

SUSPENSION STRAND DEAD ENDING—GENERAL

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1. GENERAL

- 1.01** This section outlines various methods and illustrates some typical arrangements for terminating suspension strand at poles. For conditions not specifically covered, the general principles illustrated in this section should be used.
- 1.02** This section is reissued to include information on 6.6M strand and to revise illustrations.
- 1.03** Determine the method to be used for a particular job by considering the following factors:

- (a) Corrosion
- (b) Local stocking arrangements
- (c) Field conditions.
- 1.04** When using a chain hoist for pulling up or holding suspension strand *do not exceed the safe working load for the chain hoist*. Refer to Section 627-240-211 for the chain hoist capacity.
- 1.05** The size of the hardware to be used is determined by the size of the suspension strand or guy strand, whichever is larger.
- 1.06** Only A cable suspension bolts should be used in conjunction with guy hooks in deadending operations. *The head of this bolt should always be placed against the guy hook on the anchor side* (See Fig. 1). B cable suspension bolts should not be used in this operation.

2. HARDWARE

B GUY HOOKS

- 2.01** B guy hooks described in Section 621-410-200 are available in 5/8, 3/4, and 1 sizes. The 5/8 size is for use with 10M or smaller strand, 3/4 size is for use with 16M strand and the 1 size is for use with 25M strand.
- 2.02** The 3/4 size B guy hook may be used for branch strand terminations where the main cable and branch cable are on the same side of the pole. It can be attached to the pole with the same bolt that supports the suspension strand for the main cable (see branch strand termination in Part 6). When used in this manner, the 3/4 size B guy hook must be used for terminating 6M, 6.6M, 10M, or 16M suspension strand.

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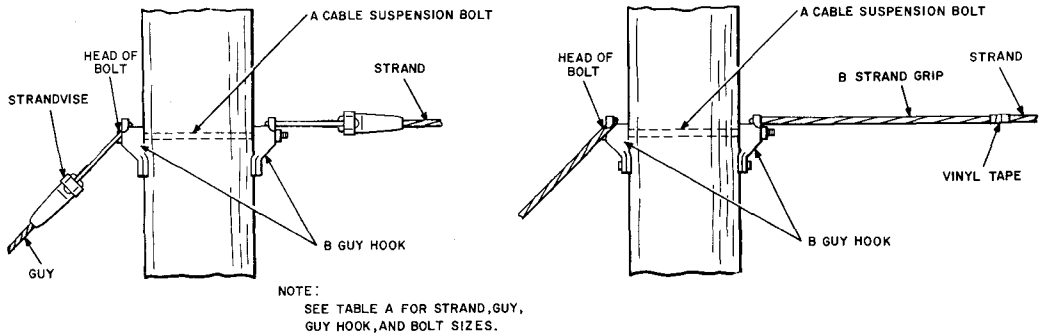


Fig. 1—Installed B Guy Hooks and Associated Hardware

2.03 Two B guy hooks, with the proper Type A cable suspension bolt, are the preferred method to dead end 6M, 6.6M, 10M, and 16M, and 25M strand.

CABLE SUSPENSION BOLTS

2.04 Type-A cable suspension bolts are available in 5/8-inch, 3/4-inch and 1-inch sizes. Their heads are marked 10M, 16M, and 25M, respectively, indicating the maximum strand size which can be used with each size of suspension bolt.

COMBINATION OF B GUY HOOKS AND CABLE SUSPENSION BOLTS

2.05 Table A lists the sizes of suspension strands and guys that may be terminated on B guy hooks secured with Type A cable suspension bolts.

2.06 Installed B guy hooks and associated hardware are shown in Fig. 1. Refer to Table A for the size of suspension strand and guy that may be used.

TABLE A

COMBINATIONS OF B GUY HOOKS AND CABLE SUSPENSION BOLTS FOR TERMINATING VARIOUS SIZES OF SUSPENSION STRAND AND GUY

SIZE OF LARGER STRAND	CABLE SUSPENSION BOLT			B GUY HOOK (SIZE)
	SIZE	MARKED	TYPE	
6M	5/8	10M	A	5/8
6.6M	5/8	10M	A	5/8
10M	5/8	10M	A	5/8
16M	3/4	16M	A	3/4
25M	1	25M	A	1

GUY BOLTS, THIMBLE EYE NUTS, AND ASSOCIATED HARDWARE

2.07 Guy bolts, thimble eye nuts, and associated hardware can be used to terminate if B guy hooks are not available.

2.08 The 5/8-inch, 3/4-inch, and 1-inch guy bolts are marked with the maximum size strand with which they can be used, ie, 10M, 16M, and 25M, respectively.

2.09 When guy bolts and thimble eye nuts are used and the lead/height ratio of the guy is 1-1/4 or less, install a B guy bolt as shown in Fig. 2 and select the associated hardware as listed in Table B.

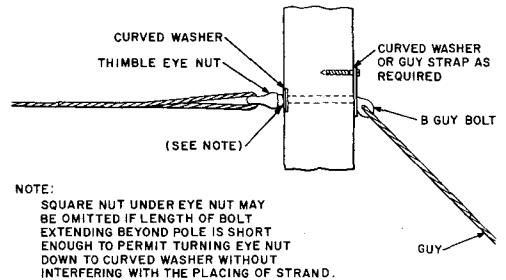


Fig. 2—B Guy Bolt and Associated Hardware Installed Where Lead/Height Ratio of Guy is 1-1/4 or Less

TABLE B

HARDWARE USED FOR TERMINATING SUSPENSION STRAND WHERE LEAD/HEIGHT RATIO OF THE GUY IS 1-1/4 OR LESS

SIZE OF LARGER STRAND	B GUY BOLT		TYPE OF WASHER OR GUY STRAP AT EYE END OF BOLT	TYPE OF CURVED WASHER AT THREADED END OF B GUY BOLT
	SIZE (INCHES)	MARKING		
6M	5/8	10M	B Curved Washer	B
6.6M	5/8	10M	B Curved Washer	B
10M	5/8	10M	B Guy Strap	B
16M	3/4	16M	B Guy Strap	E
25M	1	25M	L Guy Strap	C

Note: Use guy bolts only when B Guy Hooks are not available.

