

SELF-SUPPORTING CABLE PLACING GENERAL

	PAGE		PAGE
1. GENERAL	1	8. TENSIONING	23
2. PRECAUTIONS	2	9. DEAD ENDING	23
3. DESCRIPTION	3	10. TRANSFERRING AND ATTACHING CABLE TO POLES	25
CABLE	3	11. CABLE PROTECTION	26
TOOLS AND CONSTRUCTION APPARATUS	4	12. CABLE DANCING	29
ATTACHMENTS AND HARDWARE	10	13. USE IN CORROSIVE AREAS	29
4. GUYING	15	14. RAILROAD CROSSINGS	29
5. PLACING CABLE—MOVING REEL METHOD	15	1. GENERAL	
MOUNTING THE REEL	15	1.01 This section provides general information and placing methods pertaining to self-supporting cable. Information is also provided to cover the tools and hardware used for placing this type of cable.	
TEMPORARY POLE ATTACHMENTS	15	1.02 The reasons for reissuing this section are listed below. Since this reissue is a general revision, no revision arrows have been used to denote significant changes.	
PLACING CABLE	16	• Show lashed cable supports at areas of stress where web has been slit	
AERIAL LIFT	17	• Revise information on dead-ending cable	
6. PLACING CABLE—STATIONARY REEL METHOD	19	• Include information from Section 627-700- 201, Self-Supporting Cable—Placing Meth- ods.	
SELECTION OF POLE LINE HARDWARE AND CONSTRUCTION APPARATUS	19	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	
POSITIONING CABLE REEL AND TRUCK	21		
PULLING-IN CABLE	21		
AERIAL LIFT	22		
7. MEASURING SAGS	22		

NOTICE

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by deleted and "expunged".

to remove the supporting strand when pulling self-supporting cable through subsidiary conduit.

1.04 Self-supporting cable can be placed from a stationary reel or from a moving reel.

1.05 Refer to the following sections for additional information.

SECTION	TITLE
081-410-108	Cable Blocks and Associated Equipment—Description and Use
626-101-005	Air-Core PIC and DEPIC Cables—Nonscreened and Screened—Description, Use, and Reel Lengths
627-020-005	Bonding and Grounding Aerial Plant
627-240-211	Suspension Strand—Pulling Up and Tensioning
627-295-500	Testing Suspension Strand
627-320-011	Lashed Aerial Cable Placing—General
627-610-205	Block and Building Cable—Placing
627-700-011	Stringing Sags and Tensions

The sections in the 620 Division contain information on guarding work areas and working aloft. The 627-070 layer of sections contains information on clearances for aerial cable and guys installed in light, medium, and heavy loading areas. The sections in the 649 Division contain information on the operation of aerial lifts.

2. PRECAUTIONS

2.01 Technicians placing self-supporting cable should follow precautions listed in the sections in the 620 Division which pertain to the guarding of work areas and working aloft.

2.02 When required, use warning signs and traffic warning cones to clearly define the work area and to safely channel the traffic.

2.03 On streets or highways, place the cable with the motor vehicle *moving in the direction of traffic*.

2.04 Before starting cable placing operations, survey the proposed cable run to ensure that there are no obstructions which would interfere with placing the cable. Where trees or tree limbs cannot be avoided, they should be trimmed. Where it is impractical to trim, or where permission to trim cannot be obtained and the obstruction can be cleared by use of a cable extension arm, install the arm *before* placing the cable.

2.05 Before starting cable placing operations, inspect the cable reel carefully, particularly the inside edge of the reel flanges. Check for protruding edges or other obstructions that would damage the sheath, or interfere with turning the reel or unwinding the cable properly.

2.06 When the cable is pulled in from a stationary reel or payed out on the ground, do not drag it over obstructions in the span or on the ground as this may damage the sheath.

Note: Avoid excessive tensile and bending stresses on the sheath when handling and placing reinforced self-supporting cable.

2.07 Do not allow vehicular traffic to pass over the cable during placing operations. The cable should be suspended temporarily above roads, driveways, etc. Cable blocks placed on a slack span of suspension strand or rope may be used to temporarily suspend the cable.

2.08 When placing self-supporting cable from a stationary reel and using plastic or manila rope for the pulling line, grounding the strand is not required.

2.09 When using a metallic pulling line to place self-supporting cable from a stationary reel, insert a length of approximately 25 feet of B plastic rope or manila rope between the pulling line and the strand as an insulating joint. Use the B grounding roller on the pulling line.



The above method may be used only when a grounding conductor for the B grounding roller is available within two spans of the pulling vehicle.

2.10 When pulling up and tensioning self-supporting cable, observe the same precau-

tions as outlined in Section 627-240-211 for pulling up and tensioning suspension strand.

2.11 Before cutting the strand at a dead-end location, apply three turns of vinyl tape around the strand and cable to prevent the weight of the unsupported cable from tearing the web.

2.12 Permanent or temporary guys must be used at any location where self-supporting cable is tensioned **to avoid placing any unbalanced load on the pole.**

2.13 **Use only a B or modified L strand puller when tensioning or temporarily holding fully tensioned self-supporting cable.**

2.14 **Self-supporting cable must be tested in the same manner as suspension strand before work is performed aloft on a ladder or splicing platform.** Testing methods are outlined in Section 627-295-500.

2.15 Do not use a ladder or splicing platform on self-supporting cable that is held by strand pullers. The strand must be permanently dead ended before a technician can be safely supported by the cable.

2.16 When aerial lift equipment is used for placing self-supporting cable, all the precautions outlined in Section 627-320-011 must be observed as well as local instructions covering the equipment being used. The sections in the 649 Division cover the operation of aerial lifts.

3. DESCRIPTION

CABLE

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

3.02 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.

3.03 The cable consists of a standard PIC core, a core wrap, and a longitudinally applied corrugated aluminum shield. The PIC core is undulated to prevent strain in the conductors after the cable has been placed and tensioned.

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

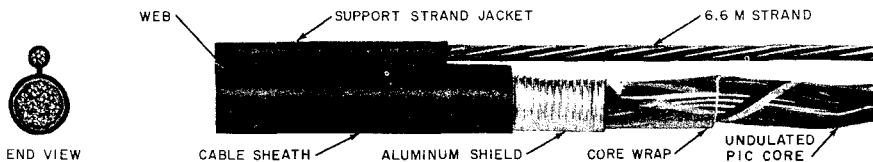


Fig. 1—Cutaway View of Self-Supporting Cable

TOOLS AND CONSTRUCTION APPARATUS

3.05 B Web Slitter (Fig. 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.

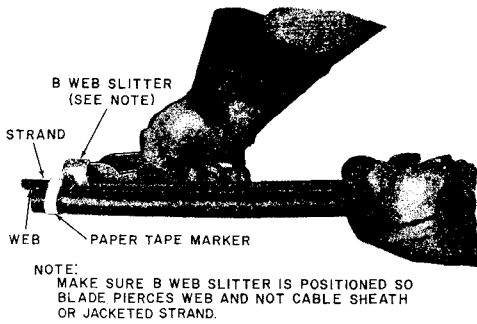


Fig. 2—Piercing Web With Blade of B Web Slitter

3.06 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 polyethylene jacket from the strand and produces a shaving action similar to that of a plane.

