SELF-SUPPORTING CABLE

GENERAL

Contents

1. GENERAL

1.01 This section provides general information pertaining to self-supporting cable. Information is also provided to cover the tools and hardware used for placing this type of cable.

1.02 (Reserved for future use.)

1.03 Self-supporting cable can be used for aerial or block construction and may be placed through subsidiary conduit to a manhole. It is not necessary to remove the supporting strand when pulling self-supporting cable through subsidiary conduit.

1.04 The available sizes and reel lengths of self-supporting cable are listed in Section 626-101-005.

1.05 The use of self-supporting cable for pole to building spans can be constructed as outlined in Section 627-610-205.

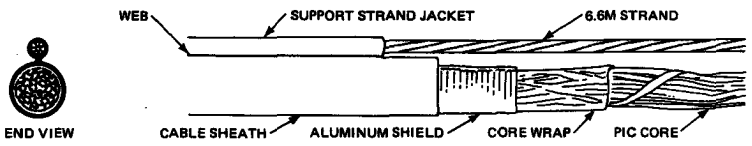
2. DESCRIPTION

2.01 Self-supporting cable consists of a supporting strand and a cable core combined into an integral unit by a polyethylene (poly-) jacket.

2.02 The supporting member is 1/4-inch extra high-strength class A galvanized steel strand designated as 6.6M and having a minimum breaking strength of 6650 pounds. The strand is flooded with a compound for corrosion protection.

2.03 The cable consists of a standard polyethylene-insulated conductor (PIC) core, a core wrap, and a longitudinally applied corrugated aluminum shield. The PIC core is waved to maintain slack in the conductors after the cable has been placed and tensioned.

2.04 The cable core and the strand are paralleled and jacketed with polyethylene in such a manner that they are joined by a narrow web of polyethylene (Fig. 1).



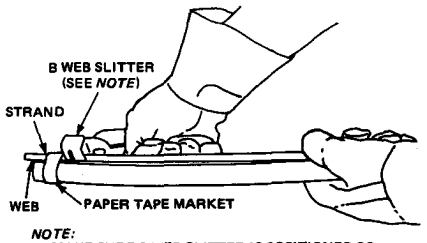
Cutaway View of Self-Supporting Cable
Fig. 1

3. TOOLS AND CONSTRUCTION APPARATUS

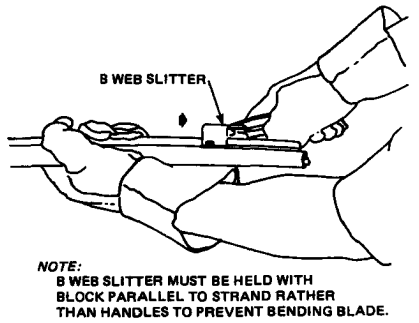
3.01 ***B Web Slitter*** (Figs. 2, 3, and 4): This tool is used to slit the web between the strand and the cable core. It is a plier-type tool with a replaceable cutting blade. The blade is retained with one screw and is reinforced with a replaceable square washer to prevent bending.

3.02 ***B Jacket Slitter*** (Fig. 5):

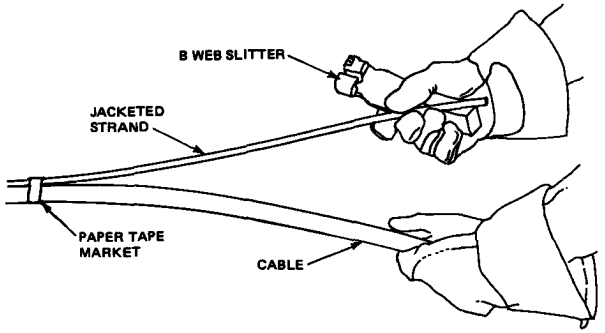
(a) ***Description:*** The B jacket slitter consists essentially of a hardened steel blade, a guide, and a handle. The blade is replaceable and is retained in the guide with two screws. This tool is intended for use in removing the poly-jacket from the strand and produces a shaving action similar to that of a plane.



