

APPLICATION PROCEDURE & SAFETY CONSIDERATIONS **PREFORMED** LINE PRODUCTS



JANUARY 1999

FIBERLIGN® Formed Wire Dead-end for OPGW

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

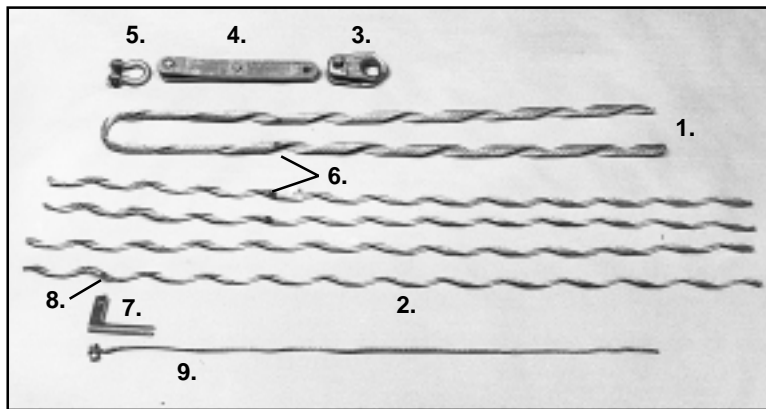


FIGURE 1 - NOMENCLATURE

1.00 NOMENCLATURE

1. **Dead-end Component**
2. **Structural Reinforcing Rods (SRR)**
3. **Thimble Clevis**
4. **Extension Link** (optional)
5. **Anchor Shackle** (optional)
6. **Color Code and Crossover Marks**
7. **Current Transfer Tab**
8. **Current Transfer Tab Location Mark**
9. **Grounding Wire Assembly** (optional)
10. **Bonding Clamp** (special option, may be customer supplied, not shown above, see Figure 1B)

2.00 DESCRIPTION

2.01 FIBERLIGN® Formed Wire Dead-ends for Optical Ground Wire (OPGW) terminate optical ground wire cable, keeping the cable under the required tension while preserving the desired sag.

2.02 FIBERLIGN Formed Wire Dead-ends are specially designed to develop the required holding strength while minimizing compressive stresses that may be transferred to the fiber optic elements.

3.00 INSTALLATION ISSUES

3.01 Dead-end Design: FIBERLIGN Formed Wire Dead-ends are manufactured with a specific number of rods (wires) and length specified by PLP® in order to provide necessary holding strength.

CAUTION:

1. Alterations to the number or length of the rods may prevent the product from functioning properly. DO NOT alter the rods in any way.
2. Ultimate tensile strength of multi-layer OPGW may exceed the rated holding strength of the Formed Wire Dead-end. Consult PLP before using this product for this application.

3.02 Structural Reinforcing Rods (SRRs): This layer of helically formed rods transfers the load between the cable's outer wire strength member and the dead-end component. SRRs are specially designed to transfer these axial tensile forces. The SRRs also armor the cable and protect the optical cable from the compressive forces of the dead-end.

3.03 Dead-end Component: The dead-end's helically formed rods transfer the load from the SRRs to the structure. Attachment to the structure is provided with the convenient built-in loop of the dead-end. The dead-end component transfers the axial tensile forces without distortion to the SRRs and cable.

3.04 Current Transfer Tab: A Current Transfer Tab is provided for grounding. Without a Current Transfer Tab, the dead-end alone does not provide adequate grounding for the OPGW, therefore the use of the Current Transfer Tab is required.

3.05 Associated Hardware: There are five additional components associated with the FIBERLIGN Formed Wire Dead-end.

- A. **Thimble Clevis:** A clevis of proper size and strength is provided in order to support the dead-end's loop and connect the dead-end to the structure or other fittings.
- B. **Extension Link:** The extension link positions the dead-end at the structure to allow an acceptable cable bending radius. PLP offers a standard 14" extension link rated for 25,000 pounds (cat. no. 0006132). The standard link assembly includes a 3/4" diameter pin and cotter pin.
- C. **Anchor Shackle:** The anchor shackle provides additional articulation and is normally used in conjunction with the extension link to connect to a structure. PLP offers an anchor shackle (cat. no. AS-5) with a 25,000 lb. ultimate load rating.
- D. **Bonding Hardware:** The Current Transfer Tab is provided for electrical grounding/bonding from the OPGW to the supporting structure or ground lead. The Current Transfer Tab is rated for 90kA². The standard FIBERLIGN® Formed Wire Dead-end includes a Current Transfer Tab with every kit. PLP can offer an optional bond clamp design shown in Figure 1B. Specify the outer diameter and material of OPGW and bond wire to PLP for proper selection.

