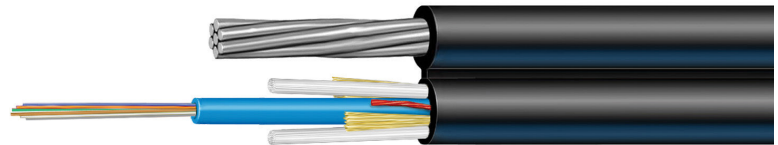


## Figure 8 Fiber Optic Drop Cable Applications Procedure

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### 1.0 Scope

The instructions in this document explain how to prepare end openings of the Prysmian Figure 8 Fiber Optic Drop Cable for termination. The document also covers applications notes including the use of coupling coils and hardware recommendations for aerial installations.

**Question? Call 1-800-669-0808 or 1-800-879-9862**

### 2.0 Safety

**2.1** Prysmian strongly recommends the use of approved personal protective equipment in the performance of this procedure. Wear safety glasses and gloves, and use solvents in well-ventilated areas.

**2.2** Never look directly into the end of a fiber that may be carrying laser light. Laser light may be invisible and can damage your eyes. Viewing it directly does not cause pain. The iris of the eye will not close involuntarily as when viewing a bright light. Consequently, serious damage to the retina of the eye is possible. Should accidental eye exposure to laser light be suspected, arrange for an eye examination immediately.

**2.3** DO NOT use magnifiers in the presence of laser radiation. Diffused laser light can cause eye damage if focused with optical instruments. Should accidental eye exposure be suspected, arrange for an eye examination immediately, serious damage to the retina of the eye is possible.

### 3.0 Key Points

**3.1** Please consult the product data sheet on the internet to assure that the cable bend radius, tension, maximum span distance, and maximum installation load are not violated.

**3.2** DO NOT exceed the cable minimum bend radius.

**3.3** Aerial applications: Coupling coils are required at both ends prior to entering the termination point.

**3.4** DO NOT exceed the maximum pulling tension of 300 lbf. Note that the installation tension in aerial applications is below this value.

**3.5** Separation of the messenger subunit and the fiber subunit should be limited to attachment, termination, and grounding and bonding locations. The length of separation between the messenger subunit and the fiber subunit shall not exceed 40 ft.

**3.6** NEVER separate the messenger subunit and the fiber subunit by pulling apart by hand. Although this may seem okay, there is potential to kink the buffer tube and/or break fibers. Always use a tool to slit the web.

**3.7** DO NOT bend buffer tubes at sharp angles while removing the jacket, armor, yarns, or strength members.

## 4.0 Tools and Materials For Cable Access



- [+] Nine Inch Pliers
- [+] Wire Strippers
- [+] Protective gloves
- [+] Safety glasses
- [+] Buffer Access Tool
- [+] Utility Knife
- [+] Snips
- [+] Needle Nose Pliers

**Not pictured:** Vinyl tape, isopropyl alcohol, small black wire ties, lint free wipes

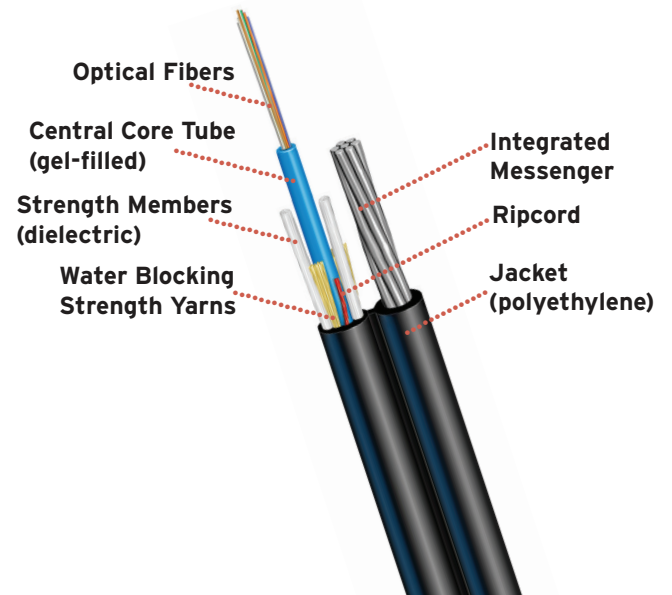
### 4.1 Alternative Web-Slitter For End Access

There are several web-slitting tools on the market that are designed to cut the web to separate the fiber sub-unit from the messenger subunit. Prysmian has tested and recommends using the Benner-Nawman UP-B36 Cable Slitter for slitting the web during end access. The largest opening should be used with the Prysmian Figure 8 Fiber Optic Drop Cable.