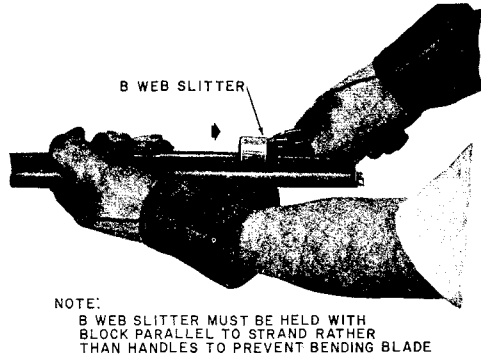


Fig. 3—Slitting the Web

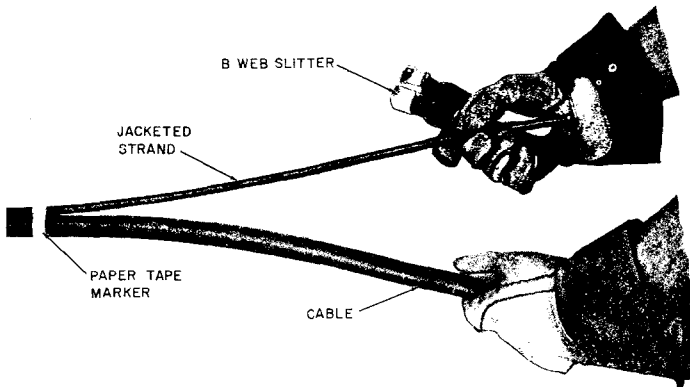


Fig. 4—Separating Cable From Strand

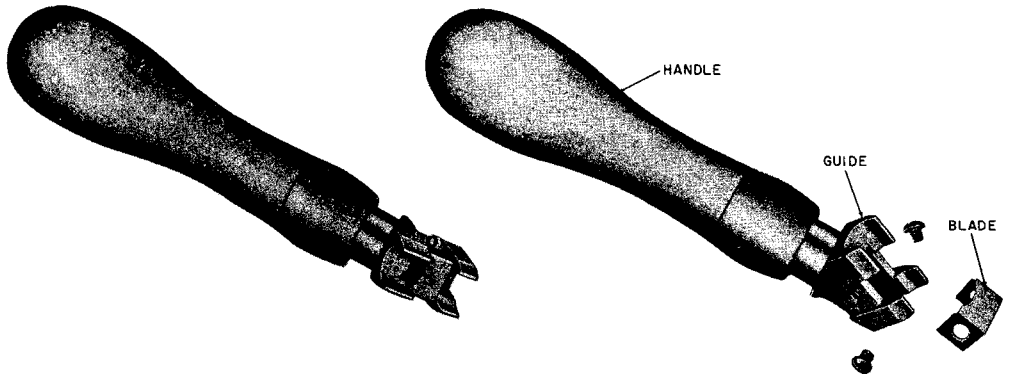


Fig. 5—B Jacket Slitter

(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.**

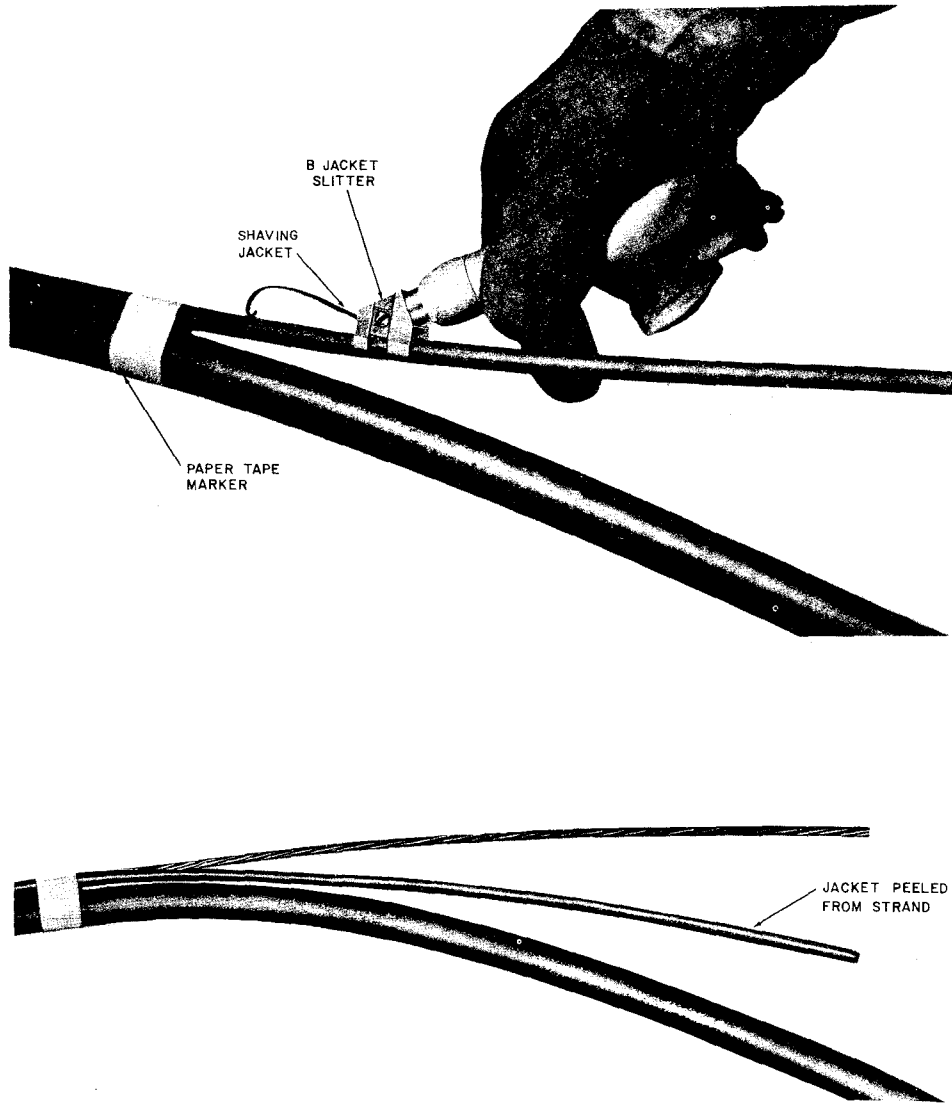


Fig. 6—Using B Jacket Slitter

3.07 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.

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

3.09 Hacksaw: The hacksaw may be used to cut both the strand and the cable.

3.10 B Strand Cutter (Fig. 8): This may be used to cut the jacketed strand without slitting the



Fig. 7—R-2761 Skinning Knife

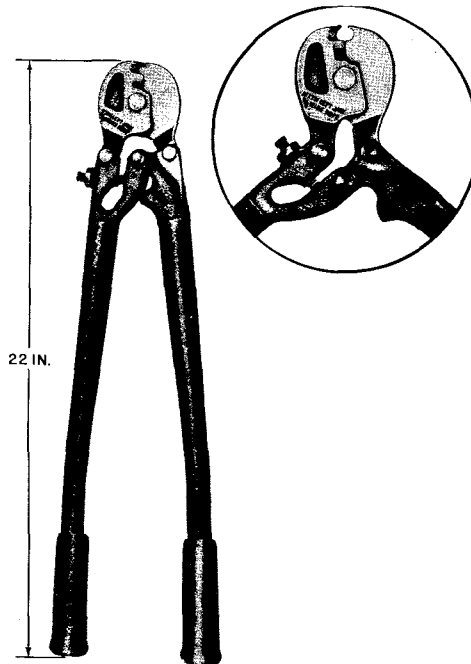


Fig. 8—B Strand Cutter

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.

3.11 Modified L Strand Puller (Fig. 9): Either the modified L strand puller or the B strand puller (Mfr Disc.) with serpentine jaws may be used over the jacketed strand for pulling up tensioning and dead ending self-supporting cable.

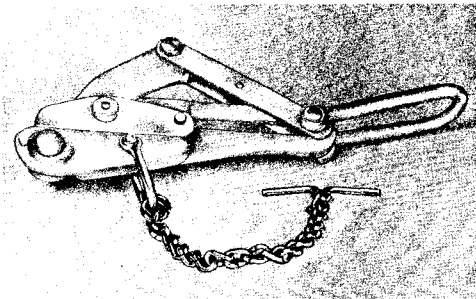


Fig. 9—Modified L Strand Puller



Only the modified version of the L strand puller should be used on the jacketed strand. The modified L strand pullers may be identified by the radius on the front of the fixed jaw and radius at the rear of the movable jaw. They will also have a manufacturer date stamping of 4-78 or later.

3.12 E Chain Hoist: A 1-1/2 or 3 ton chain hoist may be used with the B or modified L strand puller and tensiometer for tensioning and dead ending self-supporting cable.

3.13 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 the E chain hoist, and a modified L strand puller when tensioning

self-supporting cable. The proper tension in pounds (as recommended in Section 627-700-011) is read directly from the scale on the tensiometer.

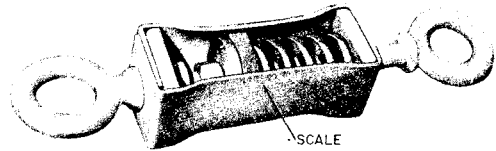


Fig. 10—Upright Scaffolds L-1371 In-Line Tensiometer

3.14 B Placing Hook (Fig. 12): This is 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.

3.15 E Cable Blocks and B, C, D, E, and F Block Frames: The 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 627-350-204.

3.16 B Plastic Rope—1/2 Inch—Caution: Do not wind B plastic rope on a CR collapsible reel while the rope is under tension, as damage to the reel will result. 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 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.

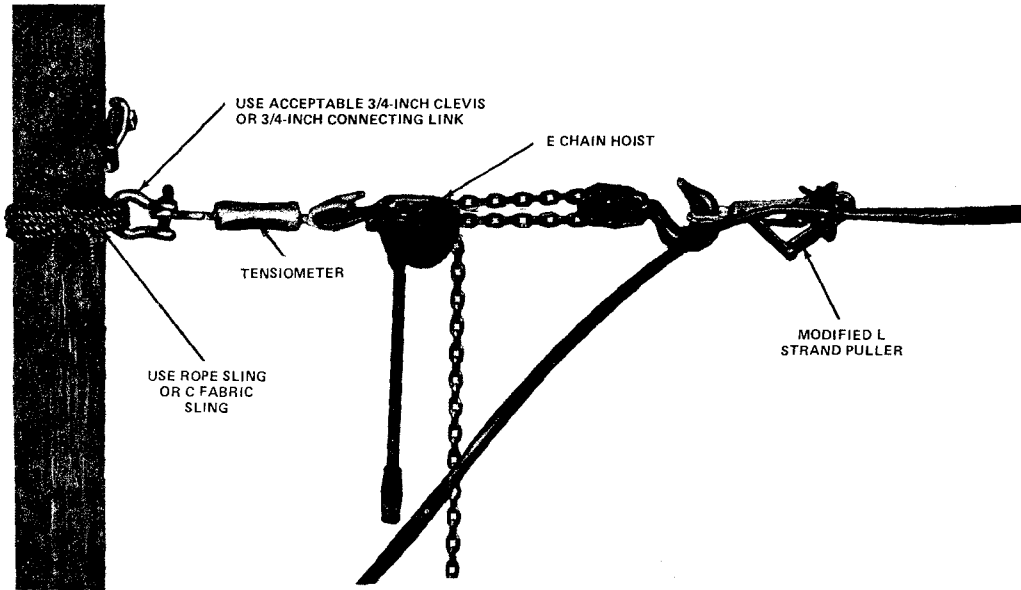


Fig. 11—Tensioning Self-Supporting Cable

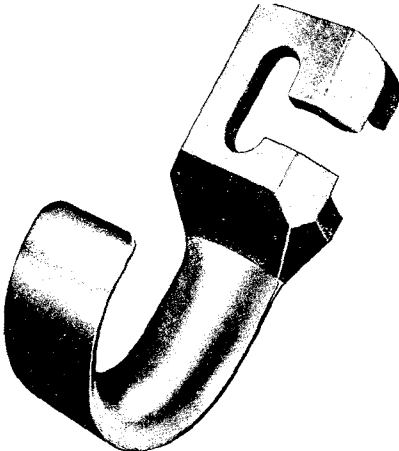


Fig. 12—B Placing Hook

3.17 Manila Rope—5/8 Inch: The 5/8-inch manila rope may be used as a substitute for B plastic rope as described in paragraph 3.16.