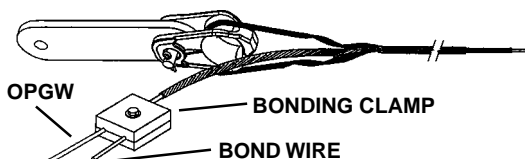


FIGURE 1B - CUSTOM DEAD-END ASSEMBLY WITH OPTIONAL BONDING CLAMP

E. Grounding Wire Assembly: A 4/0 7w x 4' long aluminum ground wire (suffix code GA) or #4, 7w x 4' long copper ground wire (suffix code G) can be provided by PLP for OPGW bonding clamp applications. Assemblies include a terminal connector on one end with 1/2" bolt, nut and lockwasher. Adding the suffix code to the product number will include the appropriate ground wire assembly in the same package.

3.06 Reapplication: FIBERLIGN Formed Wire Dead-ends for Optical Ground Wire may be used only once as a pulling-in grip under the condition that OPGW rotation is restricted during the operation. Immediately thereafter, the dead-end may be removed and reapplied only once more for permanent installation, for a total of two applications. DO NOT reuse after initial permanent installation is completed.

CAUTION: Possible damage to the cable or fiber can occur during initial construction. Therefore, it is important to understand the above installation issues and the following application procedures.

4.00 STRUCTURAL REINFORCING ROD AND CURRENT TRANSFER TAB APPLICATION

4.01 Before applying the structural reinforcing rods, loop the FIBERLIGN Formed Wire Dead-end component through the thimble clevis and pull it taught in a position parallel to the cable. (Figure 2) This will establish proper position for the dead-end assembly relative to the cable in order to maintain the desired cable sag and tension level.



FIGURE 2 - POSITIONING DEAD-END COMPONENT

4.02 With the color-coded crossover mark of the dead-end positioned adjacent to the cable, place a mark on the cable approximately 1" further from the structure and beyond the dead-end component crossover mark. This will be the reference mark for positioning the structural reinforcing rod (SRR) subsets on the cable. Shifting the mark slightly away from the structure will help maintain sag and tension after the dead-end has seated in the thimble clevis under load.

NOTE: Be sure to provide clearance for complete application of SRRs near the structure. Blocks or other hardware should be pushed back toward the structure to allow wrapping of the SRR subsets onto the OPGW.

4.03 Notice that the color mark of the SRRs is offset from the center (the length from one end of the subset to the mark is shorter than the other). With the short length positioned near the structure, align the color code mark to the reference mark you just made on the cable and place another mark on the cable adjacent to the Current Transfer Tab location mark. (Figure 3)



FIGURE 3 - APPLY MARK ON CABLE FOR CURRENT TRANSFER TAB LOCATION

4.04 Position the L-shaped Current Transfer Tab against the mark on the cable centered at the tab attachment hole with the cable leg of the tab directed away from the structure. Apply a single layer of tape to hold the Current Transfer Tab in place. (Figure 4)

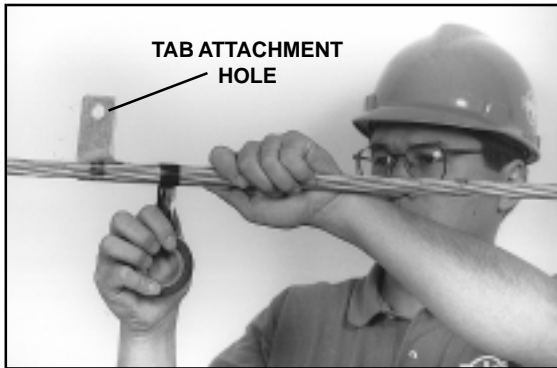


FIGURE 4 - POSITION CURRENT TRANSFER TAB AND APPLY TAPE

NOTE: SRRs are best installed starting at the Current Transfer Tab for proper location and ease of application.

4.05 Match the Current Transfer Tab color location mark of the first SRR subset to the base of the Current Transfer Tab attachment area. (Figure 5) In order to keep the Current Transfer Tab in place, wrap the short length of the SRR subset nearest the structure completely onto the OPGW. (Figure 6)