2.10 Where guy bolts and thimble eye nuts are used and the lead/height ratio is more than 1-1/4, select the hardware listed in Table C and terminate as shown in Fig. 3.

3. TERMINATING STRAND—B STRAND GRIP

3.01 B Strand Grips are made of spirally formed high-strength steel wires with class C galvanized coating for use with class A and class C galvanized steel strand. They are used for dead ending suspension strand and guys. The inner surface of the grips is coated with grit to increase the holding power. The two legs are of unequal length to facilitate application or unwrapping.

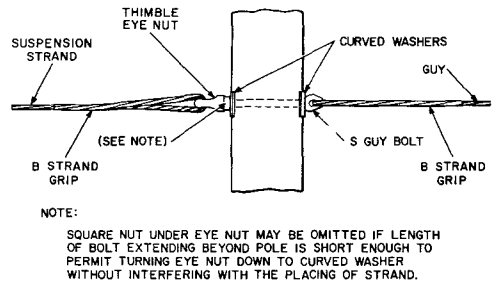


Fig. 3—S Guy Bolt and Associated Hardware Installed Where Lead/Height Ratio of Guy is More Than 1-1/4

TABLE C

HARDWARE USED FOR TERMINATING SUSPENSION STRAND WHERE
LEAD/HEIGHT RATIO OF THE GUY IS MORE THAN 1-1/4

SIZE OF LARGER STRAND	S GUY BOLT		TYPE OF CURVED WASHER AT EACH END OF S GUY BOLT
	SIZE (INCHES)	MARKING	
6M	5/8	10M	B
6.6M	5/8	10M	B
10M	5/8	10M	B
16M	3/4	16M	E
25M	1	25M	C

Note: Use guy bolts only when B Guy Hooks are not available.

3.02 B strand grips are available in sizes corresponding to standard suspension strand. The size of the strand grip is indicated by the color of the paint marking at the starting or crossover point as illustrated in Fig. 4. The color mark **A** indicates the starting or crossover point

for all dead-end installations. The color mark **B** indicates the starting or crossover point when a strand grip is installed on a strain insulator. On each leg of the 16M and 25M sizes there is only one color mark. This is used as the starting or crossover point for all installations.

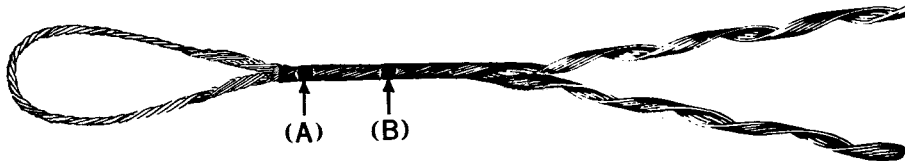


Fig. 4—B Strand Grip

3.03 Table D shows the color code used to identify the sizes of B strand grips to be used with the various sizes of suspension strand.

3.04 Strand grips made of stainless steel are available for terminating in maintenance work on CR strand. These grips are similar in appearance and application to the galvanized B strand grip. The color codes shown in Table E indicate the size strand grip to be used with CR strand.

3.05 Gloves should be worn when wrapping or unwrapping strand grips. *Strand grips must not be reused after initial installation.*

TABLE D

B STRAND GRIP FOR GALVANIZED

STEEL STRAND

STRAND SIZE	STRAND DIAMETER (INCH)	CROSSOVER POINTS COLOR MARKING
2.2M	3/16	Red
6M	5/16	Black
6.6M	1/4	Yellow
10M	3/8	Orange
16M	7/16	Green
25M	1/2	Blue

TABLE E
CR STRAND GRIP FOR CR STRAND¹

STRAND SIZE	STRAND DIAMETER (INCH)	CROSSOVER POINTS COLOR MARKING	LOOP COLOR MARKING
6M	9/32	Black	Green
10M	5/16	Orange	White
16M	3/8	Green	White

Note 1: These CR strand grips must be obtained commercially from Preformed Line Products Company, Cleveland, Ohio as follows:
Guy Grip Dead-End SDE-0120 (6M)
Guy Grip Dead-End SDE-5104 (10M)
Guy Grip Dead-End SDE-5105 (10M)

3.06 Install a strand grip in the following manner:

- (a) Install a C fabric sling, rope sling or construction chain, strand puller, and chain

hoist at the location where the strand grip will be installed. Refer to Fig. 16 and to Section 081-500-125 for information on the load capabilities and precautions associated with the use of the C fabric sling and to Section 081-020-101 for the use of construction chains.

- (b) Pull the strand to the desired tension. Apply two layers of vinyl tape approximately 4 inches short of the dead-ending hardware and cut the strand at that point as illustrated in Fig. 5. Avoid excessive taping.

- (c) Select the proper size strand grip for the strand being dead ended. Place the end of the strand inside the proper crossover mark on one leg of the strand grip. Align the loop of the strand grip with the outside edge of the dead-ending hardware. Simultaneously, pull the strand toward the pole to remove all possible slack. Fig. 6 illustrates the start of strand grip installation.

