

APPLICATION PROCEDURE & SAFETY CONSIDERATIONS PREFORMED LINE PRODUCTS



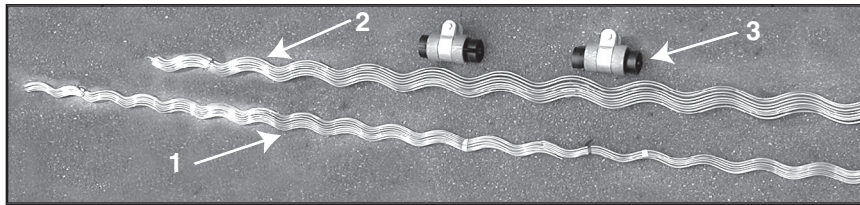
NOVEMBER 2003

FIBERLIGN® Suspension: Double & Spread Double

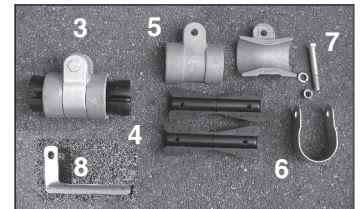
For use on OPGW & ADSS

Be sure to read and completely understand this procedure before applying product. Be sure to select the proper PREFORMED™ product before installation.

Double Suspension kit with "Single Set" Structural Reinforcing Rods (SRR):



Hardware Kit & Components



Spread Double Suspension kit with "Two-Sets" of SRR's for Extended Length

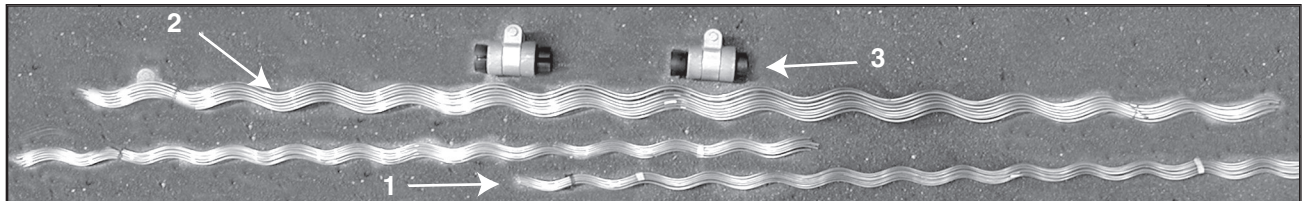


FIGURE 1: NOMENCLATURE FOR FIBERLIGN SUSPENSIONS FOR OPGW & ADSS

1.00 NOMENCLATURE

- 1. Structural Reinforcing Rods (1 or 2 sets)
- 2. Fiberlign Outer Rods (1 set)
- 3. Hardware kit as received from factory (2 ea.)

Hardware Kit Components

- 4. Insert Half (4 ea.)
- 5. Housing Half (4 ea.)
- 6. Strap (2 ea.)
- 7. Bolt, Nut & Lock washe (2 ea.)
- 8. Current Transfer Tab for OPGW (1 ea.)

2.00 DESCRIPTION

2.01 Double Suspensions are typically designed for standard Yoke-Plate connections with hardware kits positioned a relatively short distance apart (18" to 37", see Figure 2 and table 1). **Spread Double Suspensions** are designed to attach to structures with hardware kits positioned various distances beyond the standard yoke plate connection.

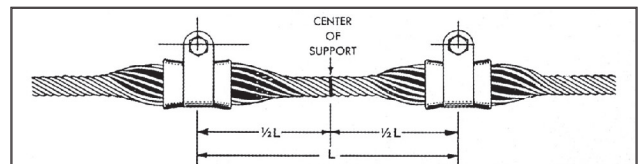


FIGURE 2: HARDWARE SPACING FOR DOUBLE SUSPENSION

Cable Diameter Range				Hardware Spacing Distance (L)		
Min (in)	Max (in)	Min (mm)	Max (mm)	Length (in)	Length (mm)	PLP Yoke Plate Cat. No.
0.354	0.565	9.0	14.4	18	457	YP-5908
0.566	0.625	14.4	15.9	22	559	YP-5909
0.626	0.786	16.0	20.0	26	660	YP-5910
0.787	0.855	20.1	21.7	29	737	YP-5911
0.856	1.057	20.8	26.8	32	813	YP-5912
1.058	1.208	21.6	30.7	37	940	YP-5913

2.02 OPGW Suspensions include a current transfer tab (CTT) for bonding the suspension to the structure or system ground. Various Ground Wire assemblies are available that electrically link the CTT to the system ground.