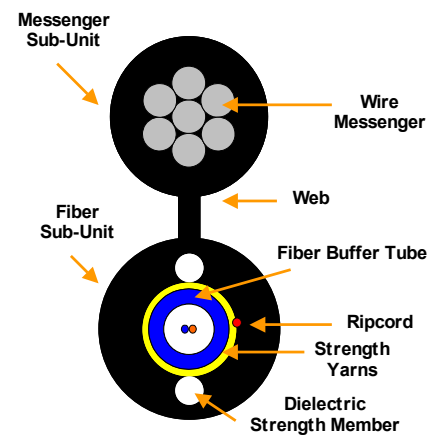
**Banner-Nawman, Inc.**  
**UP-B36 Cable Slitter**  
[www.benner-nawman.com](http://www.benner-nawman.com)  
 1-800-992-3833



## 5.0 Reference Drawing



**Figure 8 Drop Fiber Optic Cable**

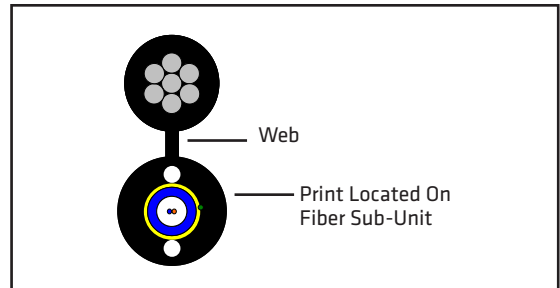


## 6.0 End Access Procedure

**6.1** Determine the length of fiber and tube needed for splicing as recommended by the manufacturer of the splice closure or termination box. Leave enough subunit length to route from the messenger attachment point to the closure. Mark the cable or place some tape to identify the end of the length to be accessed.



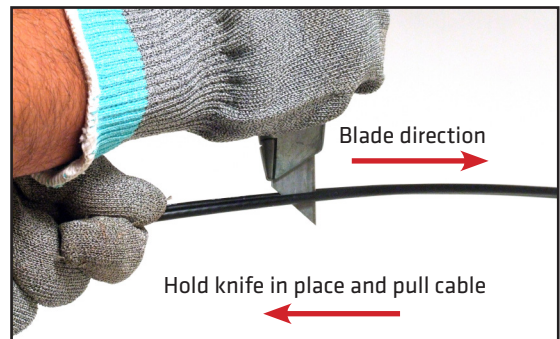
**6.2** Identify the fiber sub-unit and the messenger subunit. The fiber subunit will always be the half with print.



**6.3** At 12" from the end of the cable, cut a small hole through the web using a utility knife such that the knife blade will fit through the web. Place the knife blade through the web such that the sharp end is facing toward the end of the cable and away from your body. Rotate the knife such that it is pointing slightly towards the messenger and away from the fiber subunit. The tilting of the knife will prevent inadvertent cutting into the fiber subunit.

**6.4** Hold the knife in place at the slight angle and pull the cable towards your body, slitting web is with the utility knife.

**NOTE:** By holding the knife in place at the slight angle and pulling the cable through the blade, the web is cut smoothly and consistently, minimizing risk of cutting into the fiber subunit.



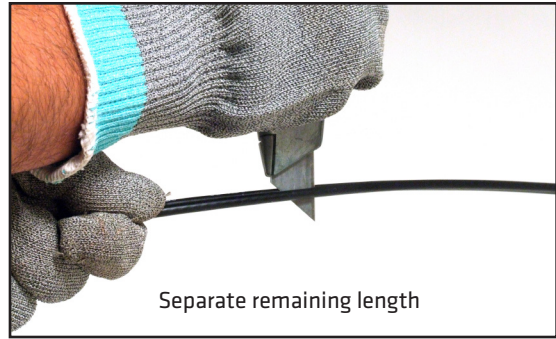
**6.5** At 2 inches from the end, score the fiber subunit, using 10 AWG wire strippers.

**6.6** Grab a section of intact cable with one hand (down stream from the separated 12 inches) and use the wire strippers in the other hand to pull the 2-inch section of the sheath off of the fiber subunit. The ripcord, buffer tube, and strength elements will now be exposed.

**NOTE:** Grab a section of the cable with the messenger still attached for leverage when stripping the 2-inch jacket section.

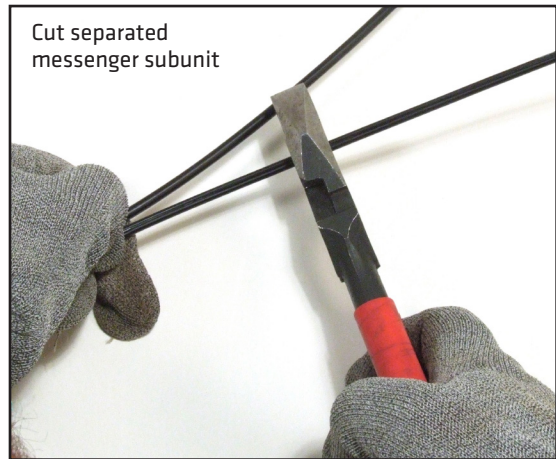


**6.7** From the end of the access window (location marked in Step 1), use the utility knife to separate the remaining length of cable. Again, make sure to slightly tilt the knife blade away from the fiber subunit (printed side) and towards the messenger subunit. Hold the knife in place and pull the cable towards your body. Pull in multiple steps, 2–3 ft at a time.