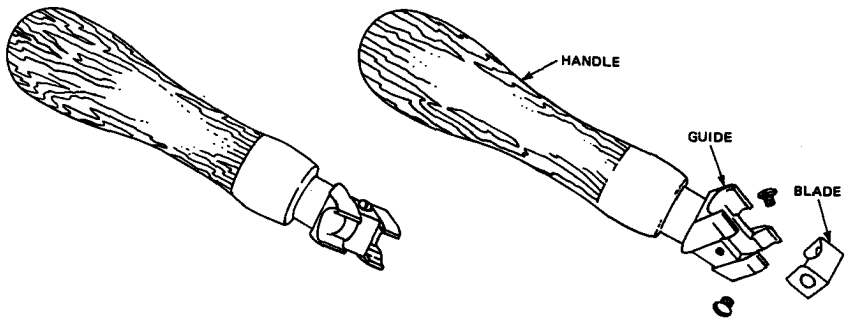
Piercing Web with Blade of B Web Slitter
Fig. 2



Slitting the Web
Fig. 3

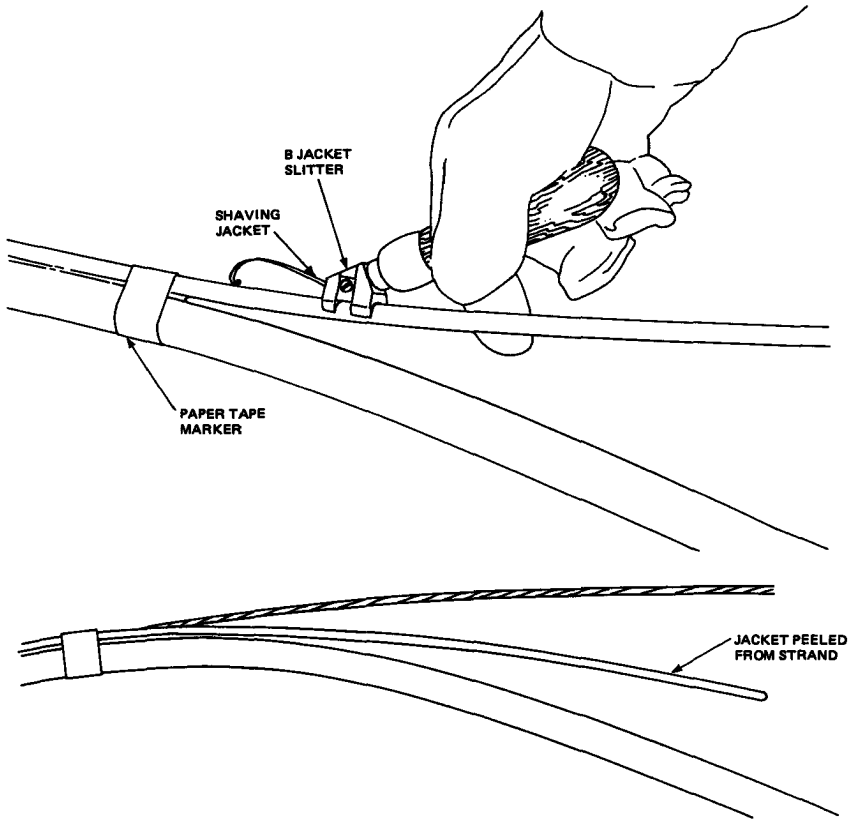


Separating Cable from Strand
Fig. 4

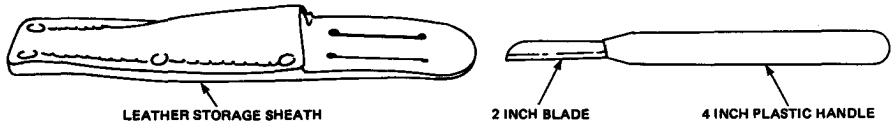


B Jacket Slitter
Fig. 5

(b) *Use:* After slitting the web, separate the strand from the cable. Determine the length of jacket to be removed and make a cut along the top of the jacket for this length, exposing the flooded strand (Fig. 6). After the jacket has been removed from the top of the strand, start at the cut end of the strand and peel the remaining jacket off for the required distance. Cut the loose jacket off at the proper point. ***Do not nick or otherwise damage the strand.***