2.03 Standard Double Suspensions have a Single-Set of Structural Reinforcing Rods (SRR) made up of preformed helical shaped rods with a color code mark located at the center of each rod. Spread Double Suspension may have a Single-Set of Structural Reinforcing Rods (SRR) or Two-Set SRRs as shown above in figure 1.

2.04 OPGW Suspensions are rated for 60-degree maximum turning angles whereas ADSS Suspensions are rated for 80-degree maximum turning angles.

3.00 STRUCTURAL REINFORCING ROD APPLICATION

3.01 Plumb suspension and mark cable at center of stringing block with felt tip marker or lumber crayon; do not scratch.

3.02 For Single-Set SRR, lift the cable at a position beyond the ends of the SRR to allow sufficient clearance for the application. For Two-Set SRR, the cable can be supported at the cable marked center. One end of each set can be applied beginning about 1/2" (13 mm) from center in each direction.

The Single-Set SRR Application is described beginning at step 3.03.

Proceed to step 3.06 for the Two set SRR application procedure.

3.03 Single Set SRR Application: apply the factory-marked centerline of the first FIBERLIGN Suspension SRR to the center mark on the cable (Figure 3). Wrap the first rod around the cable and leave the last 10-14" (250-355 mm) on both ends of the SRR loose or unwrapped. The loose ends are wrapped on once all SRR rods are partially on the cable - this helps establish proper alignment as rods are snapped into place.

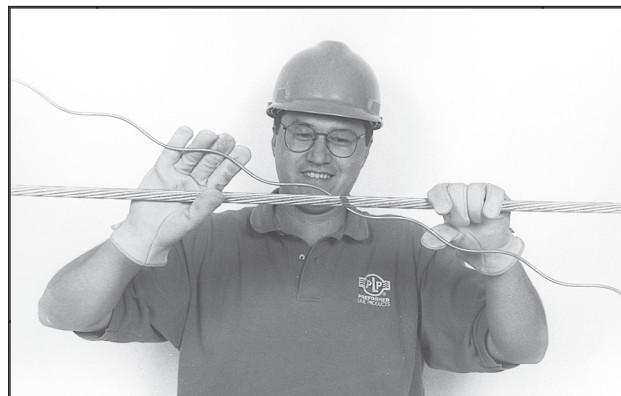


FIGURE 3: APPLY AND WRAP FIRST ROD AROUND CABLE

3.04 For Single-Set SRR, apply all remaining rods around the cable. When most of the rods are applied and most gaps are closed, the remaining rods will push between rods already applied, to assure a strong, armored reinforcement. MAKE SURE THAT NO RODS ARE CROSSED AND THAT ALL RODS ARE EVENLY SPACED.

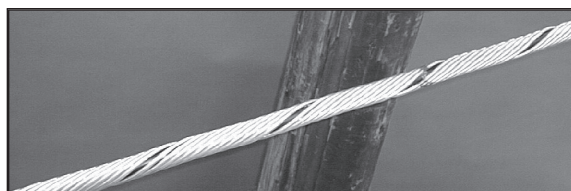


FIGURE 4: APPLY REMAINING SRR

PLP TIP: Be sure alignment of all rod ends is maintained within 2" (50 mm). Remove and reapply any that exceed this limit.

3.05 For Single-Set SRR, the remaining 10" to 14" (250-355 mm) of rods can be simultaneously wrapped into position with both hands - do first end bundle then the other end bundle. (Figure 5)

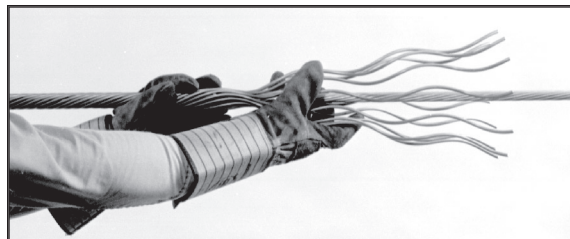


FIGURE 5: WRAP END BUNDLE

NOTE: FIBERLIGN Suspension SRR are not interchangeable with standard Armor Rods or ARMOR-GRIP® Suspension Rods. Do not intermix rods from different sets or attempt to apply more rods than supplied.