**6.8** Cut the separated messenger subunit at the desired location. Make sure to leave some length for hardware attachment within the closure or termination unit and/or pole.

**NOTE:** If the steel messenger needs to be exposed for grounding/bonding, use 14 AWG strippers to strip off the sheath from the messenger.

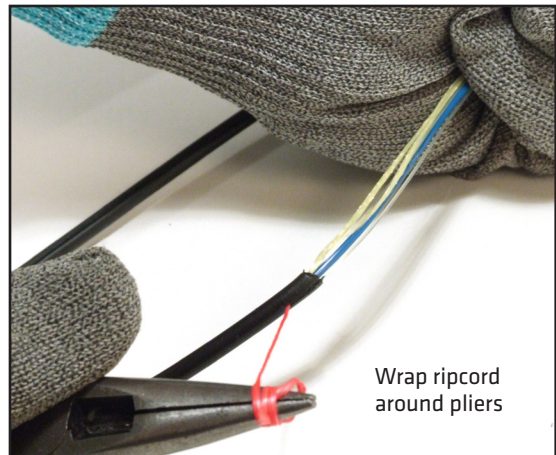


**6.9** Make a second score of the fiber subunit at the end of the desired access window. The ripcord will be used to remove the sheath from the end of the cable up to this location.



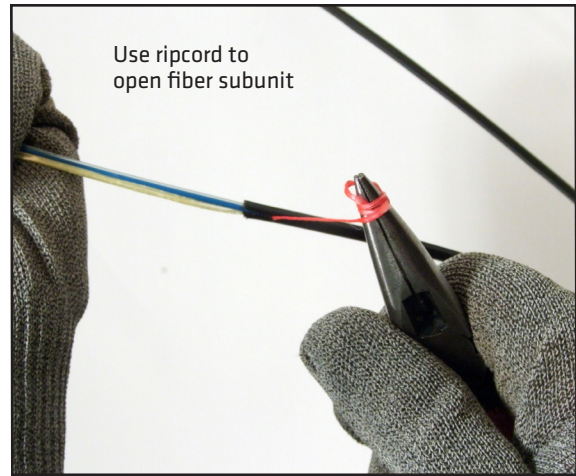
**6.10** Locate the ripcord and wrap it through and around the needle nose pliers. With one hand holding the buffer tube and strength elements, pull the ripcord in the opposite direction. Holding the tube and strength elements will counteract the force of pulling the ripcord in the opposite direction.

**NOTE:** Hold the fiber subunit at one end while pulling the ripcord in the opposite direction. This will prevent kinking of the buffer tube.



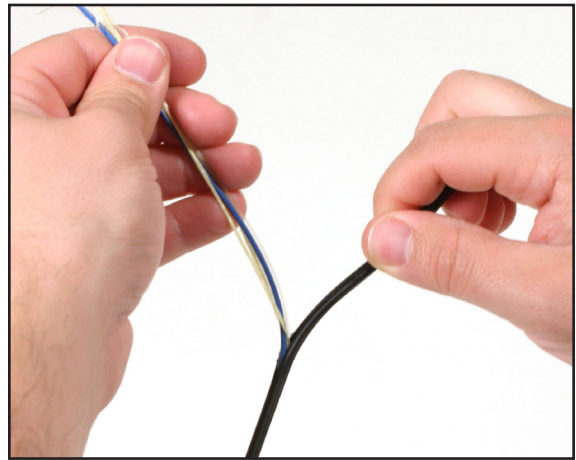
**6.11** Pull the ripcord in 2–3 ft. increments and regrip the fiber subunit with the opposite hand. Pull the ripcord to the second score location.

**DO NOT** wrap the buffer tube around the palm of your hand for leverage while pulling on the ripcord. This may kink the tube and break fibers. Keep the fiber buffer tube as straight as possible while pulling on the ripcord.

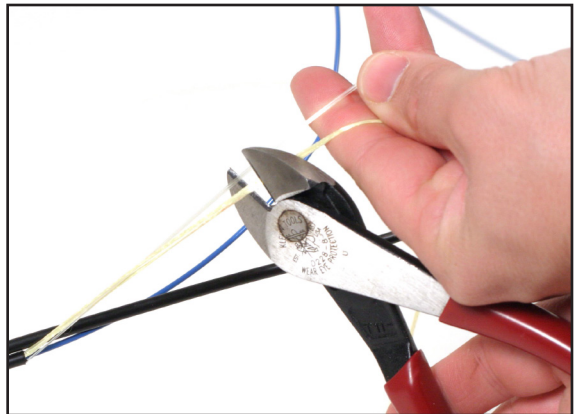


**6.12** While holding the buffer tube and strength elements in one hand, peel away the sheath. In order to prevent the tube from kinking, regrip every 1–2 ft.