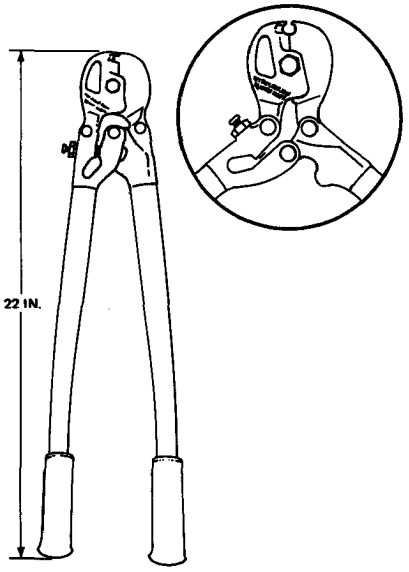
Using B Jacket Slitter
Fig. 6



R-2761 Skinning Knife
Fig. 7

3.03 ***R-2761 Skinning Knife*** (Fig. 7): This tool has a 2-inch blade with a sheep-foot point, and a 4-inch plastic handle. It is provided with a leather sheath for storage. When the B web slitter and B jacket slitter are not available, the skinning knife can be used to slit the web and the jacket on the strand of self-supporting cable.

3.04 ***Cable Cutter:*** The cable cutter may be used for cutting the cable only. ***Do not attempt to cut the strand with a cable cutter.***

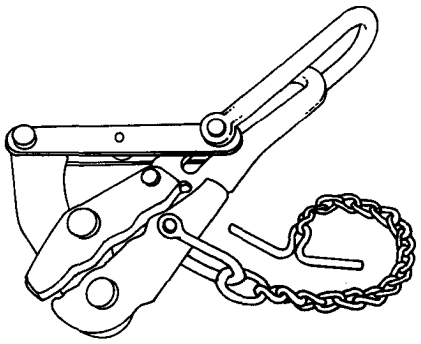


B Strand Cutter
Fig. 8

3.05 ***Hacksaw:*** May be used to cut both the strand and the cable

3.06 ***B Strand Cutter*** (Fig. 8): It is used to cut the jacketed strand without slitting the web. The short handle length and light weight of the B strand cutter make it desirable for use when working aloft. ***The B strand cutter is to be used only for cutting the strand of self-supporting cable.*** If heavier strand is cut, the jaws will spring and the cutter will not function properly. It will be necessary to slit the web and separate the cable from the support strand to prevent damage to the cable sheath when strand cutters other than B strand cutters are used.

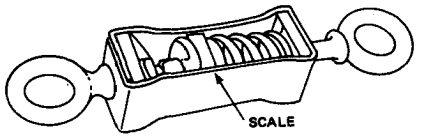
3.07 ***B Strand Puller*** (Fig. 9): It is used over the ***jacketed*** strand for pulling up and tensioning self-supporting cable.



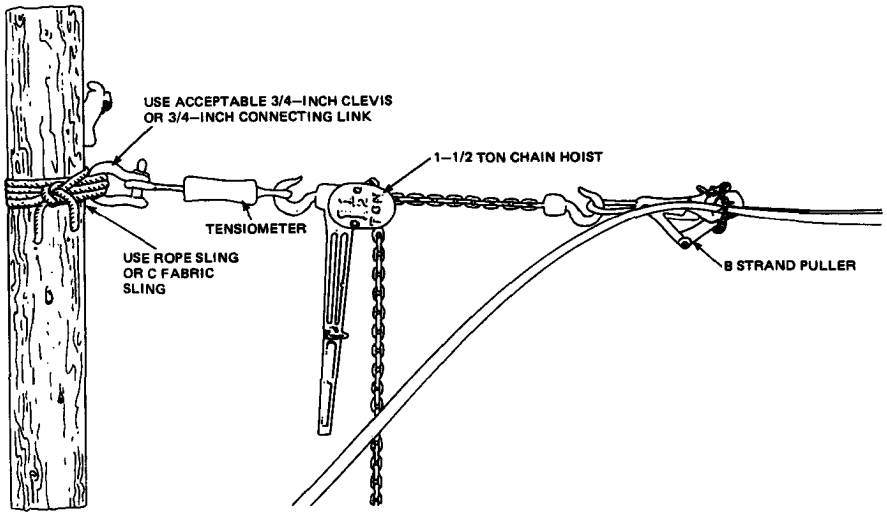
B Strand Puller
Fig. 9

3.08 ***Chain Hoist:*** A 1-1/2 ton chain hoist may be used with the B strand puller and tensiometer for tensioning and dead ending self-supporting cable.