3.18 B Chuck (Fig. 13): This is 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.

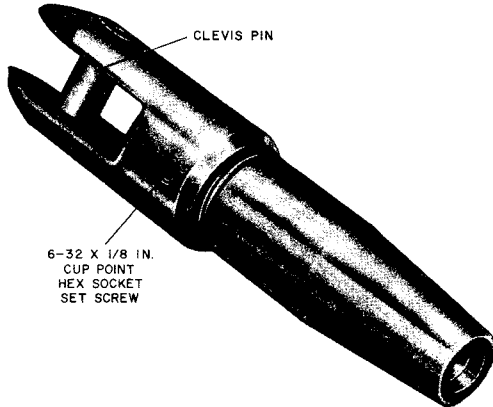


Fig. 13—B Chuck

3.19 B Cable Spiraler: This may be used to spiral self-supporting cable to prevent dancing.

ATTACHMENTS AND HARDWARE

3.20 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. To bond the strand to the guy wire, a separate No. 6 ground wire must be placed between the strand and the guy wire.**

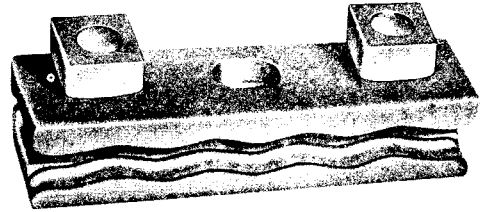


Fig. 14—C Cable Clamp

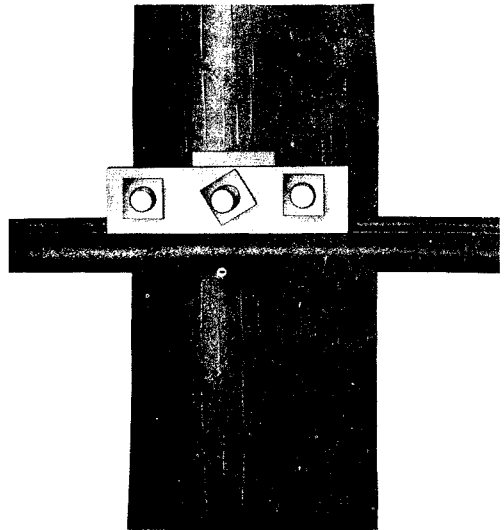


Fig. 15—C Cable Clamp Installed

3.21 B Cable Suspension Clamp: The 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.

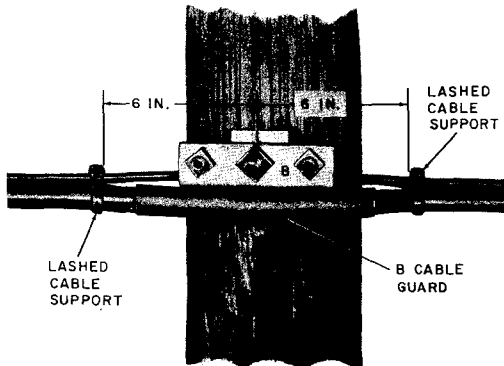


Fig. 16—B Cable Suspension Clamp With Cable Attached

- (4) Place a lashed cable support at each end of slit area.
- (5) When the clamp is used at a guyed corner, place a bond between the strand and guy (Section 627-020-005).

3.22 B Corner Suspension Clamp: The 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) When the clamp is used at a guyed corner, place a bond between the strand and guy (Section 627-020-005).

3.23 **STRANDWISE*—6.6M:** This may be used for dead ending 6.6M strand (Fig. 17).

3.24 **B Strand Grip—6.6M:** This may be 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.

*Registered Trademark of Reliable Electric Company.

3.25 **B Strand Reducer:** The B strand reducer may be used for joining 6.6M strand to 6M or 10M strand. See Section 627-230-210.

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

3.27 **B Strand Connector—6.6M:** This may be used for joining 6.6M strand as shown in Fig. 19 and 20.

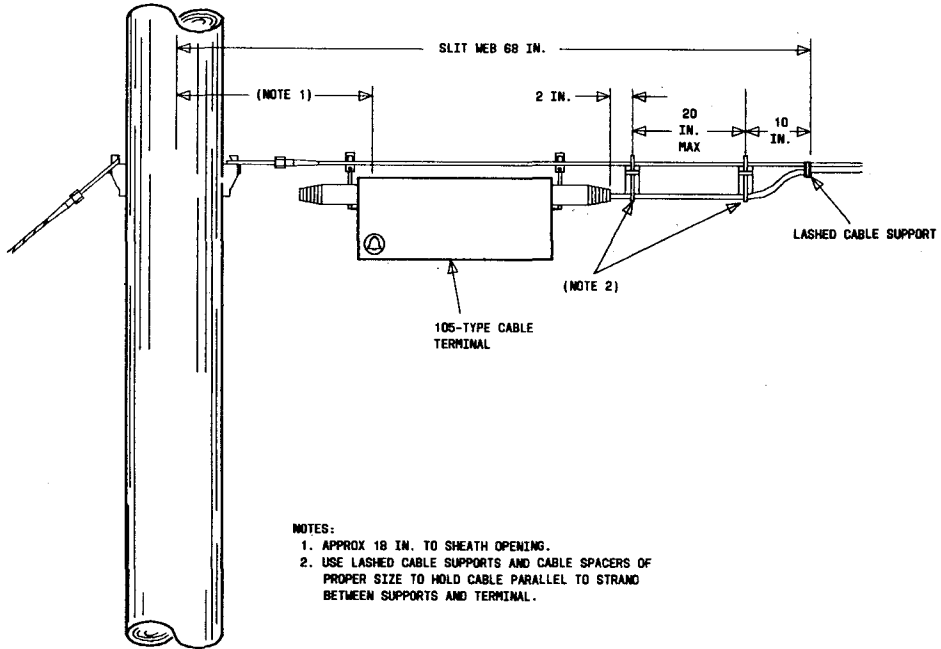
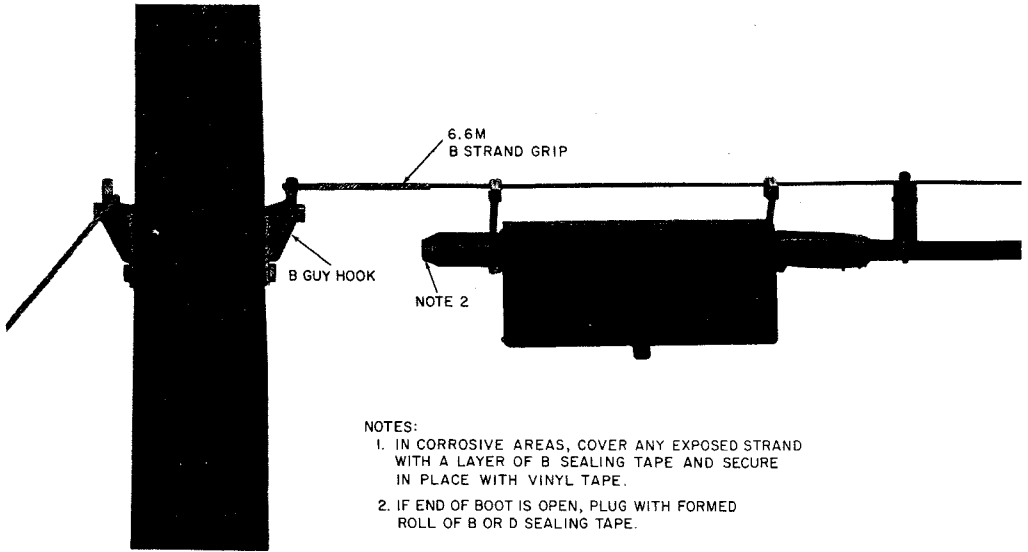


Fig. 17—Use of Strandwise at Dead End



- NOTES:
1. IN CORROSIVE AREAS, COVER ANY EXPOSED STRAND WITH A LAYER OF B SEALING TAPE AND SECURE IN PLACE WITH VINYL TAPE.
 2. IF END OF BOOT IS OPEN, PLUG WITH FORMED ROLL OF B OR D SEALING TAPE.