3.06 "Two Set SRR" Application: Assuming the first SRR set applied is to the left of the cable center mark, apply one rod starting 1/2" (13 mm) to the left of the cable center mark and wrap on completely (right to left in Figure 6). The remaining rods are aligned with the extreme end of the first rod, i.e. the rod end furthest from the center mark. Apply rods one at a time or in subsetted groups (2 to 4 rods) - wrap rods from the extreme end inward toward the cable center mark (left to right in Figure 6). This assures proper alignment at the extreme rod ends for other accessories.



FIGURE 6: LEFT SRR SET OF A TWO-SET APPLICATION. FIRST ROD APPLIED FROM THE CABLE CENTER MARK OUTWARD SUBSEQUENT RODS ALIGNED AT EXTREME END AND WRAPPED INWARD TOWARD CENTER.



FIGURE 7: LEFT SRR SET COMPLETED AND ROD ENDS ALIGNED.

3.07 The first one or two rods from the Second SRR set are started 1/2" (13 mm) to the right of the cable center mark and wrapped on (from right to left in Figure 8).

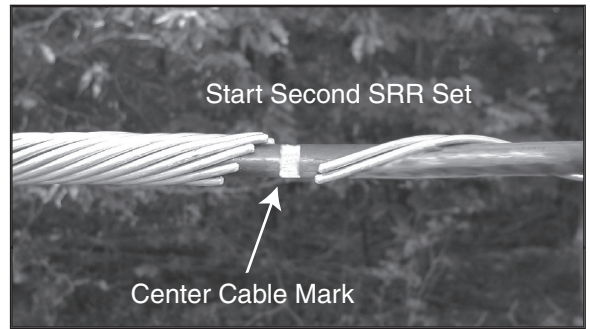


FIGURE 8: RIGHT SRR SET SHOWN STARTING ABOUT 1/2" (13 MM) TO THE RIGHT OF THE CENTER MARK

3.08 The remaining rods are aligned with the extreme end of the first rod(s), Figure 9. In this case the remaining rods are wrapped from right to left toward the center cable mark, Figure 10. Figure 11 is a view of the completely applied two set SRR near the center mark area.

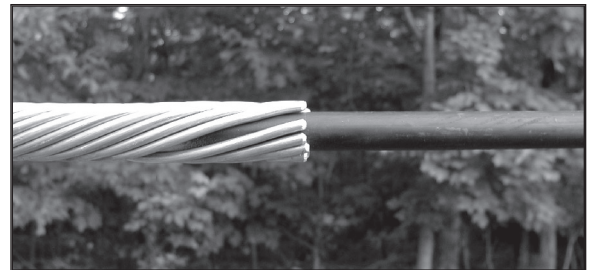


FIGURE 9: RIGHT SRR SET WITH RODS ALIGNED AT EXTREME RIGHT END

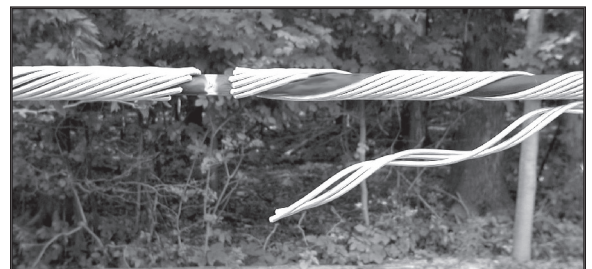


FIGURE 10: REMAINING RODS WRAPPED ON TOWARD CENTER MARK

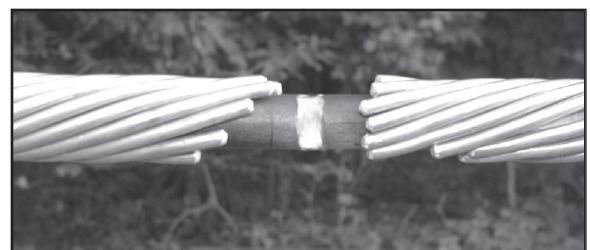


FIGURE 11: TWO SET SRR COMPLETED AT CENTER MARK AREA

NOTE: During installation, support the cable and SRR's evenly to avoid sharp bending at the short exposed cable near the center mark. Sharp bending may cause damage to the fiber.