**NOTE:** Pull a couple of the yarns through the beginning of the tear to initiate the opening. This will help guide the tube out of the jacket.

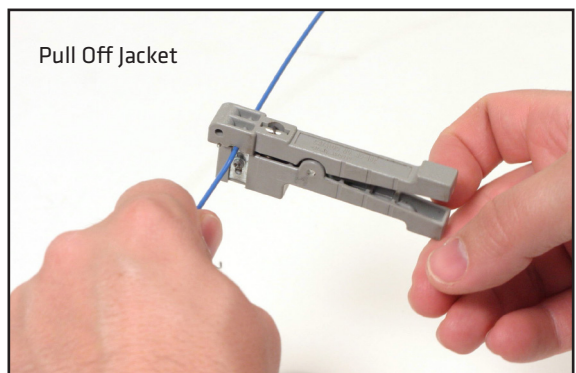


**6.13** Cut the strength yarns, ripcord and rigid strength elements.



**6.14** Determine the length of fibers to be accessed, score and snap the buffer tube and remove the tube in 12–15 inch (30–40 cm) increments until the desired length of fiber is exposed.

**NOTE:** The small buffer tube can be routed in most splice trays eliminating the need for transportation tubing. Clean fibers and prepare for splicing.



## 7.0 Recommended Hardware for the Aerial Installation of Figure 8 Fiber Optic Drop Cable

Prysmian's Figure 8 Fiber Optic Drop Cable is designed for use with standard WIREWISE® service drop wire clamps in aerial applications. Wirelink splices can be used to splice together the messenger at mid-point locations for continuity purposes.

These parts are specifically designed for interface with the 3/23" stranded galvanized steel messenger in the Figure 8 Fiber Optic Drop Cable.

### MacLean Power Systems

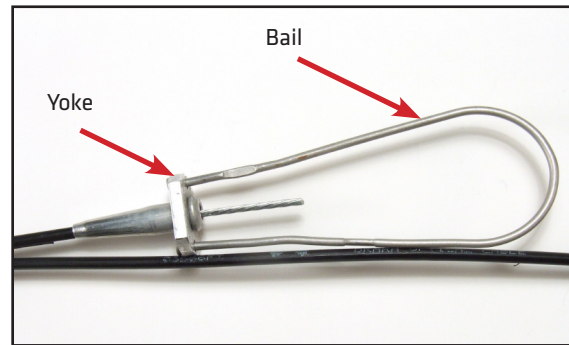
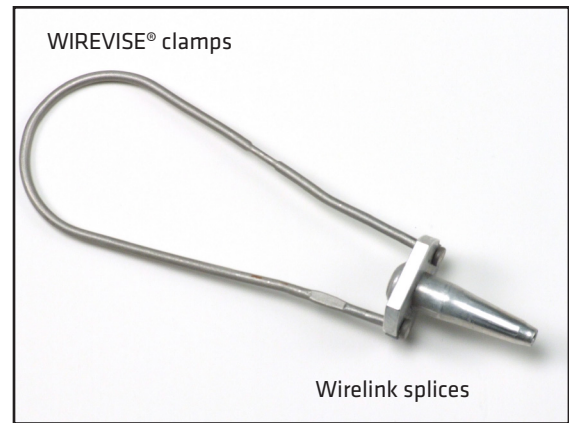
Clamp: WIREWISE® Part # 5056

Splice: Wirelink Part #5057 or 5057N

[www.maclepower.com](http://www.maclepower.com)

These parts are available through various distribution outlets.

**WARNING:** The WIREWISE® clamps are the only approved clamps with the Prysmian Figure 8 Fiber Optic Drop Cable. Other clamps such as twisted wire dead end, universal clamps or drop wire wedge clamps are not compatible with the Figure 8 Fiber Optic Drop Cable. Use of unapproved clamps may lead to damage to the cable and/or fibers.

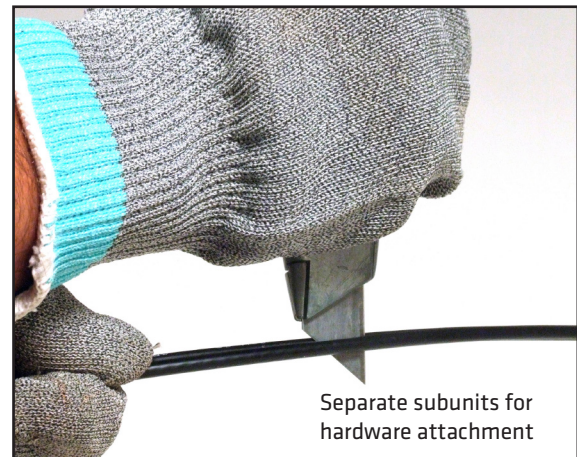


Please consult Prysmian Customer Service if there are any questions, 1-800-879-9862 or 1-800-669-0808.