Fig. 18—Use of B Strand Grip at Dead End

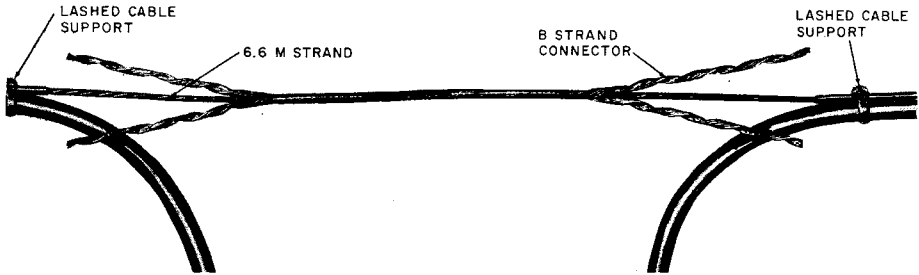
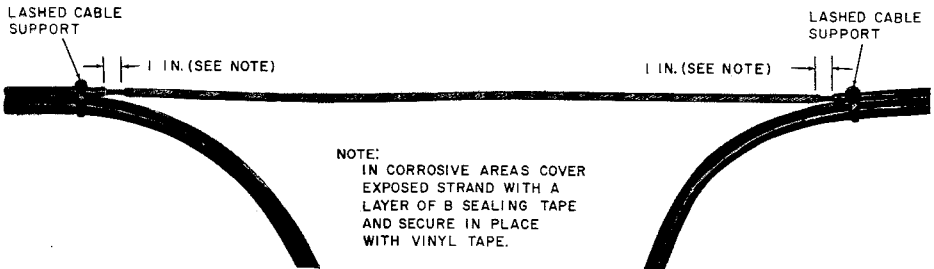


Fig. 19—Wrapping B Strand Connector



- NOTE:
- IN CORROSIVE AREAS COVER EXPOSED STRAND WITH A LAYER OF B SEALING TAPE AND SECURE IN PLACE WITH VINYL TAPE.

Fig. 20—B Strand Connector Installed

3.28 B False Dead End—6.6M (Fig. 21): This may be used for false dead ending or dead ending 6.6M strand.

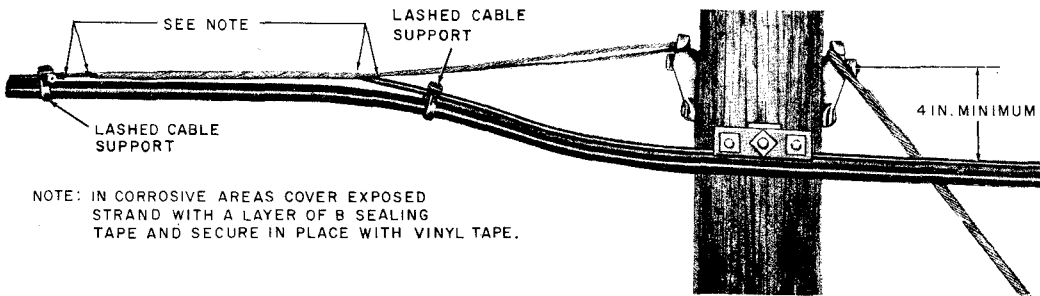


Fig. 21—B False Dead End

3.29 C and D Connectors (Fig. 22): The C and D connectors may be 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 No. 6 ground wire may be used with the connectors; however, when the No. 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.

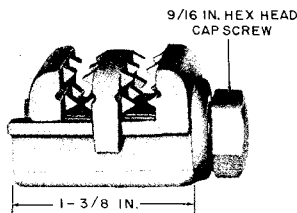


Fig. 22—C or D Connector

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

3.31 E Span Clamp (Fig. 23): The E span clamp may be 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.

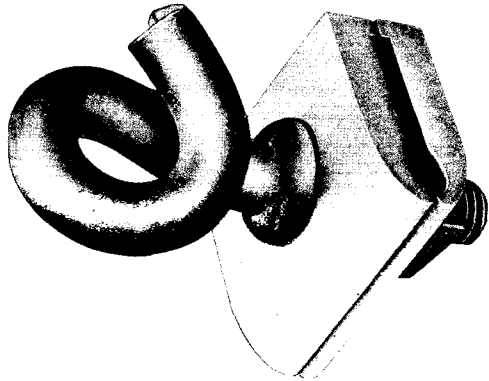


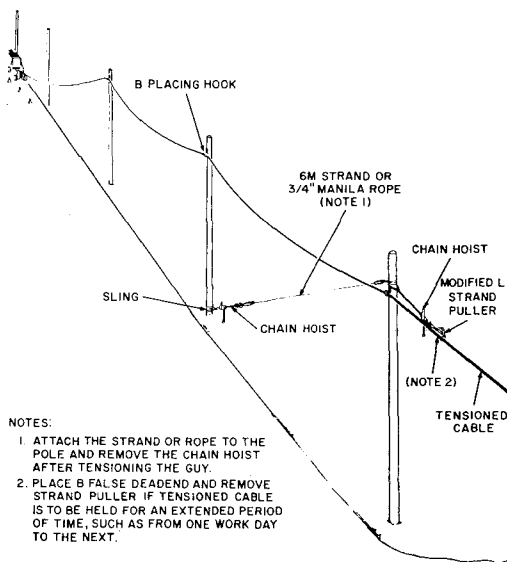
Fig. 23—E Span Clamp

3.32 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.

4. GUYING

- 4.01 The strand of self-supporting cable should be considered as a 6M suspension strand when determining the size of guys. (See the sections in the 621 Division.)
- 4.02 All guys must be placed **before** self-supporting cable is fully tensioned.
- 4.03 Where it is necessary to tension self-supporting cable at an intermediate pole in the lead, and suitable guying is not provided, place a temporary 6M strand or 3/4-inch manila rope guy. An example of temporary guying is shown in Fig. 24.



NOTES:

1. ATTACH THE STRAND OR ROPE TO THE POLE AND REMOVE THE CHAIN HOIST AFTER TENSIONING THE GUY.
2. PLACE B FALSE DEADEND AND REMOVE STRAND PULLER IF TENSIONED CABLE IS TO BE HELD FOR AN EXTENDED PERIOD OF TIME, SUCH AS FROM ONE WORK DAY TO THE NEXT.

Fig. 24—Temporary Guying

4.04 Where bonding of guys to strand is required, it will be necessary to bond the guys to the strand using either a C or D connector and B ground wire (Section 627-020-005).

4.05 An occasional long span, which does not exceed the maximum span length, but exceeds by 50 percent the average length of the adjacent five spans in each direction, shall be guyed away from the long span and have false dead ends placed at each end of the long span in accordance with the engineering work prints.

5. PLACING CABLE—MOVING REEL METHOD

5.01 The moving reel method of placing self-supporting cable is used where a cable reel can be moved along the side of the pole line on which the cable is to be placed and there are no obstructions which would prevent raising the cable into position. Jobs should be planned so this method can be used wherever possible.

5.02 If trees or other obstructions restrict the use of the moving reel method for a few sections relatively close to either end of the run, proceed as follows:

- (1) Position the reel and pull the cable beyond the obstruction using the stationary reel method.
- (2) Resume cable placing operations using the moving reel method.

MOUNTING THE REEL

5.03 Before mounting a cable reel on a cable reel trailer or lift truck, check the size, gauge, type, and length of cable with the information given in the detail plans.

5.04 Mount the cable reel on the cable reel trailer so the cable is payed out from the top of the reel.

TEMPORARY POLE ATTACHMENTS

5.05 Either the B placing hook or the B wire block may be used for temporarily supporting the cable at in-line poles and at corners not exceeding 3 feet of pull. See the sections in the 621 Division for method of determining pull.

5.06 If self-supporting cable is tensioned around corners exceeding 25 feet of pull, E cable blocks must be used with E or F cable block frames, as required.

5.07 The B wire block may be attached to a crossarm, B wire bracket, or behind a C cable clamp attached vertically to a cable suspension bolt.

5.08 The B placing hook is installed as follows:

- (1) Drill a hole through the pole and install a cable suspension bolt with a 3/4 by 2-1/4 inch square washer. The bolt should extend beyond the pole 3-1/2 inches.
- (2) Place another 3/4- by 2-1/4 inch square washer and a nut to secure the bolt to the pole.
- (3) Install the B placing hook on the cable suspension bolt so the hook is seated over the nut and washer at the pole and the slotted hole in the hook is seated on the bolt.
- (4) Install and tighten the second nut with the **chamfered side toward the B placing hook**. A completed installation of the B placing hook is illustrated in Fig. 25.

5.09 The B sheave support or E cable block must be used at poles where there is an up-pull, as there is no keeper to retain the cable in the B placing hook, and the B wire block is not rigidly secured to the pole.

PLACING CABLE

5.10 Place all guys and extension fixtures before starting cable placing operations so delays in the **moving reel** placing operation will be kept to a minimum.

5.11 Pole attachments for the cable may be installed before or during placing operations as desired.

5.12 Leave sufficient cable for splicing. Permanently dead end the strand at the dead-end poles. Drive the truck slowly along the line beyond the next pole to which the cable is to be attached. Stop the truck when the cable reel has reached a distance of approximately 60 feet beyond the pole.

