with rounded side edges)
- Aramid shears
- Tube Shaver or Slitter
 - » Alcatel EZ Shaver TM (LG side) recommended for 3.0mm buffer tubes
 - » Alcatel Pocket Shaver with J or L Tool recommended for 2.1mm buffer tubes
- Gel cleaner and lint-free wipes

Procedure

1. Ensure all required materials are on hand. It is recommended that the processes of mid-span access, fiber splicing, and splice closure assembly be performed from beginning to end with minimal interruption. If for any reason actions are interrupted, ensure fiber cable and fibers are adequately protected.
2. Determine location on cable where the splice point is to be located.
3. Adjust the cutting depth of the rotary cable slitter to approximately 90% of the jacket thickness. If the cable is armored, adjust the blade to cut through the jacket and score the armor. Ring cut the jacket/armor at the approximate midpoint of the intended splice location. Flex the cable slightly at the cut to complete the opening of the jacket. If necessary, adjust the cutting depth and repeat the process until the jacket/armor is cut completely through.
4. Ring cut the jacket/armor approximately 2” (50 mm) from the cut completed in the previous step. Flex the cable slightly at the cut to complete the opening of the jacket. If necessary, adjust the cutting depth and repeat the process until the jacket/armor is cut completely through.

5. With the cable knife or utility razor, cut the jacket/armor longitudinally between the two ring-cuts. Cut completely through the jacket/armor, but be careful not to cut the buffer tubes underneath.
6. Pry the jacket/armor open at the longitudinal cut and remove it from the cable core.
7. Locate a ripcord along the cable core. Depending on the cable, there will be one or two ripcords that will be a different color (typically blue, orange or red) than the yellow and/or white yarns utilized in the cable. Also, the ripcord(s) will be longitudinally applied just under the jacket or armor rather than wrapped around the cable core. Using the aramid shears, cut the ripcord in the middle of the opening.
8. Using the diagonal cutters, cut a notch in both exposed ends of the jacket/armor next to the ripcord(s).
9. Using round-edge needle nose pliers, grab one end of a ripcord and wrap the ripcord around the pliers' jaws. With the ripcord in the notch created in the previous step, continue rotating the pliers, winding the ripcord around the pliers' jaws. This will pull the ripcord through the jacket/armor down the length of the cable. After pulling the ripcord with this method for 3-4" (75-100 mm), it may be more efficient to grab the pliers in a T-handle fashion with the ripcord between your fingers and simply pull along the length of the cable. Continue until the ripcord has been pulled a total of approximately 12" (30 cm). Note: rounded edges on pliers will prevent the pliers from cutting through the ripcord during initial pulling.
10. If two ripcords exist under the jacket, repeat for second ripcord to split the jacket.
11. Peel back the jacket material to expose the cable core. For single-ripcord cables, gently pull the cable core through the opening created by the ripcord. Do not exceed the cable's minimum bend radius.
12. Using the aramid shears, carefully cut the aramid covering the cable core at the approximate mid-section of the exposed core.
13. Locate the switchback point of the buffer tubes, which is the center of the area where the buffer tubes reverse the direction of wind around the cable axis. If necessary, use the ripcord(s) to expose more cable core until the switchback point is revealed. (Depending on cable design, distance between switchback points will be between 24" (60 cm) and 41" (104 cm)) The switchback point is now the new center of the splice location.
14. Determine the length of cable to be stripped according to the manufacturer's recommendations for the splice/termination system utilized.
15. Measure and mark the recommended length of cable, centered around the switchback point located during the previous step.
16. Using the final cutting depth determined previously, ring cut the jacket/armor at the marks and flex the cable slightly to complete the opening of the jacket at both locations.
17. Locate a ripcord below the jacket/armor and slit the cable from ring cut to ring cut.
18. If two ripcords exist under the jacket, repeat for second ripcord to split the jacket.
19. Remove the jacket material between the ring cuts to expose the cable core. For single-ripcord cables, gently pull the cable core through the opening created by the ripcord. Do not exceed the cable's minimum bend radius.
20. With the aramid shears, cut off the strength yarns and ripcords leaving about 12" (30 cm) of each from each end of the jacket (these will be cut to length during assembly of the splice closure). Be careful not to cut any of the buffer tubes.

21. Using the cable knife or utility razor, cut the helically-applied binder yarns at approximately 3" (75 mm) intervals. Remove the binder yarns from the cable to within 3" (75 mm) of the jacket on both ends. Make additional cuts in the binder yarns if necessary.
22. Beginning at the switchback point, carefully unwind and separate the buffer tubes from the core one at a time. Be careful not to kink the tubes during handling. If the tubes are covered with filling gel, clean them with an appropriate gel remover. If necessary, cut any remaining yarns or strings wrapped around the core of central strength rod.
23. With the diagonal cutters, cut the central strength rod leaving about 12" (30 cm) from each end of the jacket (the rod will be cut to length during assembly of the splice closure). Be careful not to cut any of the buffer tubes.
24. Review manufacturer's assembly instructions for the splice closure to be used. Follow the splice closure assembly instructions to build the closure unit, attach the cable ends, and fabricate the end seal around the cables to be spliced. Repeat the above steps for all cables that are planned to enter the closure so that closure end plate seal and fabrication is complete.
25. If the cable is armored, bond the armor of each end of the cable to an approved ground via a suitable bond clamp or shield connector. Follow the manufacturers' instructions. It may be necessary to use the ripcords to split more of the jacket/armor in order to install the bond clamp or shield connector.
26. To breakout fibers from the buffer tubes, use the appropriate size tube shaver or slitter and follow the manufacturer's instructions.
27. Use the gel cleaner and lint-free wipes to completely remove the buffer tube gel from the exposed fibers.
28. Follow closure assembly instructions and build specifications to route the buffer tubes to the appropriate splice tray.
29. Prepare and splice fiber per the instructions of the applicable splice/equipment manufacturer. Store fiber splice and excess fiber in splice tray per closure manufacture instructions.
30. After completion of the splicing operation, assemble the splice enclosure in accordance with the manufacturer's instructions.