3.09 ***Up-Right Scaffolds L-1371 In-Line Tensiometer*** (Fig. 10): This device is a dynamometer with a range of 0 to 2000 pounds. The tensiometer is placed in series (Fig. 11) with a chain hoist, and a B strand puller when tensioning self-supporting cable. The proper tension in pounds (as recommended in Section 627-700-011PT) is read directly from the scale on the tensiometer.

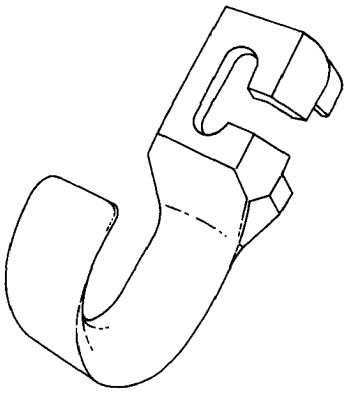


Upright Scaffold L-1371 In-Line Tensiometer
Fig. 10



Tensioning Self-Supporting Cable
Fig. 11

3.10 ***B Placing Hook*** (Fig. 12): A J-shaped hook used for temporarily supporting the cable during the placing and tensioning operations. It is attached to the pole with the same 5/8-inch cable suspension bolt used to secure the C cable clamp to the pole. The cable suspension bolt must be at least 3-1/2 inches longer than the pole diameter at the point of attachment. This will permit the removal of the hook from the bolt after the C cable clamp and the outside nut have been mounted on the bolt. The slot in the side of the hook provides for removal from the bolt.



B Placing Hook
Fig. 12

3.11 ***E Cable Blocks and B, C, D, E, and F Block Frames:*** E cable blocks may be used with B, C, D, E, or F block frames as temporary supports for placing and tensioning self-supporting cable. The cable is then attached to the poles with C cable clamps and the blocks removed. The use of these blocks for placing self-supporting cable is exactly the same as for placing prelashed cable and is described in Sections 081-410-108, 627-350-200, and 627-350-204PT.

3.12 ***B Plastic Rope—1/2 Inch:*** This rope is supplied in 1200-foot lengths for pulling self-supporting cable from a stationary reel. It has the following advantages over other pulling lines:

(a) Reduces the possibility of an electric shock accident when placing cable on joint use poles.

(b) Normally provides the necessary spirals to prevent cable dancing.

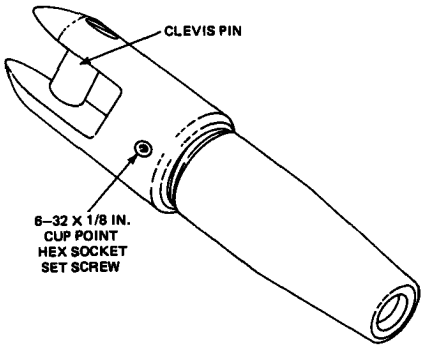
(c) Has more strength than manila rope for an equivalent size and will not absorb moisture.

Note: Do not wind B plastic rope on a CR collapsible reel while the rope is under tension, as damage to the reel will result.

3.13 ***Manila Rope—5/8 Inch:*** May be used as a substitute for B plastic rope as described in 3.12.

3.14 ***B Chuck*** (Fig. 13): Used as a pulling device to place self-supporting cable when using the stationary reel method. The jaws at one end of the chuck grip the 1/4-inch (6.6M) strand of self-supporting cable. The other end of the chuck is provided with a clevis for attaching a pulling line.

3.15 ***B Cable Spiraler (MD):*** May be used to spiral self-supporting cable to prevent dancing.



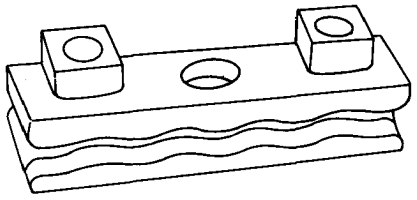
B Chuck
Fig. 13

4. ATTACHMENTS AND HARDWARE

4.01 ***C Cable Clamp*** (Fig. 14): This galvanized malleable iron clamp is installed over the ***jacketed*** strand. It is a three-bolt clamp and has serpentine grooves to prevent slippage of the jacketed strand through the clamp. The nuts on the clamp are the same size as the nuts on the 5/8-inch cable suspension bolt. The C cable clamp may be used on in-line poles and at corners with a pull of 25 feet or less. This clamp is installed without slitting the web of the cable (Fig. 15). The cable must be tensioned to the proper sag before installing the clamp on the strand. ***Electrical contact with the strand is not provided and where grounded guys are required, a separate bond between the guy and the strand will be required.***