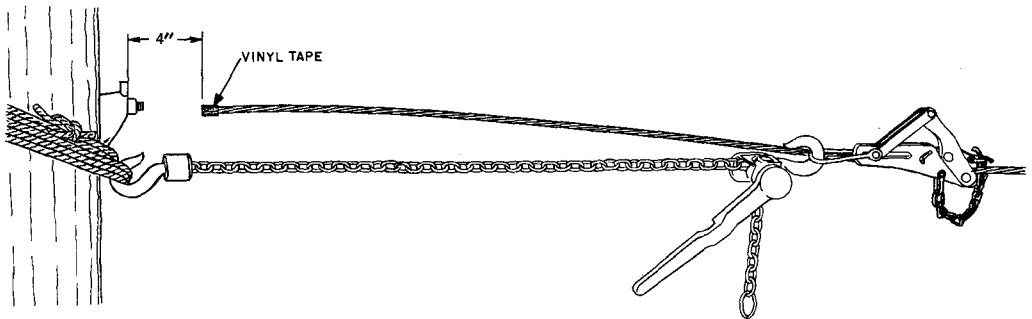


Fig. 5—Tensioned Strand

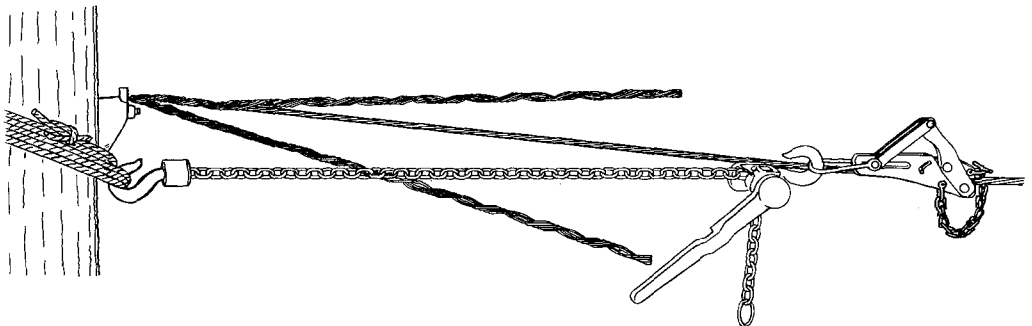


Fig. 6—Placing Strand Grip

(d) Wrap five pitches of the first leg around the strand. Bend the leg of the strand grip slightly away from the strand while wrapping (Fig. 7).

(e) Pull additional slack to permit the loop of the strand grip to seat on the dead-ending

hardware. Squeeze the loop of the strand grip to match the crossover marks and start applying the second leg to the strand. This is illustrated in Fig. 8.

(f) Apply all but two pitches of both legs, as illustrated in Fig. 9. Remove the chain hoist, strand puller, and sling.