4.00 INSERT, CURRENT TRANSFER TAB AND FIBERLIGN OUTER ROD SET APPLICATION

4.01 For **Standard Double Suspensions** the distance between inserts "L" can be found in Table 1. Place one pair of neoprene inserts on each side of the center mark a distance equal to 1/2 "L" dimension. Be sure to use the correct conductor diameter when selecting the "L" dimension.

For **Spread Double Suspensions** the center-to-center distance between inserts can vary depending on the specific design requirements. For example, the distance between inserts can vary from 26" (660 mm) to 83" (2108 mm) for Catalog No. 430011170. Final position depends on the user's attachment spacing on the structure. Drawings of the FIBERLIGN Spread Double Suspension assembly are included with each kit to indicate the allowable range.

4.02 Position the inserts so that the joining faces are parallel to the ground. Tape in place with a thin layer of tape (Figure 12).

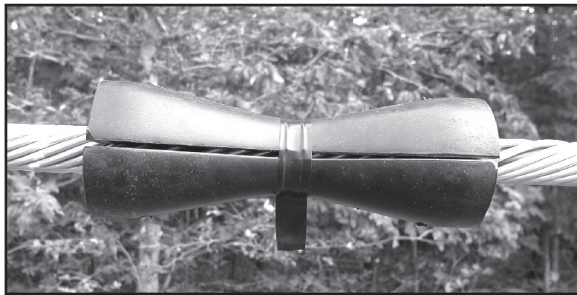


FIGURE 12: TAPE INSERTS IN PLACE

4.03 For OPGW applications, position a current transfer tab (CTT) with the short leg of the tab resting lightly against one pair of inserts. The CTT may be positioned with short leg down or in any convenient position. Tape in place with a thin piece of tape (Figure 13).

PLP Tip: Scratch brush and apply corrosion inhibitor at the CTT/SRR interface to maintain good electrical contact.

NOTE: ADSS applications do not require a CTT and CTTs are not included in FIBERLIGN Dielectric Suspension Kits.

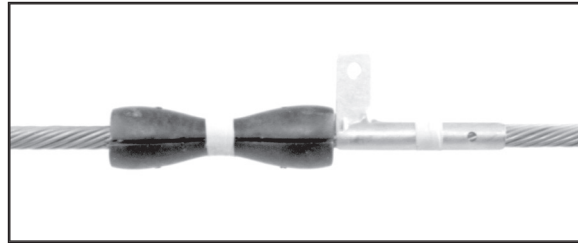
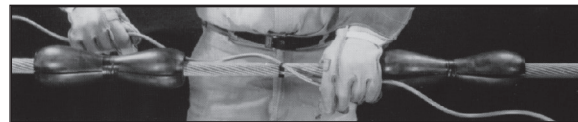


FIGURE 13: CURRENT TRANSFER TAB FOR OPGW APPLICATIONS

4.04 Start application of the outer rods at the center mark. Do not attempt to start on the insert as in the case with single suspensions.

Standard Double Suspension



Close-up of Outer Rods over Two-Set SRR

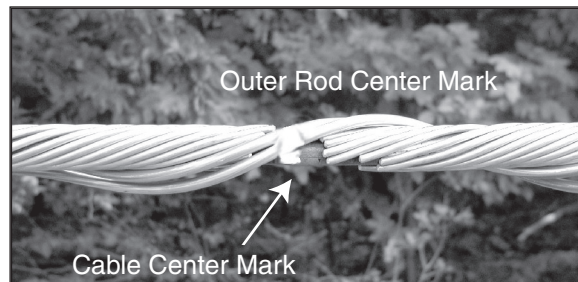


FIGURE 14: START OUTER RODS AT CENTER MARK

4.05 Wrap the first rod around the SRRs outward from center toward each neoprene insert (Figure 15). Start the rod onto each neoprene insert and lay the rod down into the contour of the hourglass shape of the insert. If the rod does not follow the contour of the neoprene, lift slightly and move the rod clockwise or counter clockwise about the cable axis (Figure 15) until the rod fits the contour as shown in Figure 16. Figure 17 shows the incorrect application.