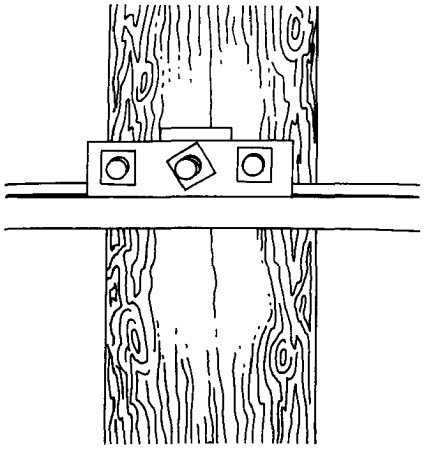
4.02 ***B Cable Suspension Clamp:*** B cable suspension clamps may be used for attaching self-supporting cable to in-line poles and at corners with 10 feet of pull or less if C cable clamps are not available. The jacketed strand may slip through B cable suspension clamps when an unbalanced load is applied to the strand and these clamps must not be used in any location where increased sag in a span would reduce clearances below minimum requirements. An attachment, as illustrated in Fig. 16, is made as follows:

1. After the cable has been tensioned, measure points on the cable approximately 6 inches on each side of the suspension bolt at the proposed clamp location and slit the web between these points.
2. Install the suspension clamp over the ***jacketed*** strand.
3. Place a B cable guard on the cable under the clamp.

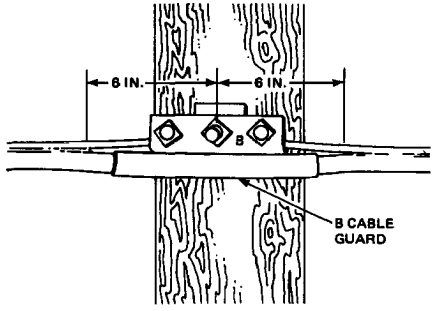


C Cable Clamp
Fig. 14

4. When the clamp is used at a guyed corner where the guy is to be grounded, place a bond between the strand and guy.



C Cable Clamp Installed
Fig. 15



B Cable Suspension Clamp with Cable Attached
Fig. 16

4.03 ***B Corner Suspension Clamp:*** B corner suspension clamps may be used to attach self-supporting cable at corners with a pull of 50 feet or less. When these clamps are used, it is necessary to tension the cable in temporary roller attachments and then transfer to the corner suspension clamp. The clamp is installed as follows:

1. After the cable has been tensioned, measure points on the cable approximately 6 inches on each side of the suspension bolt at the proposed clamp location and slit the web between these points.
2. Install the B corner suspension clamp over the ***jacketed*** strand.
3. Place a B cable guard on the cable under the clamp.
4. If the guy is to be grounded, place a bond between the strand and guy.

4.04 ***B and C Sheave Supports:*** B and C sheave supports may be used as temporary or permanent supports for placing and tensioning self-supporting cable. The description and use of B and C sheave supports is outlined in Section 627-350-212PT.

4.05 ***Strandvise®—6.6M:*** Used for dead ending 6.6M strand (Fig. 17).

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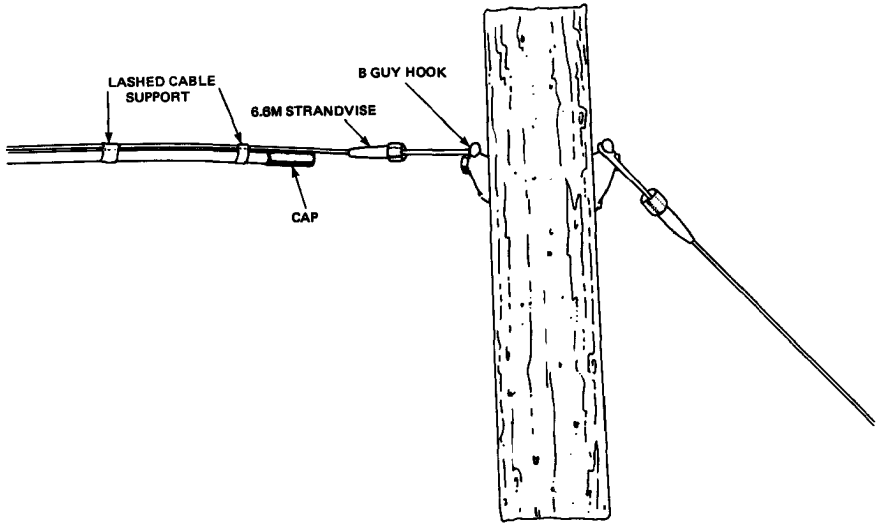