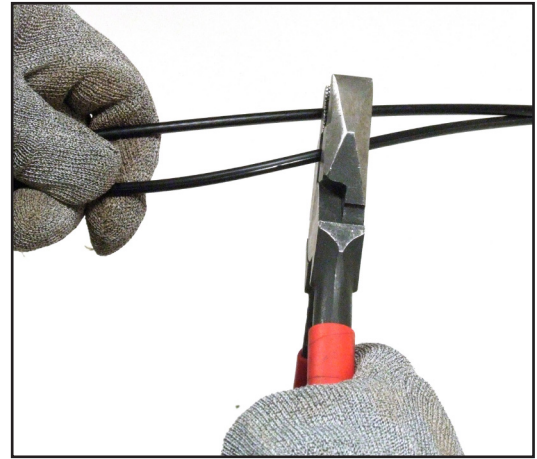
## 8.0 Preparing the Messenger Subunit for Hardware for Single Vise Attachment (Aerial Installation Only)

**8.1** Determine the location on the cable at which the messenger will be attached to hardware. Mark that location and separate the messenger 8 inches on either side of that mark using a utility knife. Make sure to slightly tilt the knife blade away from the fiber subunit (printed side) and towards the messenger subunit. The tilting of the knife will prevent inadvertent cutting into the fiber subunit.

Be sure to leave enough fiber subunit length for the coupling coil and routing of the buffer tube and fiber in the closure.



**8.2** Cut the messenger subunit at the marked location.

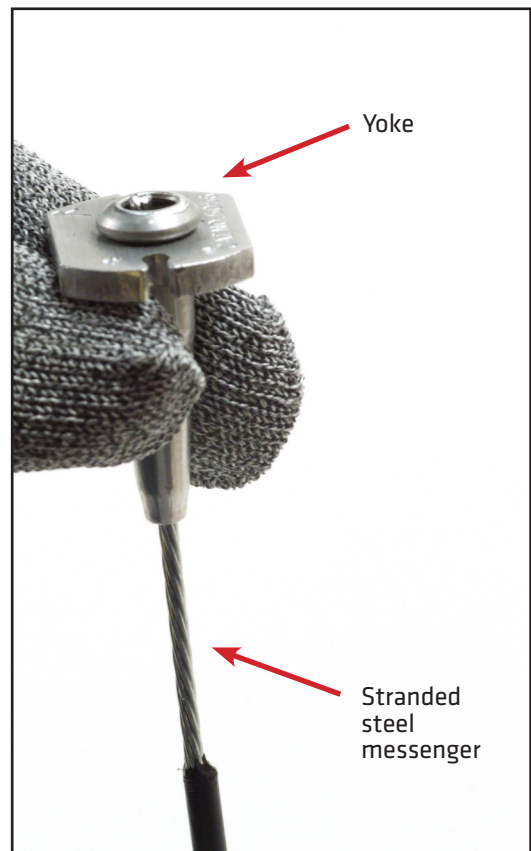


**8.3** At 2–3 inches from the end of the cable, score the messenger subunit, using 14 AWG wire strippers by repeatedly twisting. Use the wire strippers to pull the 2–3 inch section of sheath from the messenger. This will expose the stranded steel messenger and allow it to be attached to the clamps.

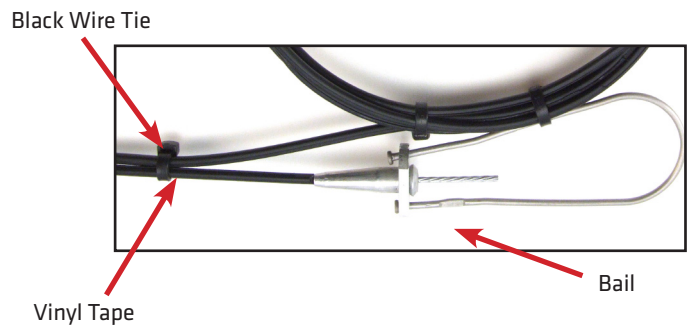


**8.4** Slide the yoke of the WIREWISE® clamp onto the steel messenger.

**NOTE:** The yoke will only slide on in one direction. It cannot be removed from the cable once initially installed. Careful measurements must be made to ensure the clamp is at the correct location on the cable.



**8.5** Once the yoke is secured, attach the bail to the yoke. The bail will be attached to hooks on the poles or house. In order to prevent additional separation of the fiber and messenger subunits, vinyl tape should be applied around the cable adjacent to the wirevise clamp. A black wire tie should be applied over the vinyl tape for additional protection. Additionally, depending on recommended local practices, multiple twists should be applied for each aerial span.