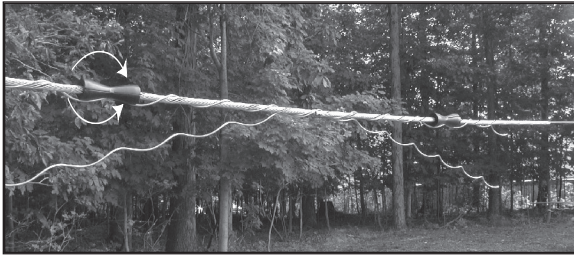


FIGURE 15: MOVE ROD AROUND INSERT UNTIL ROD FITS CONTOUR

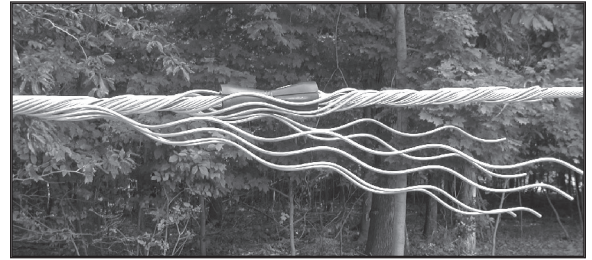


FIGURE 18: CONTINUE TO APPLY REMAINING RODS

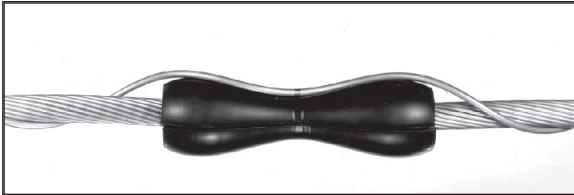


FIGURE 16: CORRECT ROD APPLICATION

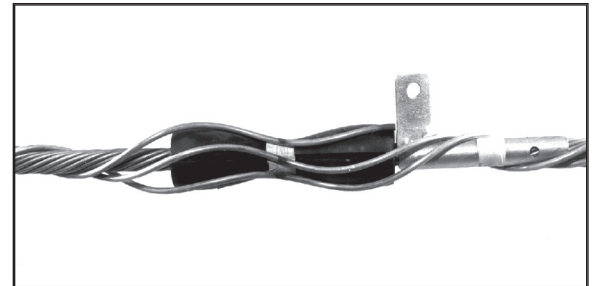


FIGURE 19: PLACE RODS AROUND CTT FOR OPGW

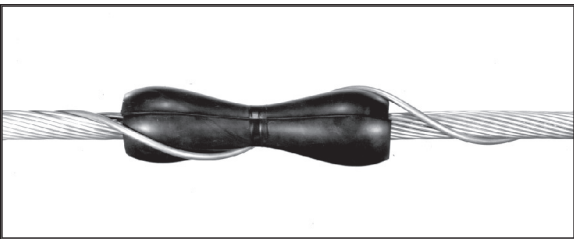


FIGURE 17: INCORRECT ROD APPLICATION

4.06 Apply the remaining rods in the same manner (Figure 18). For OPGW applications, carefully place the rods around the CTT without deforming the rods (Figure 19). Spaces or Gaps between rods will appear over the insert due to the increased diameter. Work to maintain equal spacing between rods over the insert.

PLP TIP: All remaining outer rods can be partially applied over the SRRs to cover the mid-portion between inserts with some room for manipulation before covering the insert areas. Continue to wrap rods over the insert as explained earlier. Figure 18 illustrates how rods are partially wrapped on the mid-portion and pause before the insert (moving left to right). Continuing from this point, rods are wrapped over the insert one by one and back onto the SRRs as the outer rods approach their extreme ends.

4.11 Beyond the inserts, rods can be wrapped in place individually as shown in Figure 18 or simultaneously (Figure 20). Use one or both hands to encircle the free rod ends at one end of the application. Twist all rod ends into position simultaneously. Repeat process at other end. Verify that inserts remained in proper position.