5.13 Turn the reel by hand to pay out any additional slack required to facilitate raising the cable.

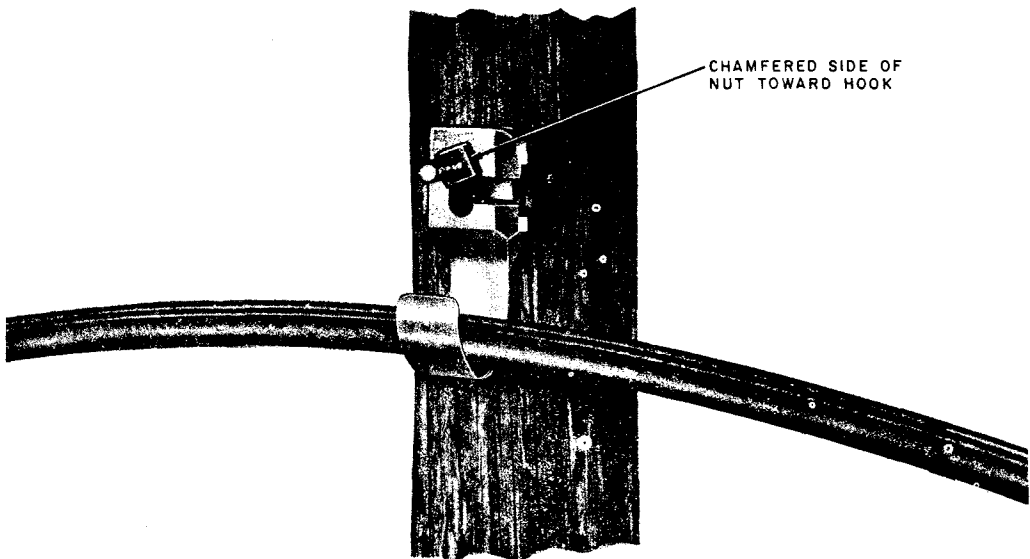


Fig. 25—B Placing Hook Installed

5.14 Raise the cable into place using a handline.

5.15 Repeat the procedure described in paragraphs 5.12 through 5.14 on successive poles until reaching the dead-end pole or an intermediate pole at which the cable is to be tensioned.

5.16 Where it is necessary to clear streets, drive-ways, etc, pull sufficient slack from the cable and hold it with a modified L or B (Mfr Disc.) strand puller attached to the pole with a sling. Place temporary guys, if required. Do not remove the strand puller until the cable has been pulled to final sag at the dead-end or tensioning location.

5.17 When placing long sections of self-supporting cable, the excess slack should be removed as described in paragraph 5.16 at intervals of approximately 1000 feet. This will facilitate the final tensioning operation and reduce the amount of slack to be removed at the tensioning location.

AERIAL LIFT

5.18 Before operating the aerial lift, review the sections in the 649 Division which cover the description and operation of approved aerial lifts. All safety precautions given in the applicable practice are to be observed. When using an aerial lift vehicle for placing self-supporting cable by the moving reel method, observe the safety precautions given in Part 2.



Aerial lifts to be used for aerial plant placers in the moving reel mode must be certified by the manufacturer for that use and be equipped with an open 2-way communication system between basket and cab. It must also have a mechanism whereby the boom automatically slips in the direction of the pull when the cable load exceeds the safe boom rating.

5.19 *The boom must not be stressed in excess of safe working loads. Only one person with his tools and the necessary equipment for performing the job is allowed in the basket at any time. Since the boom load imposed when placing cable is directly related to the tension of the cable, the cable tension needs to be known in order to operate the aerial lift within the boom load limitations. The maximum cable tension allowable, consistent with safe boom loads, is 600 pounds. Table A lists the amount of sag which will give a tension of 600 pounds for each span length and cable weight.*

5.20 For any given span length and cable weight, tension *increases* as sag *decreases*. For example, with a cable weight of .420 lbs/ft, a span

TABLE A

SAGS WHICH GIVE TENSION OF 600 POUNDS

CABLE WEIGHT (LBS/FT)	SPAN LENGTH—FEET													
	100	125	150	175	200	235	250	275	300	325	350	375	400	425
	SAG—FEET													
Up to 0.270	1	1	2	2	3	3	4	5	5	6	7	8	9	11
0.271 to 0.320	1	1	2	2	3	4	5	5	6	7	9	10	11	—
0.321 to 0.370	1	2	2	3	3	4	5	6	7	9	10	11	—	—
0.371 to 0.420	1	2	2	3	4	5	6	7	8	10	11	—	—	—
0.421 to 0.520	1	2	3	4	5	6	7	9	10	—	—	—	—	—
0.521 to 0.620	2	2	3	4	6	7	8	10	—	—	—	—	—	—
0.621 to 0.720	2	3	4	5	6	8	10	—	—	—	—	—	—	—
0.721 to 0.820	2	3	4	6	7	9	—	—	—	—	—	—	—	—
0.821 to 0.920	2	3	5	6	8	10	—	—	—	—	—	—	—	—

length of 150 feet, and 3 feet of sag, the tension is *less* than 600 pounds; with 2 feet of sag (Table A), the tension is 600 pounds; and at any sag less than 2 feet, the tension is *greater* than 600 pounds.

5.21 There are very few conditions in which the final stringing tensions of self-supporting cable will be 600 pounds or less (Section 627-700-011). The minimum sag at which self-supporting cable can be placed using an aerial lift boom can be determined by referring to Table A. The final stringing tension can then be obtained with a chain hoist or winch line fastened to the pole.

5.22 With the cable reel in place on the spindle bar, feed the end of the cable through the guide rollers on the truck and through the roller guide assembly of the fairlead. Dead end the strand at the dead-end pole and where required ground the strand. Adjust the brake tension on the spindle to maintain the necessary aboveground clearance taking care not to exceed cable tension given in Table A.

5.23 **Caution:** *In order to prevent an unbalanced load on a pole, do not attempt to place self-supporting cable at final tension or to tension the cable on a span-by-span basis.* Move to the second pole. To reduce side loads, keep the boom as near as possible in line with the direction of pull (Fig. 26). When the pole is reached, stop the truck and swing the boom to the pole to make the attachment. Temporary pole attachments may be placed at this time or may have been placed prior to the cable placing operation, as desired. In either case, use attachments as covered in paragraphs 5.05 through 5.09.

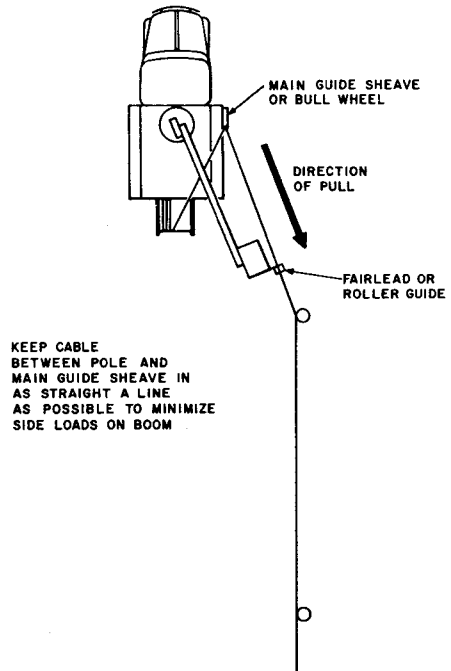


Fig. 26—Aligning Boom With Direction of Pull

5.24 Proceed to each successive pole following the same procedure. If it becomes necessary to pull slack out of the cable to clear driveways, streets, etc, use a winch, or a chain hoist and a B or modified L strand puller. Pull the cable only tight enough to provide safe aboveground clearances and hold with the strand puller and a rope sling.

5.25 When the last pole is reached, tension the cable and dead end it as outlined in Parts 8 and 9 and transfer to permanent attachments where required, as outlined in Part 10.

6. PLACING CABLE—STATIONARY REEL METHOD

SELECTION OF POLE LINE HARDWARE AND CONSTRUCTION APPARATUS

6.01 When self-supporting cable is to be placed from a stationary reel (Fig. 27), install the hardware and placing apparatus as follows:

(a) Place a B cable block frame with an E cable block on the first pole of the section in which the cable is being placed.

(b) Place E cable blocks on all in-line poles and corner poles with a pull of 3 feet or less.

(c) If self-supporting cable is tensioned around a corner exceeding 25 feet of pull, E cable blocks must be used with E or F cable block frames, as required.