## 9.0 Double Vise (Mid-Cable Attachment)

Two different methods of mid-cable attachment may be required. The correct method is determined by comparing the span lengths on either side of the mid-cable attachment point.

If all other factors are equal, the tension on a span will be proportional to its length. If there is a big difference between the length of two spans, there will be a big difference between the amount of tension they experience. This is especially true if ice or high winds are present. If two adjacent spans have significant differences in length, the change in tension between them will take place over a very short length of cable. This can result in fiber movement between the spans.

If the difference in span length is less than 35 feet, then the difference in tension between the spans at full load will not be great enough to cause the fibers in the fiber unit to migrate and **method A** may be used. If the difference in span length is greater than 35 feet, **method B** must be used to prevent fiber migration.

### 9.1 Method A (Span difference less than 35')

Begin by measuring the cable and marking it where the mid-cable attachment point needs to be placed for proper sag and tension. If you are unsure about the measurements, the span can be held up by hand and marked where it touches the attachment point. Accurate measurement is critical, since the vises can only be adjusted in one direction. (Note: when in doubt, start by installing the first span with too much slack. This slack can easily be taken up by sliding more messenger through the WIREVISE®. Excess fiber subunit length can be stored in a coil.

Cut the stranded steel support wire at the mark. Split the fiber unit and steel strand halves apart per the guidance in **section 8.0**. Separate about 6 inches of the cable on each side of the messenger cut (12 inches total). Remove the support strand sheath where the vises are to be placed.

Place the vise on the 'tensioned' cable section (section of cable already placed) first by sliding the wire end into the cartridge. The wire must be placed into the tapered end of the cartridge and cannot be pulled back once it is in the cartridge.

Place two or three wraps of vinyl tape around the fiber unit and the steel support strand at the base of the WIREVISE®. A black tie wrap should be applied over the tape for additional protection. This will prevent the fiber and support strand from any further separation.

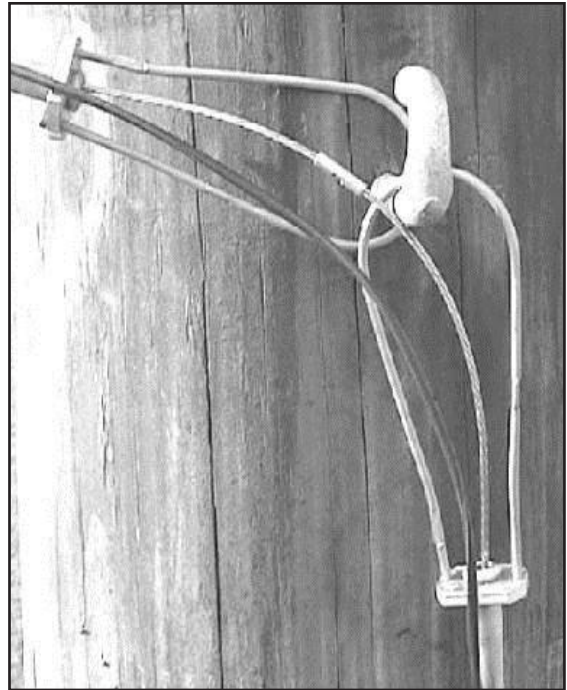


Place the U-shaped bail into the yoke base and place it on the attachment point.

Now place the second wire vise on the cable, positioned so that the cut ends of the stranded steel support wire slightly overlap. These cut ends should be re-joined using a small wire mesh grip or 14 gauge crimp to ensure grounding continuity after placing the Vise on the attachment point.

Place two or three wraps of vinyl tape around the fiber unit and the steel support strand at the base of the WIREVISE®. A black wire tie should be applied over the vinyl tape for additional protection. This will prevent the fiber and support strand from any further separation.

Verify the fiber unit is not twisted or pinched at any point. If the dead ends were properly positioned, the fiber unit should lay approximately along the same path as the stranded steel support wire with neither excessive slack nor tension.



Crimp together support strand ends to maintain continuity

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### 9.2 Method B (Span difference 35' or greater)

Method B is similar to method A except that a section of messenger must be removed to create an excess length of fiber subunit. The extra fiber unit is then coiled and attached using methods similar to Section 13 and 14.

Begin by measuring the cable and marking it where the mid cable attachment point needs to be placed for proper sag and tension. If you are unsure about the measurements, the span can be held up by hand and marked where it touches the attachment point. Accurate measurement is critical, since the vises can only be adjusted in one direction.

**NOTE:** when in doubt, start with too much slack on the first span. Adjust the first span as needed by sliding its messenger through the WIREVISE®. A black tie wrap should be applied over the tape for additional protection. The amount of excess fiber unit length can then be measured. Additional excess length can then be measured and separated as needed.)

Cut the stranded steel support wire at the mark. Split the fiber unit and steel strand halves apart per the guidance in **section 8.0**.