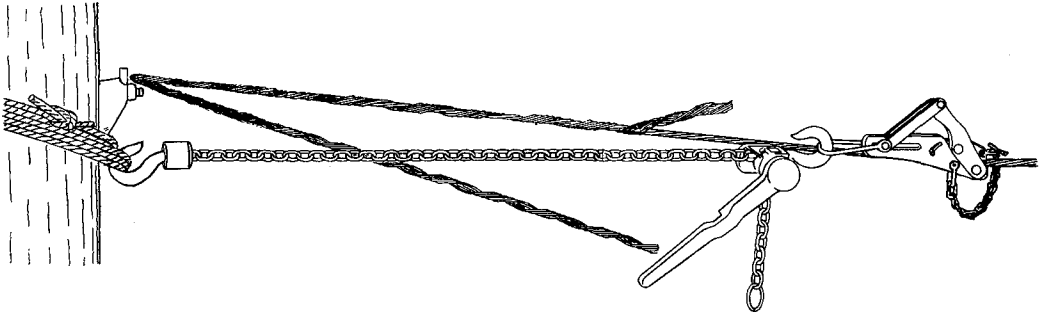


Fig. 7—Wrapping First Leg

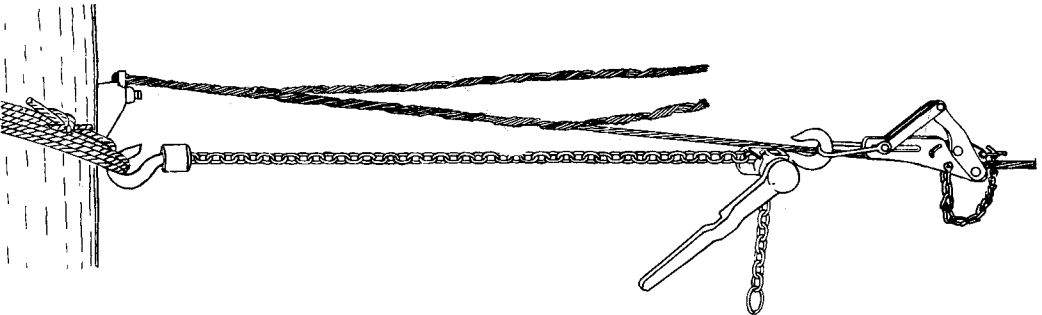


Fig. 8—Wrapping Second Leg

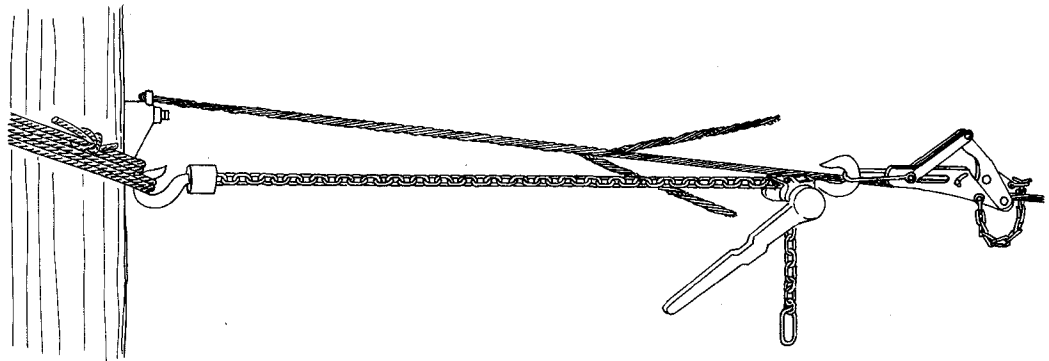


Fig. 9—Both Legs Partially Wrapped

- (g) Split the short leg first (Fig. 10) and apply. Repeat with the second leg.
- (h) Apply three half-lapped layers of vinyl tape over the end of the installed strand grip to

prevent accidental damage to the strand grip by sliding construction apparatus. A completed installation is illustrated in Fig. 11.

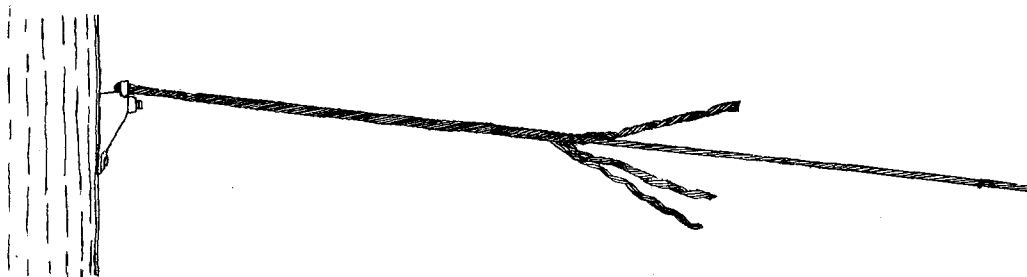


Fig. 10—Split Shorter Leg

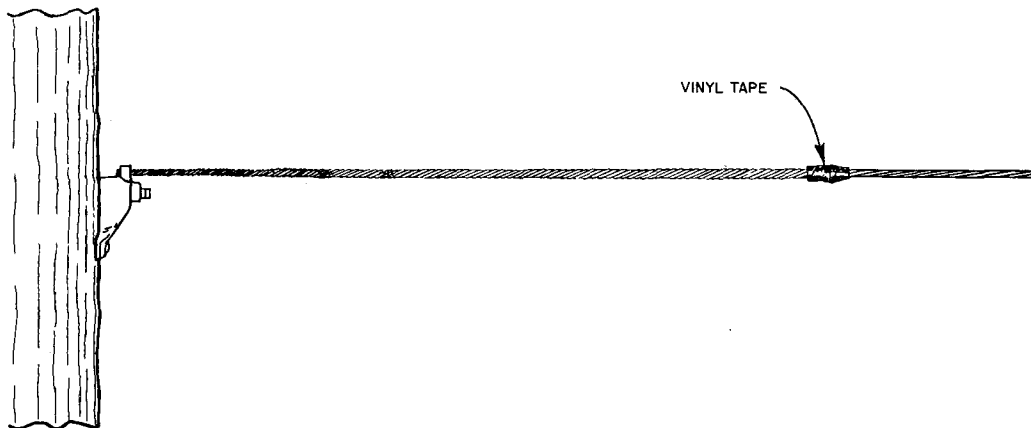


Fig. 11—Completed Installation

4. TERMINATING STRAND—STRANDVISE

4.01 The Strandvise, (Fig. 12) consists of a cartridge, a yoke, and a bail. The cartridge encloses a spring-loaded, three-jaw chuck which grips the strand.

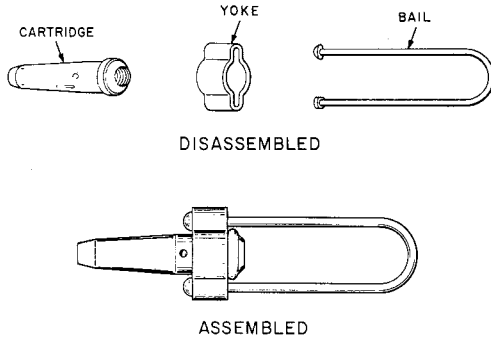


Fig. 12—Strandvise

4.02 The cartridge for the Strandvise is available as a replacement part when the bail and yoke are reusable. The bail and yoke may be used with a new cartridge. **Do not reuse the cartridge. Do not use a long bail Strandvise on eye-type (B guy bolt, S guy bolt, eye nut, guy rod) hardware. The long bail Strandvise is designed solely for use with strain insulators.**

4.03 The Strandvise is available in the following sizes:

- (a) 5/16-inch for 6M galvanized strand
- (b) 1/4-inch for 6.6M galvanized strand and self-supporting cable.

(c) 3/8-inch for 10M galvanized strand

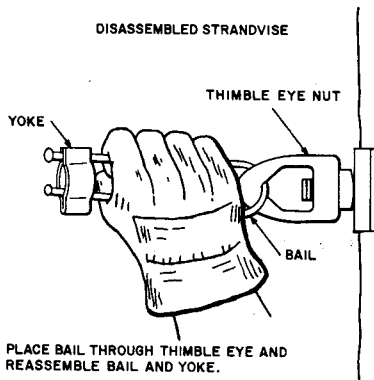
(d) 7/16-inch for 16M galvanized strand.