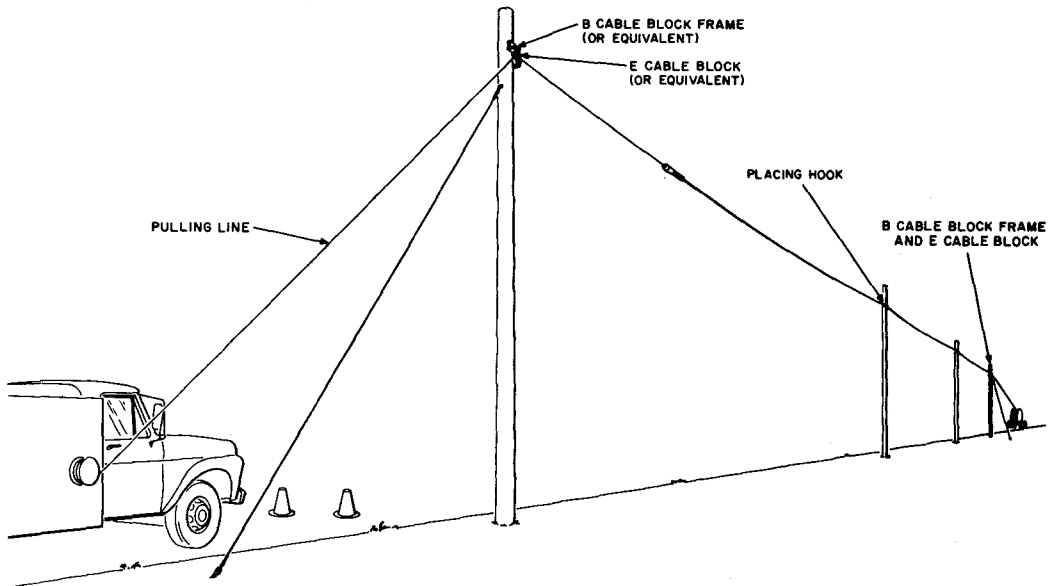


Fig. 27—Hardware and Construction Apparatus—In-Line Sections

(d) The E cable block frame with two E cable blocks may be used at corners where the **pull away** from the pole does not exceed 50 feet (Fig. 28).

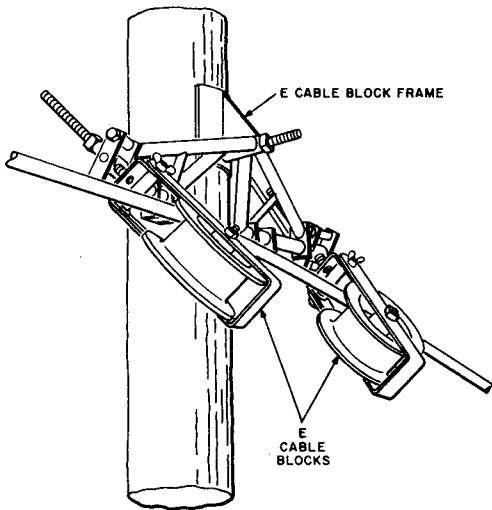


Fig. 28—Pull Away From Pole—Up to 50 Feet—Placing Temporary Blocks

(e) The F cable block frame with two E cable blocks may be used at corners where the **pull against** the pole does not exceed 50 feet (Fig. 29).

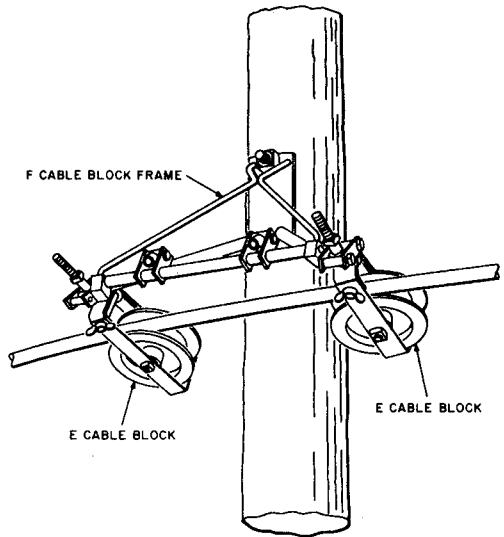


Fig. 29—Pull Toward Pole—Up to 50 Feet—Placing Temporary Blocks

(f) Place a 1/2-inch polypropylene or 5/8-inch manila rope pulling-in line in the roller attachments.

6.02 Permanent attachment holes may be bored at the same time that the B, E, and F cable block frames are placed, or during transferring operations.

(a) Holes for mounting E cable block frames are located 6 inches above the holes bored for the cable clamp attachment.

(b) Holes for mounting F cable block frames are located **14 inches above** the holes bored for the cable clamp attachment.

6.03 When E or F cable block frames are used, adjust the rollers so that the cable is positioned as close to the pole as possible without rubbing against the pole. This will facilitate transferring the tensioned cable to the permanent attachment.

6.04 The B placing hooks may be used for supporting short lengths of cable to be pulled in.

POSITIONING CABLE REEL AND TRUCK

6.05 The cable reel can, in most cases, be set up at either end of the pull. In locating and positioning the cable reel, the following factors should be considered:

- The distance of the cable reel from the first pole should be approximately two times the height of the pole attachment from the ground.
- The cable should pay off from the top of the reel.
- The cable reel should be as near in line with the pole line as possible.
- The cable reel should be located at the end farthest from a heavy corner so that a minimum amount of cable is pulled around the corner.

6.06 The pulling truck is set up at the opposite end of the pull from the cable reel trailer. In positioning the truck, the following factors should be considered:

- The distance of the pulling truck from the last pole should be at least three times the height of the pole attachment from the ground, where possible.
- The spool of the power reel (or drum of the winch) should be as nearly in line with the pole line as possible.
- Whenever practical, the truck should be faced in the direction of the cable reel to provide the driver with an unobstructed view of the section of pull.

6.07 Guard the work area with traffic warning devices and position the truck and cable reel to provide the least possible obstruction to traffic.

PULLING-IN CABLE

6.08 Prepare self-supporting cable for pulling in by the stationary reel method as follows:

- Remove approximately 4 inches of jacket from strand and 5 inches of jacket from cable.
- Connect the strand to the B chuck.
- Connect the pulling line to the clevis pin and clevis (Fig. 30).

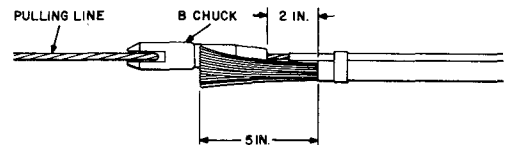


Fig. 30—Preparation of Cable at Pulling End

- Taper the cable core sufficiently to permit the cable to ride over the roller attachments.
- Tape the cable conductors and the leading portion of the cable tightly to the strand and B chuck using vinyl tape, build up with friction tape if required, and apply a half-lapped layer of vinyl tape as shown in Fig. 31.

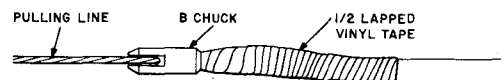


Fig. 31—Completed Attachment

6.09 Establish reliable communication between the pulling end and the technician following the end of the cable.

6.10 When using a metallic pulling line, a winch truck shall be used as a pulling device. The operator shall be located off the ground, either at a console, in the cab, or on a folding step. **Under no conditions shall the operator be permitted to operate the equipment while standing on the ground.** Insulating gloves and an insulating blanket must be conveniently available for use. To leave or

reenter the vehicle at any time, the procedures in Section 010-110-006 shall be followed. A "B" grounding roller connected to a suitable protective ground shall be placed on the metallic line as close as possible to the pulling vehicle.

6.11 When using a nonmetallic pulling line, a power trailer may be used as a pulling device. The operator may stand on the ground provided the operator stands on an insulating blanket and wears insulating gloves. To leave the station, break all contact with the pulling device, then step clear off the blanket. When returning, the reverse procedure shall be followed. In addition, a B grounding roller shall be placed on the nonmetallic pulling line in the same fashion as if the line were metallic. Omission of the B grounding roller and no blanket or gloves in the case of the nonmetallic pulling line, is permissible if the pulling line manufacturer has certified its use as a valid dielectric.

6.12 Pull in the cable using a CR or RS spool to wind up the pulling line. If nonmetallic pulling line is being used and pulling tension exceeds 300 pounds, the rope should be wrapped around the CR or RS spool about five turns and the spool used as a capstan.

6.13 If the cable reel is mounted on a cable reel trailer, use a B cable reel brake or equivalent to maintain sufficient tension in the cable to clear any obstacles.

6.14 Upon completion of the pull, dead end the support strand at the pulling end leaving sufficient cable for splicing or for future extension and remove the B block frame and E cable block.

6.15 Tension the cable and dead end it at the reel end as outlined in Parts 8 and 9 and transfer to permanent attachments where required, as outlined in Part 10.

AERIAL LIFT

6.16 When using an aerial lift vehicle for placing self-supporting cable by the stationary reel method, observe the safety precautions given in Part 2 and see instructions in paragraph 4.01.

6.17 Before starting placing operations, obtain the cable weight from Section 626-200-130 and the span lengths from the work print. **Do not exceed the 600-pound limit given in Table A for the appropriate cable weight and span length.**

6.18 Position the cable reel in accordance with paragraph 6.05. Pass the winch line (tow line) through the roller guide of the fairlead. Pass the cable end through an E cable block or B block frame mounted on the first pole. Connect the winch line and cable end in accordance with paragraph 6.08 (1) through (3).

6.19 Set the cable reel brake to maintain sufficient cable tension to clear any obstacles. Move the lift to the next pole keeping the boom as near as possible in line with the direction of pull to minimize side loads. When the pole is reached, stop the truck and swing the boom to the working position for placing attachments.

6.20 Install the hardware and placing apparatus in accordance with paragraph 6.01 (b) through (e), 6.02, and 6.03.

6.21 Position the basket to align the roller guide of the fairlead with the cable block(s) on the pole and place the cable in the cable block(s).