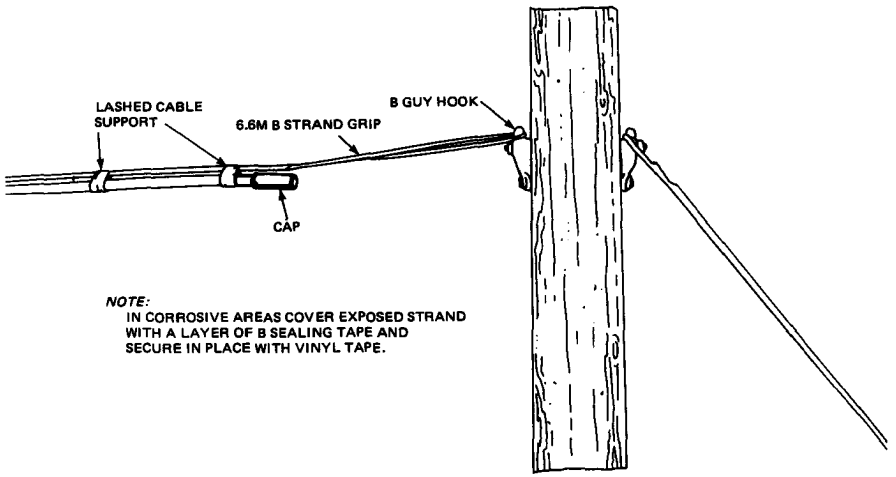
Use of Strandvise at Deadend
Fig. 17

4.06 ***B Strand Grip—6.6M:*** Used for dead ending 6.6M strand (Fig. 18). The B strand grip may also be used to join 6M strand to 6.6M strand with the strand connector as shown in Section 627-230-205.

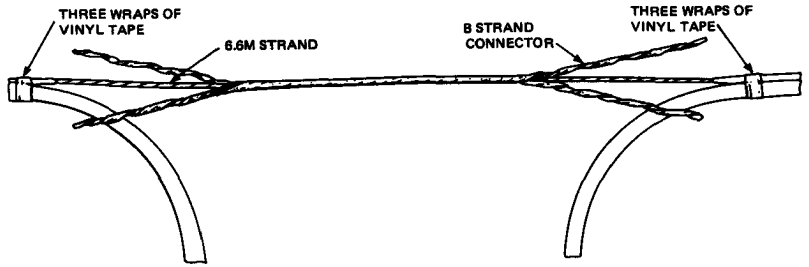
4.07 ***B Strand Reducer:*** Used for joining 6.6M strand to 6M strand.

4.08 ***B Guy Clamp:*** Only clamps marked with a "B" shall be used with 6.6M strand.

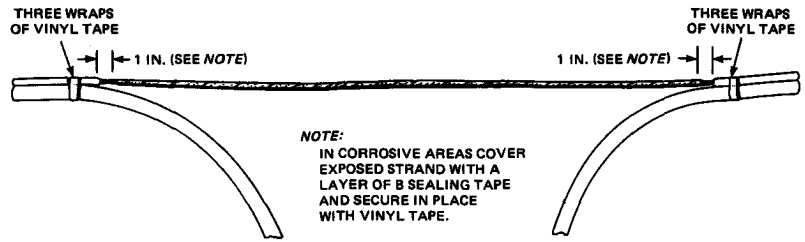
4.09 ***B Strand Connector—6.6M:*** Used for joining 6.6M strand as shown in Figs. 19 and 20.