4.04 A Strandvise is intended primarily for use on new galvanized strand. Old strand that has been inspected and is to remain in plant may also be terminated with a Strandvise. Loose rust and scale should be removed from the strand with emery cloth before installation. **Do not install a Strandvise on strand where there is no galvanizing.**

4.05 **Do not use a Strandvise on CR strand or in seacoast locations where extreme conditions of salt spray or salt fog may be encountered.**

4.06 Install a Strandvise in the following manner:

- (a) When used with a thimble eye nut as illustrated in Fig. 13, proceed as follows:
 - (1) Place the bail of the Strandvise through the thimble eye nut.
 - (2) Force the ends of the bail together and pass them through the yoke.
 - (3) Insert the cartridge into the yoke.
- (b) When used with a B Guy Hook, proceed as follows:
 - (1) Turn the bail of the Strandvise at a right angle to the bolt.
 - (2) Place the bail over the ears of the guy hook as illustrated in Fig. 14.
 - (3) Rotate the Strandvise into the proper position as illustrated in Fig. 15.

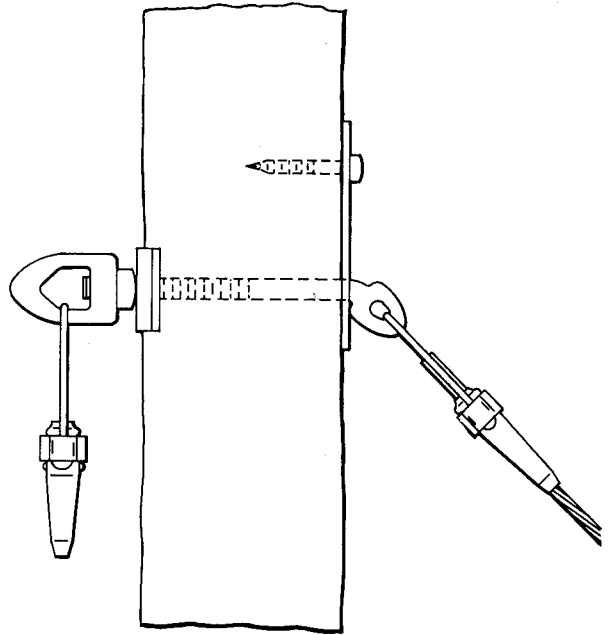


PLACE BAIL THROUGH THIMBLE EYE NUT AND REASSEMBLE BAIL AND YOKE.

CAUTION:

TO AVOID INJURY KEEP HAND OR FINGER AWAY FROM YOKE WHILE SQUEEZING BAIL THROUGH YOKE OPENING.

PLACING STRANDVISE



STRANDVISE INSTALLED

Fig. 13—Installing Strandvice (Thimble Eye Nut)

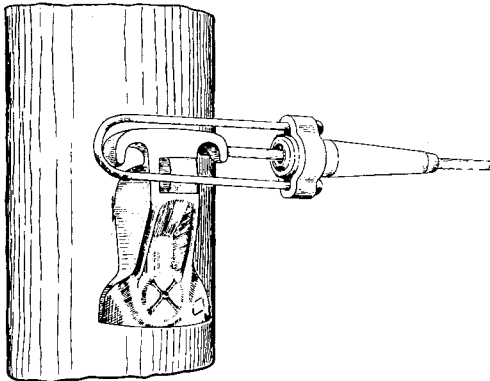


Fig. 14—Installing Strandvice (B Guy Hook)

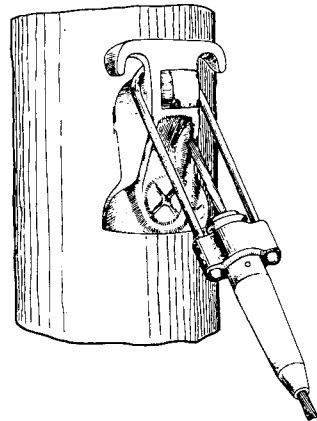


Fig. 15—Installed Strandvice (B Guy Hook)

4.07 To make a strand attachment to the Strandvise, proceed as follows:

(a) Install a fabric or rope sling or Reliable No. 9055 Pulling Hook, strand puller, and chain hoist as illustrated in Fig. 16 and 17.