6.22 Move to the next pole, realigning the boom with the direction of pull to minimize side loads, and repeat the placing procedure at each successive pole until the placing operation is completed. Dead end the support strand at the last pole leaving sufficient cable for splicing.

6.23 Return to the first pole, tension the cable, and dead end it as outlined in Parts 8 and 9. Transfer the cable to permanent attachments at intermediate poles where required as outlined in Part 10.

7. MEASURING SAGS

7.01 The sag and the resulting tension in the strand of self-supporting cable is based on the average span length of the pole line on which the cable is to be placed. The average span length is used to select the proper sag table shown in Section 627-700-011.

7.02 If the basic layout of the pole line changes from short spans to long spans, the short spans and the long spans must be sagged separately. Adequate guying and a false dead end should be provided to compensate for the difference in tension.

7.03 An occasional long span which is 50 percent in excess of the average of the adjacent five spans in each direction must be sagged individually.

Adequate guying and false dead ends should be provided, in accordance with the engineering work prints, to compensate for the difference in tension.

7.04 To properly sag self-supporting cable, it will be necessary to select a span which will permit sighting between adjacent poles at attachment height.

7.05 When the span to be sagged has been selected, measure the length of the span from center of pole to center of pole. This length and the weight of the cable per foot will enable the technician to determine the sag from the proper sag table in Section 627-700-011.

7.06 A method of measuring sag is illustrated in Fig. 32 and is done as follows:

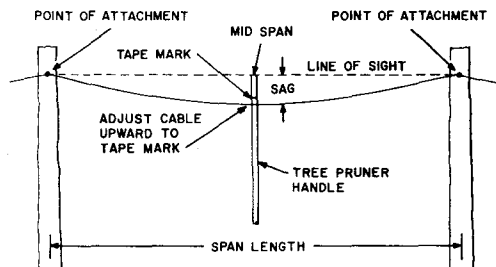


Fig. 32—Measuring Sag

- (1) Mark off the required sag from one end of a tree pruner handle and apply a layer of paper tape or equivalent to clearly indicate the mark.
- (2) Hold the tree pruner handle vertically at midspan and adjust the height so that the top of the handle is in line with the points of attachment as sighted by a technician on the pole.
- (3) Maintaining the tree pruner handle in position determined in (2), the technician controlling the tensioning will adjust the sag in the cable until it lines up with the tape marking on the tree pruner handle.

8. TENSIONING

8.01 The length of self-supporting cable that can be tensioned at one time will depend upon several

factors such as corners, span length, changes in grade, etc. However, lengths up to 4000 feet can generally be tensioned satisfactorily in straight sections of pole line.

8.02 After excess slack has been removed, use a 1-1/2 ton chain hoist, B or modified L strand puller,, and sling to tension self-supporting cable. The strand puller is installed over the jacketed strand.

8.03 A tensiometer is available that can be used to obtain the proper tension (in pounds) as recommended in Section 627-700-011. The tensiometer is placed in series with the chain hoist and strand puller, as shown in Fig. 11, so the cable tension can be read directly from the scale on the tensiometer as the cable is being sagged. The sag should be observed in selected spans to be sure cable tension is relatively equal over the length of the cable being tensioned.

8.04 A winch line may be used in place of a chain hoist for pulling up and tensioning self-supporting cable. The winch line is used in the same manner as for pulling up suspension strand.

8.05 Temporary or permanent guys are required to compensate for the unbalanced load at the pole where the tensioning is done.

8.06 Where it is necessary to tension self-supporting cable at an intermediate pole in the lead, **hold the tension with 1-1/2 ton chain hoist and B or modified L strand puller** until the cable is tensioned ahead. If fully tensioned cable is to be held for an extended period of time, such as from one workday to the next, place a B false dead end and remove the chain hoist and strand puller.

8.07 Self-supporting cable may be tensioned around corners with a pull of 50 feet or less by using E cable blocks with E or F cable block frames.

9. DEAD ENDING

9.01 Self-supporting cable is dead ended at the first and last pole and at corners exceeding 50 feet of pull by attaching the strand to a B guy hook with a strandwise, B strand grip, or B false deadend. Sufficient strand is removed prior to dead ending to provide the cable necessary for splicing, where required.

9.02 The strand must be dead ended in both directions at corners that exceed 50 feet of pull. When using the moving reel method of placing self-supporting cable, the strand may be dead ended in both directions at corners, where required, as follows:

- (1) Place the cable up to the corner pole.
- (2) Tension and dead end the support strand of the cable that has been placed.
- (3) Form the cable in a smooth bend around the corner and place the dead-end attachment for the cable that is to be placed in the subsequent spans.
- (4) If the strand continuity is broken, bond with B ground wire and proceed with the cable placing.

Note: It is not necessary to cut the strand if B false dead ends are used.

9.03 *The 6.6M strandwise* is used for dead ending the strand of self-supporting cable in the same manner as outlined in the sections in the 627 Division for suspension strand with the following exceptions:

- (a) Where cable is required to extend beyond the dead-end attachment, the web must be slit from the end of the cable to a point 2 inches beyond the strandwise location.
- (b) After the jacketed strand has been cut to the proper length, remove 4 inches of the poly-jacket.
- (c) ***Do not attempt to clean or remove the flooding compound from the strand.***

9.04 *The 6.6M B strand grip* is used for dead ending the strand of self-supporting cable in the same manner as outlined in the sections in the 627 Division for suspension strand with the following exceptions:

- (a) Where cable is required to extend beyond the dead-end attachment, the web must be slit from the end of the cable to a point 2 inches beyond the far end of the strand grip.
- (b) Cut the jacketed strand approximately 4 inches from the dead-end attachment and

remove the polyethylene jacket from the portion of the strand to which the B strand grip will be attached.

(c) ***Do not attempt to clean or remove the flooding compound from the strand.***

9.05 Install the **6.6M B false dead end** on the strand as follows:

- (a) Place the loop of the B false dead end over the B guy hook or through the thimble eye nut and lay the legs along the cable away from the dead-end attachment.
- (b) Measure points approximately 3 inches beyond each end of the location where the B false dead end will be attached to the strand and slit the web between these points.
- (c) Remove the polyethylene jacket from the portion of the strand around which the B false dead end will be wrapped.
- (d) Insert a B wire wedge between the cable and strand at each end of the slit in the web.
- (e) Install the B false dead end as outlined in Section 627-240-213.

9.06 Where a self-supporting cable is placed to extend an existing cable supported on 6M strand, the strands are joined as shown in Fig. 33. Using a strand connector and B strand grips, proceed as follows:

- (a) Use a 1-1/2 ton chain hoist and two strand pullers to equalize the tension between the self-supporting cable and the 6M strand supporting the existing cable. ***The B strand puller or modified L must be used on the jacketed 6.6M strand.***
- (b) Separate the cable and strand of the self-supporting cable.
- (c) Overlap the two strands and use tape markers to indicate where the strands are to be cut. Place the strand connector 8 inches from the center of the pole.
- (d) Cut the strands at the tape markers placed in
 - (c). Use the B strand cutter to cut the 6.6M strand.

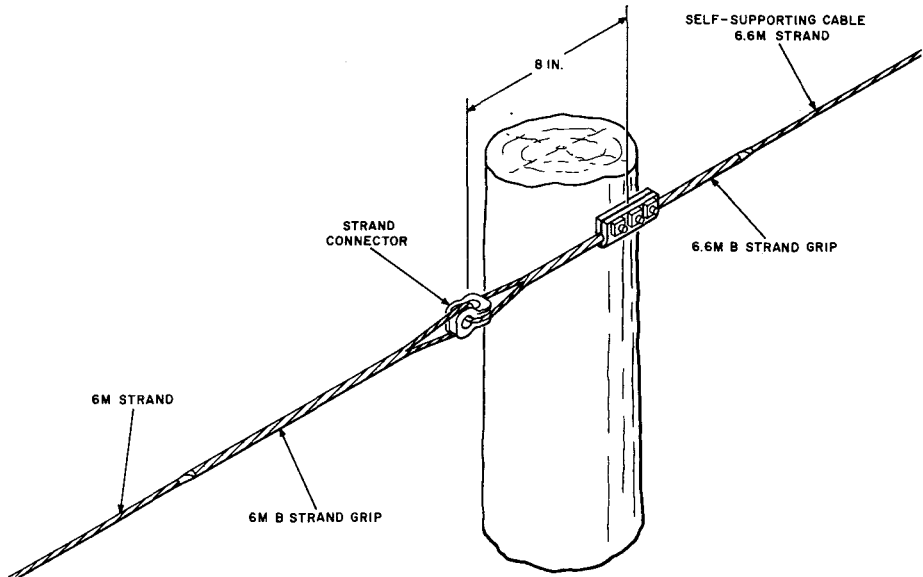


Fig. 33—Joining 6.6M and 6M Strand

(e) Install the B strand grips and the strand connector. The completed installation is shown in Fig. 33.

9.07 Where self-supporting cable is used to extend an existing self-supporting cable, the strands are joined with a B strand connector as described in Section 627-230-208.

10. TRANSFERRING AND ATTACHING CABLE TO POLES

10.01 Self-supporting cable should be permanently attached to the poles after it has been placed

and properly tensioned.

10.02 The C cable clamps are used for attaching the jacketed strand at in-line poles and at corners with a pull of 25 feet or less.