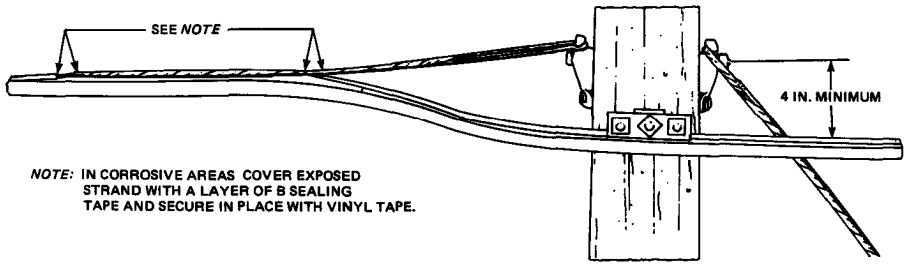
Use of B Strand Grip at Deadend
Fig. 18



Wrapping B Strand Connector
Fig. 19



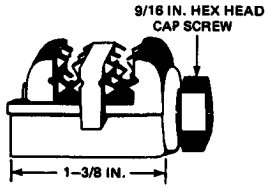
B Strand Connector Installed
Fig. 20



B False Deadend
Fig. 21

4.10 ***B False Deadend—6.6M*** (Fig. 21): Used for false deadending or deadending 6.6M strand.

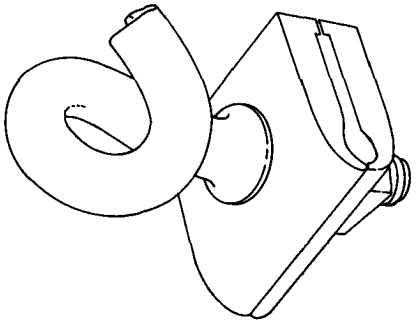
4.11 ***C and D Connectors*** (Fig. 22): Used for attaching B ground wire to the ***jacketed*** 6.6M strand of self-supporting cable. The B ground wire provides an electrical connection between the strand and grounding conductors. The C and D connectors have vise-type bodies equipped with jaws that have piercing teeth to assure both mechanical and electrical contact with the strand. Clamping action is accomplished by means of a hexagonal-head cap screw. The B ground wire and the 6 ground wire may be used with the connectors; however, when the 6 ground wire is used, the plastic jacket must be removed from that portion of the wire that is placed in the jaws of the connector.



C or D Connector
Fig. 22

4.12 The ***C connector*** is tin-coated bronze and is made for use in marine or other highly corrosive areas. The ***D connector*** is zinc-coated malleable iron and is made for use in noncorrosive areas.

4.13 ***E Span Clamp*** (Fig. 23): Used for making midspan drop attachments. The jaws on this clamp are shaped to accommodate the jacketed strand. This eliminates the necessity of removing a portion of the jacket from self-supporting cable when placing the clamp.



E Span Clamp
Fig. 23

4.14 Where it is necessary to clear obstructions in the span or to improve cable alignment, self-supporting cable may be attached to a cable extension arm with a B cable suspension clamp. Self-supporting cable that has been tensioned is attached to a cable extension arm as follows:

1. Measure points on the cable approximately 6 inches on each side of the point of attachment to the extension arm and slit the web between these points.

2. Separate the strand and cable to facilitate placing the ***jacketed*** strand in the suspension clamp.

3. Complete the installation as outlined in Section 627-220-202 and place a B cable guard under the suspension clamp to provide protection for the cable.

5. CABLE PROTECTION

Electrical

5.01 The strand of self-supporting cable placed on joint-use pole lines shall be connected to a low-impedance ground at least every 1500 feet (if possible), or at intervals specified by the local engineer.

5.02 Satisfactory low-impedance ground connections for the strand of self-supporting cable are the same as those outlined for suspension strand in Section 627-020-005.

5.03 Where self-supporting cable is in joint-use with primary power conductors at road crossings, it should be spiraled during the placing operation with a complete spiral approximately every 20 feet.

5.04 Bonding and grounding requirements are the same as for suspension strand used with lashed cable. Any break in the continuity of the strand shall be bridged with a permanent bond of B ground wire.

5.05 Due to the jacketed strand, bonding will not be achieved when self-supporting cable is attached to a bolt which supports another cable. Therefore, it will be necessary to bond the two strands with a length of B ground wire at the first and last pole and at intervals of approximately 1500 feet.