Continue splitting the cable in the direction of the first span (the span which is already attached at one end). Split off 4 feet of messenger. If you are sure of the attachment point, cut the messenger at this point. (If unsure, do not cut it yet). Split off another 6 inches of messenger. Strip the jacket from this point all the way back to the free end of the messenger (about 4.5 feet or 6 inches, depending on whether you just cut the messenger). Place the vise on the exposed messenger by sliding the wire end into the cartridge. The wire must be placed into the tapered end of the cartridge and cannot be pulled back once it is the cartridge. Adjust the messenger carefully in the WIREVISE® to obtain the correct sag and tension on the first span. Cut off any excess messenger so that the messenger extends just slightly past the attachment point.

Place two or three wraps of vinyl tape around the fiber unit and the steel support strand at the base of the WIREVISE®. A black tie wrap should be applied over the tape for additional protection. This will prevent the fiber and support strand from any further separation.

Place the U-shaped bail into the yoke base and place it on the attachment point. Adjust the sag as necessary.

Starting at the attachment point, measure the cable in the direction of the next span (the one that isn't put up, yet). Cut the messenger **ONLY** at 8 feet from the attachment point. Remove the messenger from this point back towards the attachment point using the method described in **Section 8**. The remaining 8-foot segment of fiber unit will be used to make the coil.

Split the messenger and fiber unit for 6 inches in the direction of the second span as described in **Section 8** strip the jacket off this section of messenger.

Now place the second WIREVISE® on the stripped messenger, positioned so that cut ends of the stranded steel support wire slightly overlap. These cut ends should be re-joined using a small wire mesh grip or 14 gauge crimp to ensure grounding continuity after placing the Vise on the attachment point.

Place two or three wraps of vinyl tape around the fiber unit and the steel support strand at the base of the WIREVISE®. A black tie wrap should be applied over the tape for additional protection. This will prevent the fiber and support strand from any further separation.

Carefully form the 8 foot length of the fiber unit into a compact coil of about 6" in diameter. Secure the coil to one of the WIREVISE® bails and itself with black tie wraps. (Black is preferred for both appearance and UV resistance).

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## 10.0 Bonding and Grounding

When installed aerially in the vicinity of power lines, Figure 8 Fiber Optic Drop Cables (and all cables with metallic elements) are susceptible to an induced voltage. Prysmian strongly recommends the proper bonding and grounding of the metallic components according to National Electric Code (NEC) and the National Electrical Safety Code (NESC).

Article 770 of NESC states that all non-current carrying metallic elements of an optical fiber cable must be bonded and grounded at the point of entrance into a building or residence.

There may also be local and state regulations that supersede the NEC and NESC recommendations. Prysmian strongly recommends installation according to the proper local and state regulations. National Electrical Code, ANSI/NFPA 770, 1999 Edition, National Electrical Safety Code, ANSI C2-1997

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## 11.0 Vibration (Aerial Installation Only)

When installed aerially, Figure 8 Fiber Optic Drop Cables may be subjected to wind, which can cause the cable to vibrate. Low frequency, high amplitude vibration, often called galloping or dancing, may result under certain circumstances.

In order to minimize galloping, Prysmian recommends applying one complete twist for every 20 to 40 ft of Figure 8 Fiber Optic Drop Cable.

## 12.0 Coupling Coils (Aerial Installation Only)

### 12.1 Coupling Coil Overview

Coupling coils are necessary to prevent an undesirable phenomenon commonly referred to as “fiber retraction” at splice closures or other termination points. When installed aerially, a cable may be subjected to weather loading as a result of wind and ice. This weather loading can cause a significant elongation of the cable. In typical stranded loose tube cables, the fibers, buffer tube, and cable are coupled together by design, and will elongate or strain in equal amounts. However, in central-tube-type cables, there is insufficient coupling between the fibers and the buffer tube. Because of this lack of coupling, as the cable elongates due to weather loading, the fibers will retract at both ends of the cable. This fiber retraction at closures can lead to high optical loss at the termination points, or in a worst-case scenario, break the splice.

The use of coupling coils is a necessary applications solution to prevent fiber retraction in the Figure 8 Fiber Optic Drop Cable. Coupling coils are a means to couple the fibers to the buffer tube and the cable, such that they all behave together, similar to a stranded loose tube cable.

Prysmian has conducted extensive testing and has found coupling coils to be the best solution to prevent fiber retraction. A coupling coil consists of four 6-inch loops of cable at each end of the cable. Details of preparing a coupling coil are included in **Section 13**.

**NOTE:** Coupling coils should be placed at both ends of the cable between the clamp and the splice closure or termination box.