FIGURE 20: WRAP ROD ENDS IN PLACE



FIGURE 21: OVERALL VIEW OF DOUBLE SUSPENSION OUTER ROD APPLICATION WITH FREE ROD ENDS

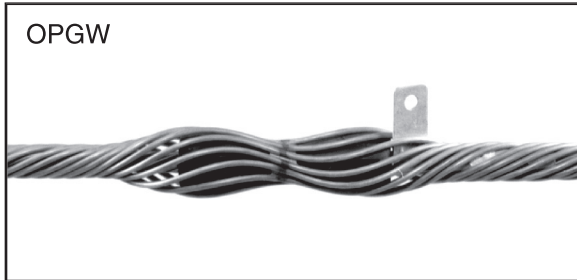
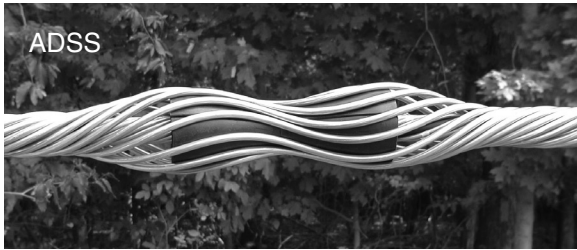


FIGURE 22: ROD AND INSERT ASSEMBLY - ADSS AND OPGW

4.07 Place the Suspension Housing Halves on both sides of the neoprene insert and rod assembly with the bolt hole facing up. Slide the Suspension Strap into position around the housing (Figure 24). Tap firmly into place with the heel of the hand (Figure 25).

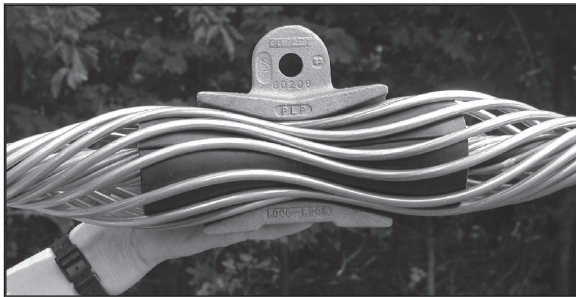


FIGURE 23: HOUSING HALF FITS CONTOUR OF INSERT AND ROD ASSEMBLY.

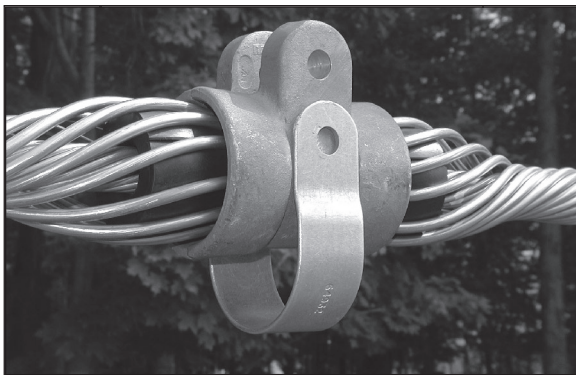


FIGURE 24: SLIDE ALUMINUM STRAP OVER HOUSING HALVES.

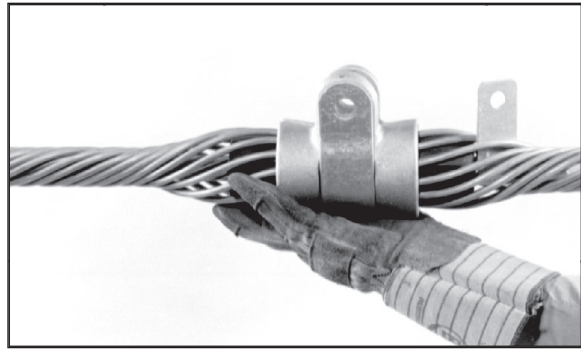


FIGURE 25: STRAP TAPPED IN PLACE FOR OPGW

4.08 Spread the ears of the housing and tap strap into position again. This will assure alignment so that the bolt can be easily inserted.

4.09 Slide the bolt into position through the strap, housing halves and fittings or structure interface. (Figure 26)

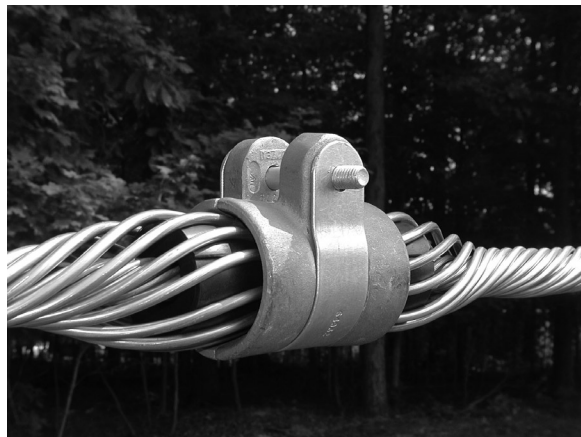


FIGURE 26: BOLT SLIDES THROUGH STRAP AND HOUSINGS - CONNECTION TO STRUCTURE NOT SHOWN

4.10 Apply the lock washer and lock nut and tighten nut until the lock washer is almost flat.

NOTE: Do not over tighten. Do not squeeze ears of housing against attachment fitting.