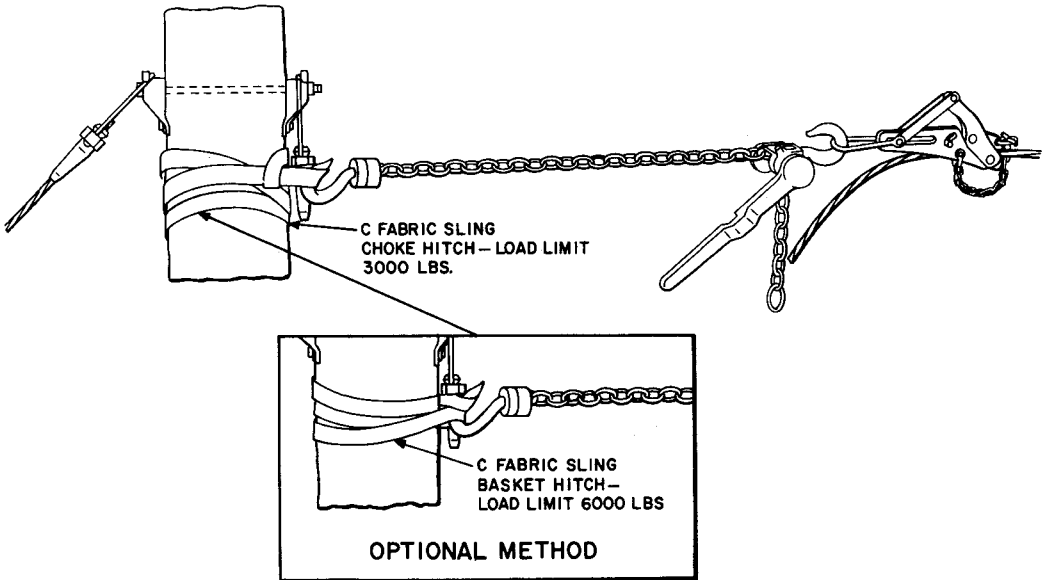


Fig. 16—Strand Attachment

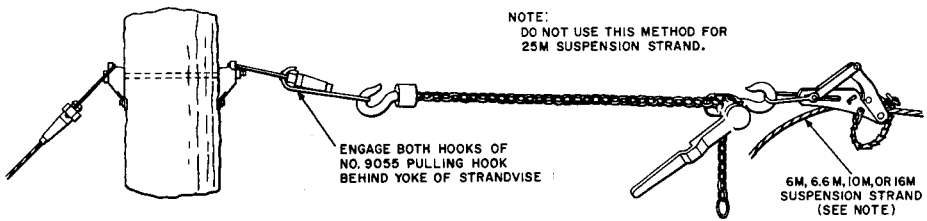


Fig. 17—Strand Attachment (Reliable No. 9055 Strand Pulling Hook)

Caution: Do not use the No. 9055 Pulling Hook on 25M strand.

- (b) Pull the strand to the desired tension.

Measure the strand to reach about 1-1/2 inches beyond the rear end of the cartridge and tape it at that point. Cut the strand 1/2 inch beyond the tape marker as illustrated in Fig. 18. Remove the tape and check to see that all strand wires are in lay.

- (c) Insert the end of the strand into the pilot cup (in the small end of the cartridge) and force the strand into the Strandvise in a continuous

forward motion without attempting to twist the strand unnecessarily. Avoid unwinding the strand, since this will cause fouling of the chuck. Make a visual check to see that the strand end in the cup has passed beyond the rear of the cartridge. Release the hoist to set the jaws of the chuck. A completed installation is illustrated in Fig. 19.

- (d) If the strand is not under tension when a Strandvise is installed, the jaws may be set by firmly pulling on the strand by hand after the strand has been properly placed in the Strandvise.

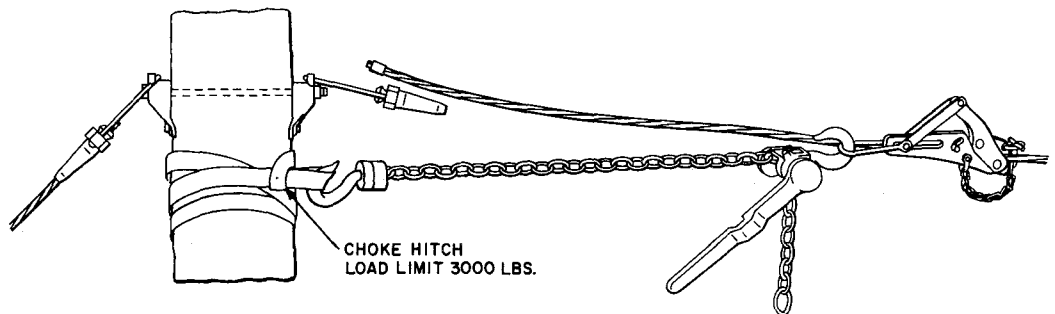


Fig. 18—Tensioned Strand (Strandvise)¶

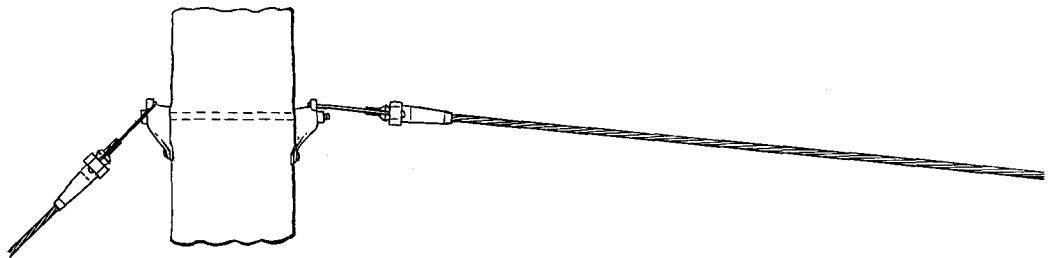


Fig. 19—Completed Installation (Strandvise)¶

5. TERMINATING STRAND—THREE-BOLT GUY CLAMP

5.01 In terminating suspension strand, the number of guy clamps required is determined by the size of the strand as follows:

SIZE OF STRAND	NO. OF GUY CLAMPS
6M	1
10M	1
16M	2
25M	3

5.02 CR guy clamps and associated hardware are available for use on CR strand.

5.03 Figure 20 illustrates the arrangement of the guy clamps when terminating strand.

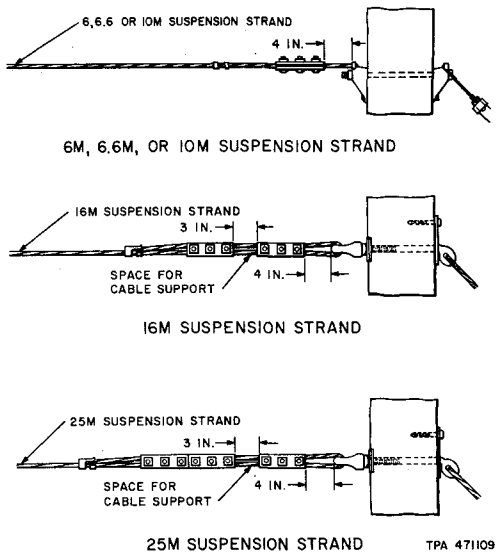


Fig. 20—Arrangement of B Guy Clamps

5.04 Provide a 6-inch tail at suspension strand deadends. Secure the tail with a strand serving sleeve or a wire serving as illustrated in Fig. 21.