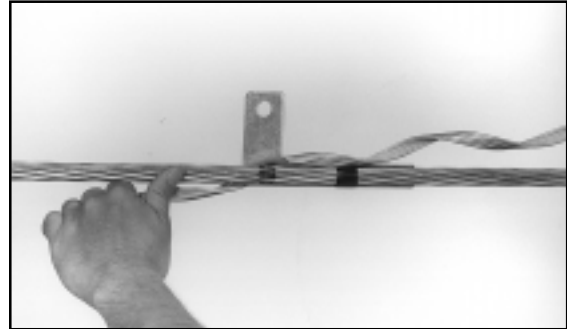


FIGURE 5 - POSITION SRR SUBSET AGAINST CURRENT TRANSFER TAB

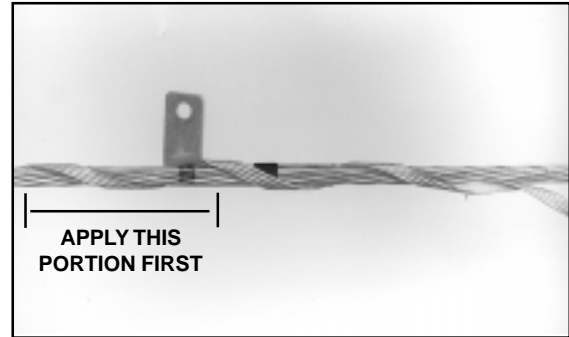


FIGURE 6 - WRAP SHORT LENGTH OF SRR NEAREST THE STRUCTURE ONTO OPGW

4.06 Continue to wrap the long portion of the first subset completely onto the OPGW while pulling the rod legs up and way from the cable as you wrap them onto the OPGW. (Figure 7) Snap the ends into place.

NOTE: You may leave portions of this subset temporarily unwrapped if convenient.



FIGURE 7 - APPLY FIRST SUBSET BY WRAPPING UP AND AWAY FROM CABLE

4.07 Align the Current Transfer Tab location mark of a second subset with that of the first subset. (Figure 8)



FIGURE 8 - ALIGN SECOND SUBSET WITH CURRENT TRANSFER TAB

4.08 Begin at the Current Transfer Tab and wrap the short section of the subset nearest the structure completely onto the OPGW. (Figure 9) Then continue to wrap the long portion of the subset for four to six pitch lengths, leaving the end loose. (Figure 10)

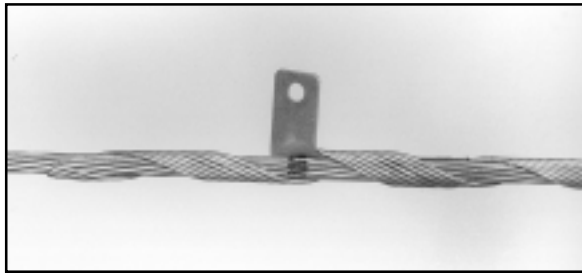


FIGURE 9 - WRAP SECOND SUBSET FROM CURRENT TRANSFER TAB

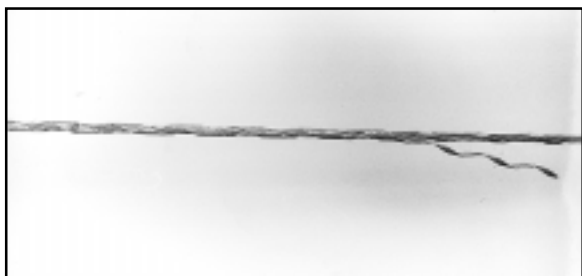


FIGURE 10 - WRAP LONG PORTION OF SECOND SUBSET FROM CURRENT TRANSFER TAB

PLP TIP: It aids installation if you wrap a subset on the cable into a previously applied subset. Wrapping away from a previously applied subset can increase the gap between subsets and cause application problems at the ends of the unapplied subsets. Wrapping all unapplied subsets at the same time can also help avoid this problem.

4.09 Apply remaining subsets as outlined in steps 4.07 and 4.08. (Figure 11)

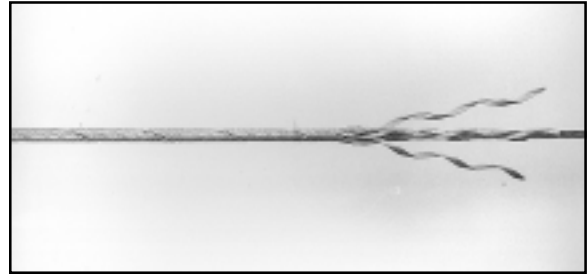


FIGURE 11 - APPLY REMAINING SUBSETS

4.10 To complete application, wrap unapplied subsets into previously applied subsets or use both hands to wrap subsets simultaneously into position. To assure proper reinforcement, make sure that rods are not crossed and that all rods are evenly spaced. **MAKE SURE ALL ROD ENDS ARE IN PLACE.** Do not use tools that can damage the cable.

PLP TIP: To ease final installation, split rod ends as shown in Figure 12A.