PLP Tip: Be sure that the locking tab on the nut is engaged with the end of the bolt. The locking tab will prevent the nut from backing off during vibration.

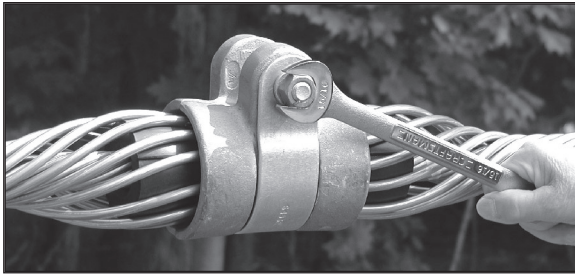


FIGURE 27: TIGHTEN NUT UNTIL LOCK WASHER FLATTENS

4.11 For OPGW applications, attach bonding strap to Current Transfer Tab using suitable bolt, nut, and washer. Bonding wire assemblies can be provided from PLP. (Figure 28)

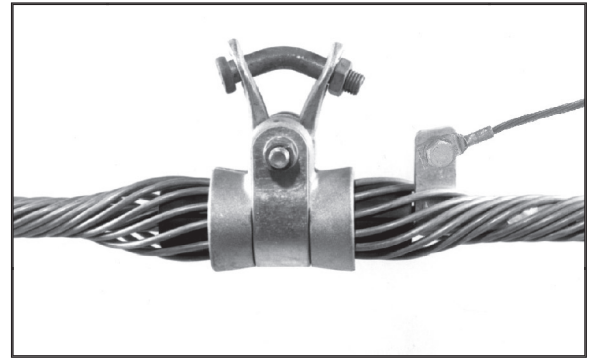


FIGURE 29: BONDING STRAP ATTACHED TO CURRENT TRANSFER TAB FOR OPGW APPLICATION

4.12 Follow the sequence above to complete assembly at the other end of the suspension.

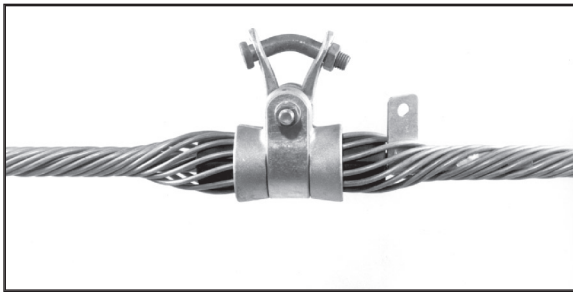


FIGURE 28 OPGW HARDWARE KIT INSTALLED WITH Y-CLEVIS EYE FITTING



FIGURE 30: FIBERLIGN SPREAD DOUBLE SUSPENSION ON ADSS CABLE

5.00 SAFETY CONSIDERATIONS

- 5.01 This Application Procedure is not intended to supersede any company construction or safety standards. This procedure is offered only to illustrate safe application for the individual. **CAUTION: FAILURE TO FOLLOW THESE PROCEDURES AND RESTRICTIONS MAY RESULT IN PERSONAL INJURY OR DEATH.**
- 5.02 This product is intended for the specified application. **CAUTION: DO NOT MODIFY THIS PRODUCT UNDER ANY CIRCUMSTANCES.**
- 5.03 This product is intended for use by trained craftspeople only. This product **SHOULD NOT BE USED** by anyone who is not familiar with and trained in the use of it.
- 5.04 When working in the area of energized lines with this product, **EXTRA CARE** should be taken to prevent accidental electrical contact.
- 5.05 For **PROPER PERFORMANCE AND PERSONAL SAFETY** be sure to select the proper size **PREFORMED** products before application.
- 5.06 **PREFORMED** products are precision devices. To insure proper performance, they should be stored in cartons under cover and handled carefully.

PREFORMED LINE PRODUCTS 

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