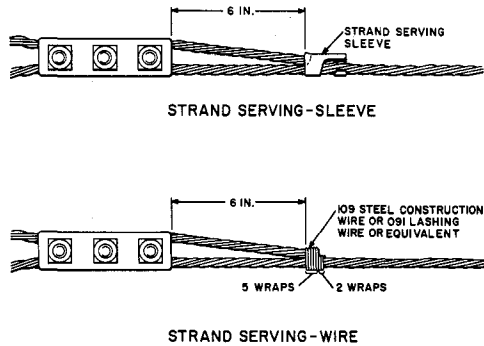


Fig. 21—Strand Serving Deadends

6. TYPICAL ARRANGEMENTS

6.01 The illustrations in this part are intended only to depict typical installations. The hardware and various types of deadends outlined may be substituted as required.

6.02 Where the main cable is located on the *same side* of the pole as the branch cable termination, dead end the suspension strand for the branch cable using a 3/4 B guy hook as illustrated in Fig. 22.

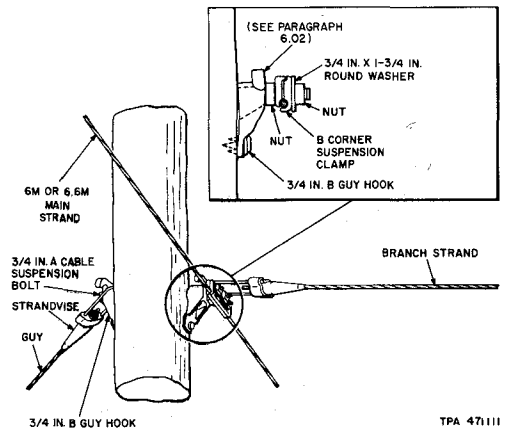
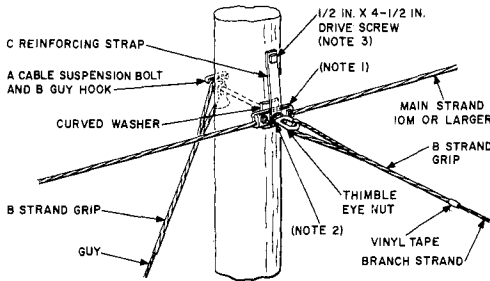


Fig. 22—Branch Strand Termination—6M or 6.6M Main Strand

6.03 When a C reinforcing strap is required, as indicated in Fig. 23, either a strand grip or Strandwise can be used.

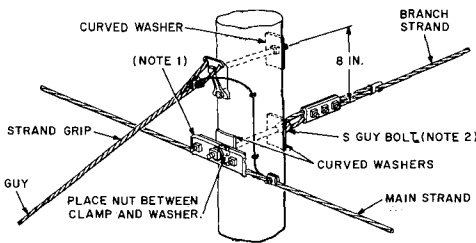


NOTES:

1. USE B CORNER SUSPENSION CLAMP WITH 3/4 IN. BOLT. FOR 5/8 IN. BOLTS, USE B CABLE SUSPENSION CLAMP.
2. PLACE NUT BETWEEN CLAMP AND WASHER.
3. SPECIAL CASES REQUIRE CABLE SUSPENSION BOLT.

Fig. 23—Branch Strand Termination—10M or Larger Main Strand

6.04 Figure 24 illustrates dead ending the branch strand, when it is located on the opposite side of the pole from the main strand.

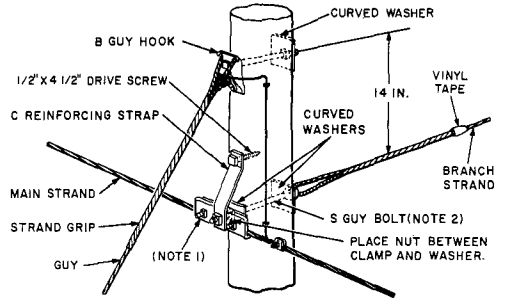


NOTES:

1. FOR 5/8 IN BOLT USE B CABLE SUSPENSION CLAMP. FOR 3/4 IN. BOLT USE B CORNER SUSPENSION CLAMP. WHEN 3/4 IN. BOLT IS USED, PLACE 3/4 IN. BY 1-3/4 IN. ROUND WASHER BETWEEN NUT AND B CORNER SUSPENSION CLAMP.
2. A CABLE SUSPENSION BOLT AND B GUY HOOK MAY BE USED INSTEAD OF S GUY BOLT.

Fig. 24—Dead Ending Branch Strand (Reinforcing Strap Not Required)

6.05 Where the main cable is located on the side of the pole opposite the branch cable termination, dead end the branch cable suspension strand as illustrated in Fig. 25.



NOTES:

1. FOR 5/8 IN. BOLT USE B CABLE SUSPENSION CLAMP. FOR 3/4 IN. BOLT USE B CORNER SUSPENSION CLAMP. WHEN 3/4 IN. BOLT IS USED, PLACE 3/4 IN. BY 1-3/4 IN. ROUND WASHER BETWEEN NUT AND B CORNER SUSPENSION CLAMP IF NO REINFORCING STRAP IS REQUIRED.
2. A CABLE SUSPENSION BOLT AND B GUY HOOK MAY BE USED INSTEAD OF S GUY BOLT.