5.06 Messenger of self-supporting cable, placed on joint leads, ***SHALL NOT BE*** bonded to the power supply vertical ground unless the power supply is a multi-grounded neutral (common neutral ground) system, and then only when specified by the Outside Plant Engineer. When specified, connections shall be made in accordance with Section 638-300-900PT.

5.07 The AT-7796X connector is provided in sizes 2, 4, and 6 to accommodate the various sizes of vertical low impedance copper ground wire as shown in Table A.

5.08 The metallic shield of the cable and the strand will be bonded at each terminal and splice location. If there are no terminals or splices for more than 1000 feet, a bond must be provided between the shield and the strand.

TABLE A

AT-7796X CONNECTOR SIZES

SIZE NO.	LOW IMPEDANCE COPPER GROUND WIRE SIZES
2	No. 2 through 6
4	No. 4 through 8
6	No. 6 through 14

Mechanical

5.09 Use an L tree guard for protecting self-supporting cable from contact with a guy, tree, or limb. Where an L tree guard is required, it should be installed as shown in Section 627-360-200.

5.10 To protect self-supporting cable against abrasion from prolonged contact with a strand attachment or other metallic hardware, a B cable guard may be installed over the strand and cable, or (by slitting the web) over the cable as shown in Section 627-360-200.

6. CABLE DANCING

6.01 Self-supporting cable will dance at wind velocities slightly below those that will cause a lashed cable of equivalent size and weight to dance.

6.02 Dancing of self-supporting cable can be prevented or minimized by spiraling the cable around the strand.

WARNING: Do not spiral reinforced sheath self-supporting cable. Alternate methods of preventing cable dancing are described in Subdivision 627-390 of the Bell System Practices.

6.03 Where dancing is anticipated, the cable should be spiraled during the placing operation with a complete spiral approximately every 20 feet. For example, a 200-foot span will require 10 spirals.

6.04 Cable spiraling may be accomplished as follows:

(a) By using a B plastic rope for pulling the cable from a stationary reel without the use of a leader or swivel. The pulling line will normally cause the cable to spiral around the strand.

(b) By spiraling the cable at alternate poles as it is being clamped to the pole. The B cable spiraler may be used if required.

6.05 Cable dancing information, general and preventive methods can be found in Subdivision 627-390.

7. USE IN CORROSIVE AREAS

7.01 Self-supporting cable can be used in corrosive areas.

7.02 Care should be exercised to prevent damage to the polyethylene jacket during placing operations. This precaution should be observed in all cases, but is especially important in corrosive areas.

7.03 The strand of self-supporting cable is covered with a flooding compound to prevent moisture from creeping along the strand if the polyethylene jacket is ruptured or removed.

7.04 B strand grips, B false deadends, and B strand connectors with a class C galvanized coating may be used with self-supporting cable in any location.

7.05 ***Do not use strandvises along the seacoast where they are exposed to salt spray or salt fog.***

7.06 When removing the poly-jacket from the strand at deadend and splice locations, ***exercise care to avoid removing the flooding compound and the galvanizing.***

7.07 In corrosive areas all exposed strand ***must*** be covered with B sealing tape. Vinyl tape is then placed over the sealing tape to hold it in place (Figs. 18 through 21). It is not necessary to cover deadend and splicing hardware.

7.08 All strand ends that are exposed in a corrosive area ***must*** be sealed with B sealing tape held in place with vinyl tape to prevent moisture from entering around the center strand wire.

7.09 The 49A3 cable terminal should be used on cable sizes having an outer diameter of cable

core and metal shield which does not exceed 0.7 inches. The 49C2 or 49D2 cable terminal should be used on larger diameter self-supporting cables as specified in Section 631-240-100.

8. RAILROAD CROSSINGS

8.01 Self-supporting cable may be placed at railroad crossings in any locations where 6M or 6.6M suspension strand could be used.

8.02 Self-supporting cable must be attached to each crossing pole with a C cable clamp. ***Do not use a cable suspension clamp or a corner suspension clamp at railroad crossing poles.*** Deadend the strand both ways at crossing poles with corner pulls of more than 25 feet.

8.03 Spiral the cable around the strand in the crossing span to provide a complete spiral every 20 feet. This will prevent the cable from dropping if it should become separated from the strand.

8.04 Self-supporting cable may be placed over foreign wires and temporarily supported over the tracks with ropes as outlined in Section 627-230-201PT.