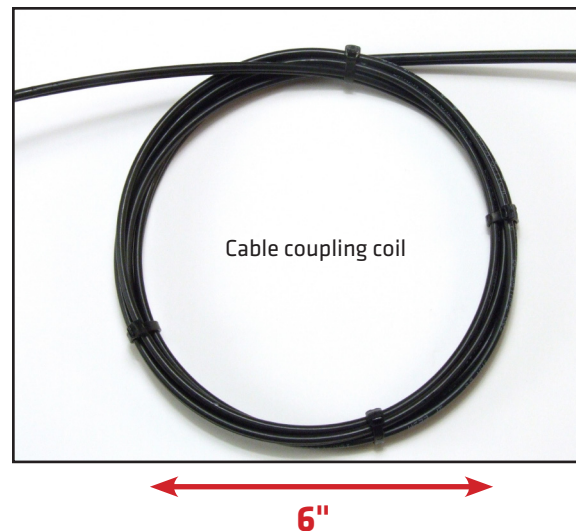
## 13.0 Cable Coupling Coil Procedure

**13.1** Determine suitable location to place the cable coupling coil that is non-intrusive and does not cross into other rights-of-way.

**NOTE:** A coupling coil must be placed at both ends of the cable to be effective. Failure to place a coupling coil at each end of the cable can lead to fiber retraction from the closure or termination box.

**13.2** Make a coil with at least 4 loops of cable, with a loop diameter of at least 6 inches. The coil should be no smaller than 6 inches, but may be larger.

**13.3** Secure the coil together by applying cable ties at 4 locations of the coupling coil, 90 degrees apart. Using less than 4 cable ties may result in the coil unraveling.

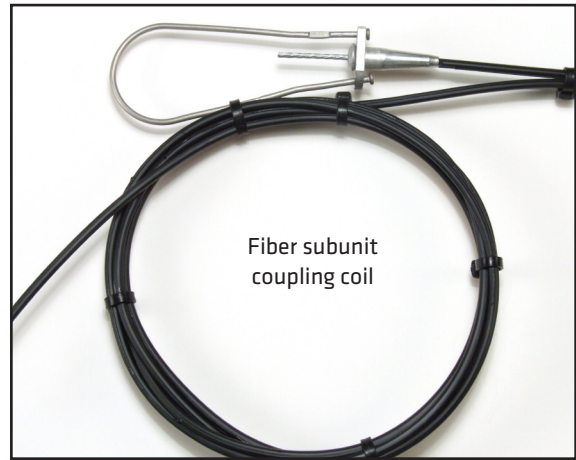


## 14.0 Alternative: Fiber SubUnit Coupling Coil Procedure

**14.1** Determine a suitable location to place the fiber subunit coupling coil. A common practice is to attach the coil directly to the bail of the Wirevise clamps. Coils should be placed at both ends of the cable, between the clamp and the termination point.

**14.2** Make a coil with at least 4 loops of the fiber subunit, with a loop diameter of at least 4 inches. The coil should be no smaller than 4 inches, but may be larger.

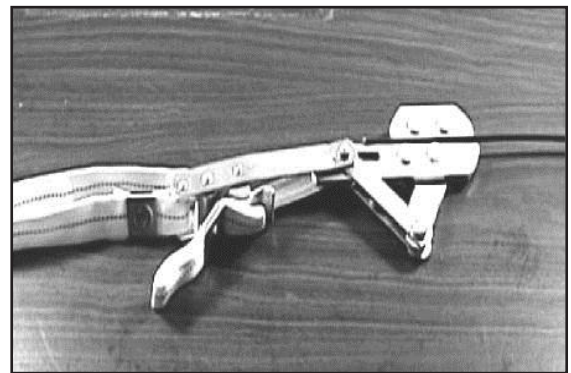
**14.3** Secure the coil together by applying cable ties at 4 locations of the coupling coil, 90 degrees apart. Using less than 4 cable ties may result in the coil unraveling.



## 15.0 Tensioning The Cable

For short drops, tensioning the cable by hand may be sufficient. For longer drops, a tensioning device will likely be required.

A 'Buffalo' Grip (Buffalo manufacturing part number 83-601) can safely be used for tensioning the cable. Ensure the cable is parallel (e.g., |8|) to the grip so that the fiber will not be pinched. Open the grip and place the steel support strand. Ideally, only the steel support strand should be between the jaws. Tension the cable per the sag and tension table requirements or company policy and practices.



*Buffalo Grip for tensioning Drop cable.*



*Buffalo Grip for tensioning cable. Note Grip jaws are only on the steel support strand.*

DISCLAIMER OF WARRANTIES AND  
LIMITATION OF LIABILITIES

The practices contained herein are designed as a guide. Since there are numerous practices which may be utilized, Prysmian has tested and determined that the practices described herein are effective and efficient. The recommended practices are based on average conditions.

In addition, the materials and hardware referenced herein appear as examples, but in no way reflect the only tools and materials available to perform these evaluations.

Prysmian makes no representation of nor assumes any responsibility for its accuracy or completeness. Local, State, Federal and Industry Codes and Regulations, as well as manufacturers requirements, must be consulted before proceeding with any project. Prysmian disclaims any liability arising from any information contained herein or for the absence of same.

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