Fig. 25—Dead Ending Branch Strand (Reinforcing Strap Required)

6.06 On poles where a branch cable is to be terminated and satisfactory clearances (on joint-use poles) or anchorages (on all poles) cannot otherwise be obtained, the branch cable suspension strand may be carried past the junction pole and dead ended on a stub or another pole as illustrated in Fig. 26.

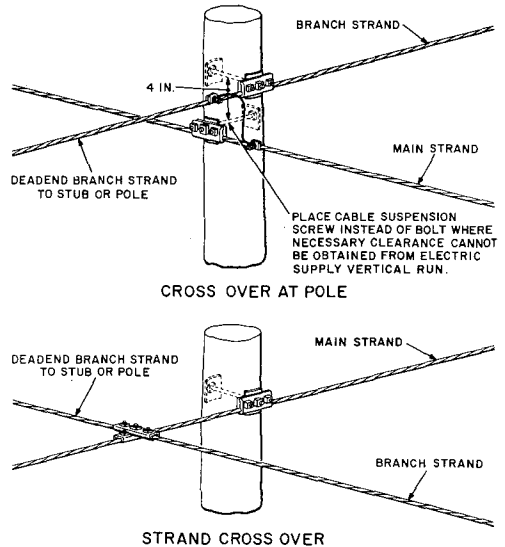
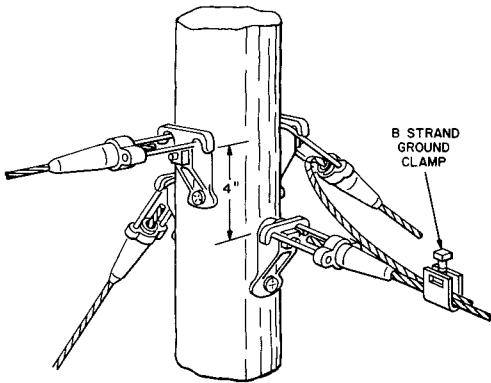


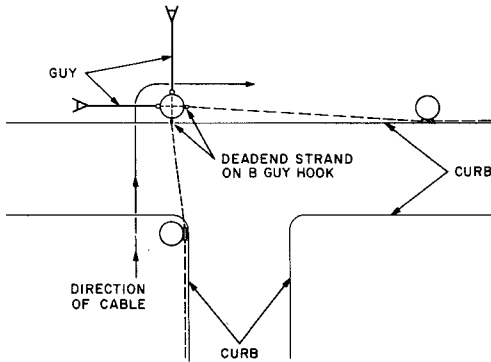
Fig. 26—Branch Cable Strand Termination

6.07 Where the pull at a corner pole would be more than 50 feet, the strand from each direction may be dead ended at the corner pole or extended through and dead ended at an adjacent pole, depending on the conditions at the corner.

6.08 At corners where the supporting guys can be placed without crossing streets or highways, dead end the strand as illustrated in Fig. 27.



DEADENDING BRANCH STRAND



SUPPORTING GUYS

Fig. 27—Dead Ending and Guy Support

6.09 At corners where supporting guys would have to cross streets or highways, extend the strand through in both directions as illustrated in Fig. 28.

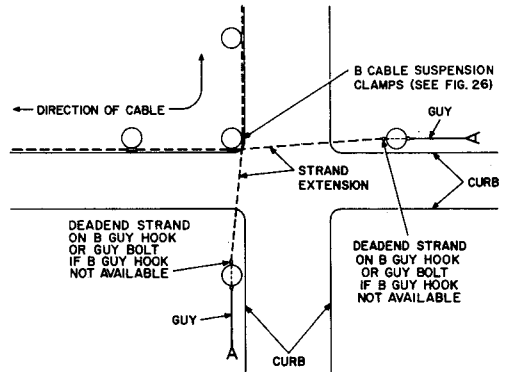


Fig. 28—Extending Guys

6.10 At corners where a dead-end attachment cannot be made due to an electric supply vertical lead on the pole or other obstructions, strand from one or both directions may be extended through to obtain the necessary clearances as illustrated in Fig. 28.

7. EXTENDING STRAND FOR FUTURE EXTENSION

7.01 Where there is a possibility of future extension, terminate the strand as shown in Fig. 29.

7.02 Secure the extended strand and cable to the down guy with lashed cable supports and cable spacers.

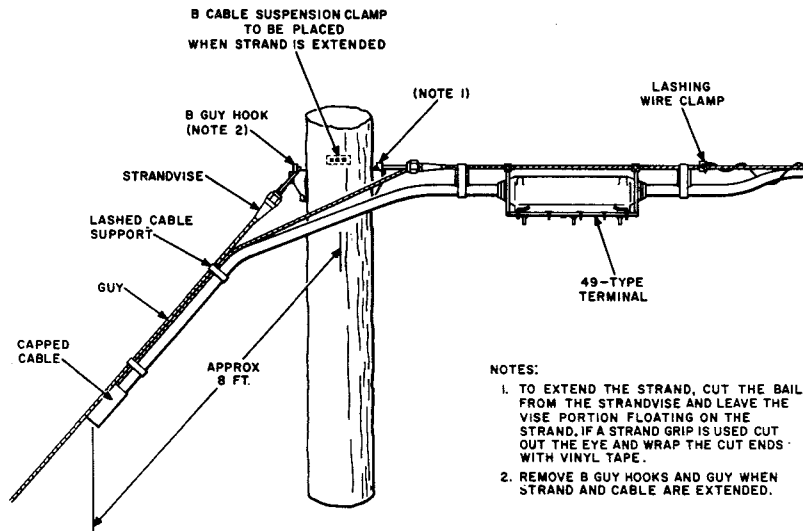


Fig. 29—Extending Strand at Dead-end Termination