10.03 The corner suspension clamp must be used for attaching the jacketed strand to poles where the corner exceeds 25 feet of pull. The web must be slit to permit the corner suspension clamp to be installed on the strand.

10.04 At corner pole locations, the self-supporting cable is transferred from E cable blocks to C cable clamps or corner suspension clamps by using a 1-1/2 ton chain hoist and two B or modified L strand pullers as shown in Fig. 34.

10.05 The methods and tools used in transferring cable from cable blocks to permanent attachments are outlined in Section 627-350-204, and can also be applied to self-supporting cable by slitting enough of the web to permit the use of the D or E strand shifter.

10.06 Transfer self-supporting cable from the B placing hook to a C cable clamp as follows:

- (1) Place the C cable clamp on the jacketed strand at the attachment location and tighten the nuts on the clamp sufficiently to hold it in place (Fig. 35).

- (2) Remove the outer nut which secures the B placing hook to the pole. The placing hook remains suspended on the bolt.

- (3) Spiral the cable if required to prevent dancing.

- (4) Place the center hole of the C cable clamp on the cable suspension bolt and start the nut on the bolt to hold the clamp (Fig. 36).

- (5) Remove the B placing hook from the bolt.

- (6) Securely tighten all nuts.

11. CABLE PROTECTION

Electrical

- 11.01 The strand of self-supporting cable placed on joint-use pole lines shall be connected to a

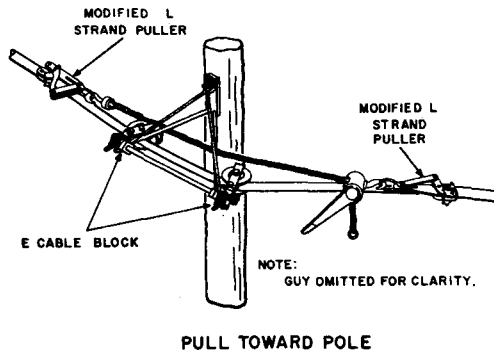
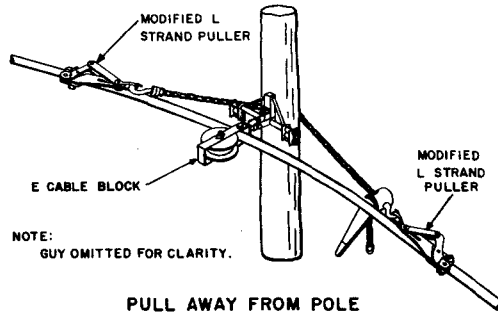


Fig. 34—Transferring Self-Supporting Cable to Permanent Attachments

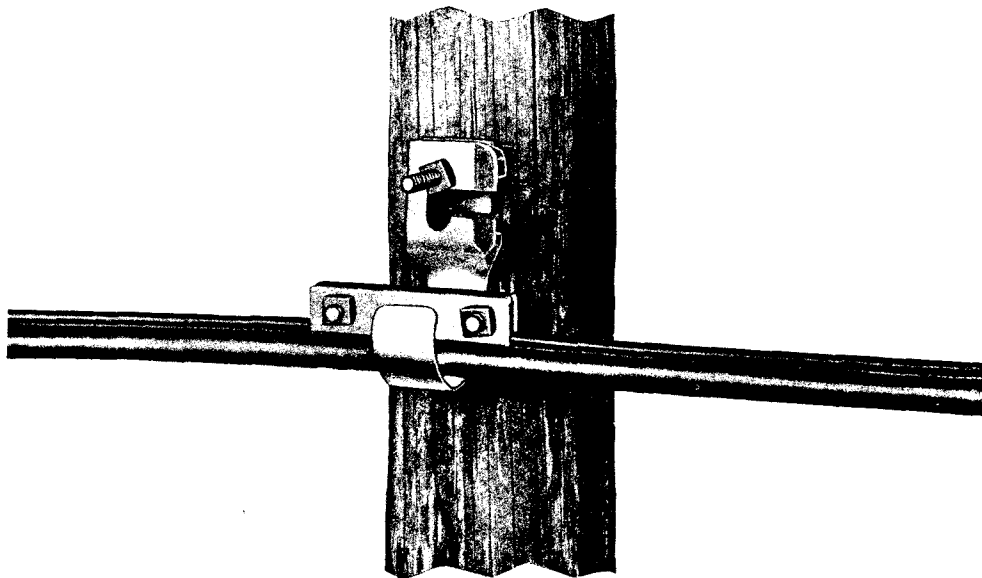


Fig. 35—Self-Supporting Cable in B Placing Hook

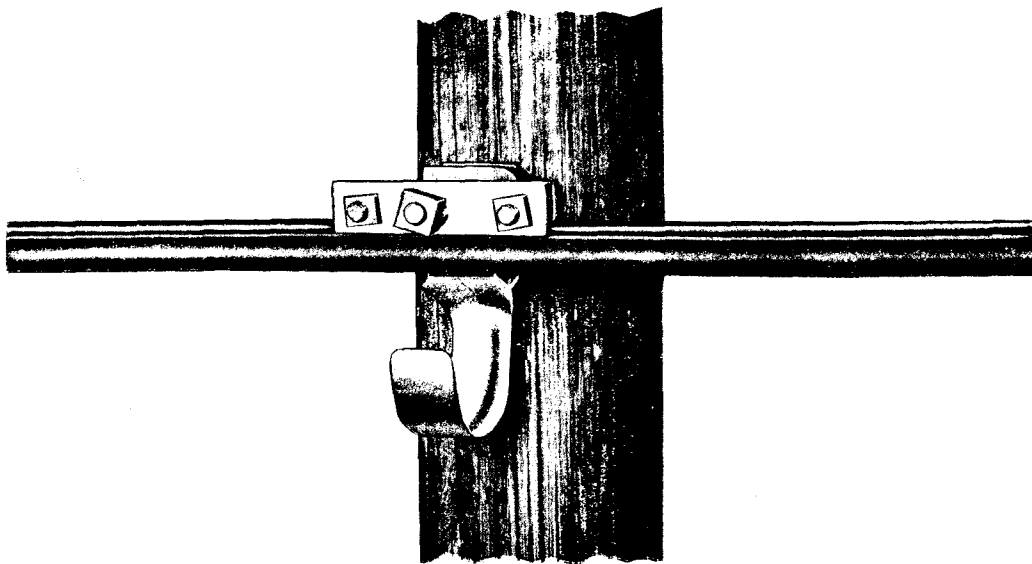


Fig. 36—Self-Supporting Cable Transferred From B Placing Hook

low-impedance ground at intervals specified by the local outside plant engineer (Section 627-020-005).

11.02 Satisfactory low-impedance ground connections for the strand of self-supporting cable are the same as those outlined for suspension strand in Sections 627-230-203 and 627-020-005.

11.03 Bonding and grounding requirements are basically 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.

11.04 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.

11.05 Prior to ground connection, test the vertical low impedance **copper** ground conductor with a B voltage tester (Section 620-105-010) or a 188A test set (Section 081-705-102). **Insulating gloves shall be worn when making or breaking a ground connection** to the vertical ground of multigrounded neutral power system.

11.06 Attach one end of the B ground wire or the No. 6 ground wire to vertical low impedance ground with an H connector. The other end of the B or No. 6 ground wire is attached to the **jacketed** strand of self-supporting cable with a C or D connector (Fig. 37).

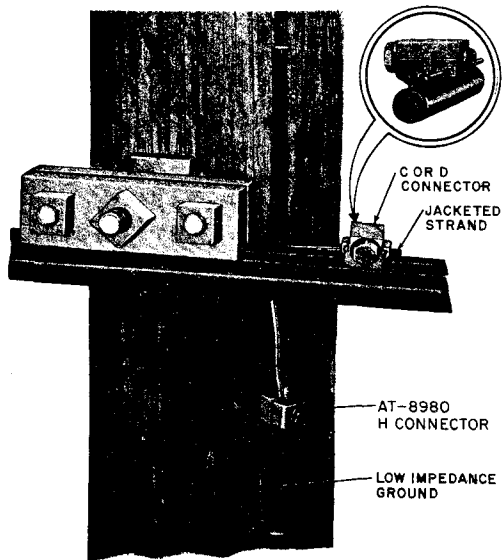


Fig. 37—Ground Attachments

11.07 The metallic shield of the cable and the strand will be bonded at each terminal and splice location.

Mechanical

11.08 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.

11.09 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.

12. CABLE DANCING

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

12.02 *Warning: Do not spiral reinforced sheath self-supporting cable. Alternate methods of preventing cable dancing are described in the 627-390 layer of sections.* Dancing of self-supporting cable can be prevented or minimized by spiraling the cable around the strand.

12.03 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.

12.04 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.

12.05 Cable dancing information, general and preventive methods, can be found in the 627-390 layer of sections.

13. USE IN CORROSIVE AREAS

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

13.02 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.

13.03 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.

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

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

13.06 When removing the polyethylene jacket from the strand at dead end and splice locations, *exercise care to avoid removing the flooding compound and the galvanizing.*

13.07 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 (Fig. 18, 20, and 21). It is not necessary to cover dead-end and splicing hardware.

13.08 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.

14. RAILROAD CROSSINGS

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

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

14.03 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.

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