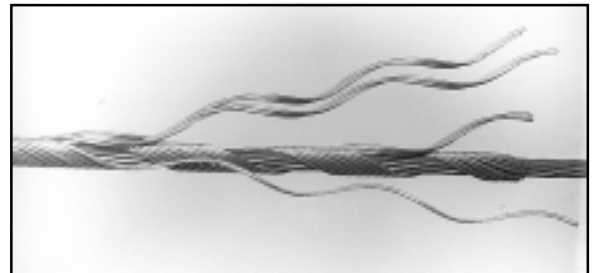


FIGURE 12A - SPLIT ROD ENDS TO EASE INSTALLATION



FIGURE 12B - COMPLETED SRR APPLICATION

5.00 FIBERLIGN FORMED WIRE DEAD-END APPLICATION

5.01 Insert the FIBERLIGN® Formed Wire Dead-end loop through the thimble clevis provided.

5.02 Align the crossover mark of the dead-end with the color code mark of the SRR. (Figure 13) Begin application by wrapping the dead-end legs over the SRR starting at the crossover marks. It may be possible to wrap one leg at a time; however, it may aid installation to wrap both legs simultaneously.



FIGURE 13 - MATCH DEAD-END CROSSOVER MARK AT SRR COLOR CODE MARK

5.03 Continue the installation by wrapping the leg(s) around the SRR as shown in Figure 14. Whether you wrap one leg at a time or both simultaneously, make sure the gap between both legs is evenly spaced.



FIGURE 14 - WRAP LEGS OF DEAD-END

5.04 To ease final installation, do not apply the last two leg pitches. Split the legs as shown in Figure 15 then apply them completely. Make sure all rod ends are snapped into place.



FIGURE 15 - SPLIT LEGS TO EASE APPLICATION



FIGURE 16 - FINISHED APPLICATION OF DEAD-END

5.05 The assembly can be grounded through the Current Transfer Tab. Preformed Line Products offers a Grounding Wire assembly (described in Section 3.00) that can be simply fastened to the hole of the Current Transfer Tab. (Figure 17)

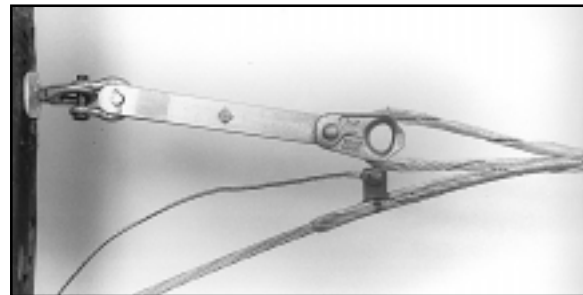


FIGURE 17 - GROUNDING WIRE ASSEMBLY ATTACHED TO CURRENT TRANSFER TAB

6.00 ALTERNATE BONDING HARDWARE APPLICATION

6.01 PLP can provide the bonding clamp hardware shown in Figure 1B. The bonding clamp has been designed to accept the outer diameter of the OPGW and bond wire. General application guidelines follow.

NOTE: For applications without the Current Transfer Tab, structural reinforcing rods are wrapped onto the cable beginning at the color code crossover mark, and not at the Current Transfer Tab location.

Other than the reference to the Current Transfer Tab, the methods and techniques described for installing the SRRs and dead-end of the standard assembly apply for the custom dead-end assembly shown in Figure 1B.

6.02 Locate the area of attachment for the bonding clamp on the OPGW and on the bond wire. Clean the surfaces with a wire brush to remove oxides.

6.03 Distribute electrical joint compound evenly over the areas of attachment on the OPGW and bond wire. Place the bond clamp halves on the OPGW and bond wire, making sure to match the clamp grooves properly to the OPGW outside diameter and bond wire outside diameter.

6.04 Bolt bond clamp halves together. Use a back-up wrench to restrain the head of the bolt and to avoid bending the OPGW while tightening hardware. Tighten bolts to the recommended installation torque (1/2" bolt: 20-25 lbf-ft). Do not remove electrical joint compound that squeezes out when the clamp is tightened.

6.05 If clamp is not supplied by PLP, follow clamp manufacturer's recommended procedure.

CAUTION: To avoid damage to the OPGW, clamp OPGW and bond wire in the proper grooves and tighten to recommended installation torque.

SAFETY CONSIDERATIONS

1. 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.**
2. This product is intended for a single permanent installation as described in paragraph 3.05 and for the specified application. **CAUTION: DO NOT REUSE OR MODIFY THIS PRODUCT UNDER ANY CIRCUMSTANCES.**
3. 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.
4. When working in the area of energized lines with this product, **EXTRA CARE** should be taken to prevent accidental electrical contact.
5. For **PROPER PERFORMANCE AND PERSONAL SAFETY** be sure to select the proper type and size FIBERLIGN® Formed Wire Dead-end before application.
6. FIBERLIGN Formed Wire Dead-ends for OPGW are precision devices. To insure proper performance, they should be stored in cartons under cover and handled carefully.

PREFORMED LINE PRODUCTS 

P.O. Box 91129, Cleveland, Ohio 44101 • 440.461.5200 • www.preformed.com • e-mail: inquiries@preformed.com
SP2866-1