

SUSPENSION STRAND ATTACHMENTS—GENERAL

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suspension strand to line poles and corner poles when the suspension strand placement does not exceed the following:

- (a) 40-foot pull for 25M strand.
- (b) 50-foot pull for 6M, 6.6M, 10M, or 16M strand.
- (c) 50 percent grade change for 6M or 6.6M strand.
- (d) 30 percent grade change for 10M strand.

1.02 This section is reissued to:

- Include information on 6.6M suspension strand and hardware.

Note: The B cable suspension clamp and the B corner suspension clamp supersede prior designs. Only clamps marked with a "B" shall be used with 6.6M strand.

- Include size 1 B guy hook
- Include 1-inch cable suspension bolt
- Delete information on CR strand and CR hardware.

1. GENERAL

1.01 This section covers the description and use of various types of hardware for attaching

2. SELECTION OF HARDWARE

2.01 The types and sizes of hardware required for supporting 6M, 6.6M, and 10M suspension strands are listed in Table A.

TABLE A

SUSPENSION STRAND HARDWARE FOR 6M, 6.6M, AND 10M STRAND

HARDWARE (SEE CAUTION)	CABLE DIA	6M OR 6.6M SUSPENSION STRAND			10M SUSPENSION STRAND		
		PULL			PULL		
		LESS THAN 10 FT	10 FT TO 50 FT ⁵		LESS THAN 5 FT	5 FT TO 50 FT ⁵	
			PULL TOWARD	PULL AWAY		PULL TOWARD	PULL AWAY
Suspension Clamp ¹	All Sizes	B Cable ³	B Corner	B Corner	B Cable	B Corner	B Corner
Suspension Bolt ² Size	All Sizes	10M 5/8 in.	16M 3/4 in.	16M 3/4 in.	10M 5/8 in.	16M 3/4 in.	16M 3/4 in.
Washer	All Sizes	B Curved	E Curved	E Curved	B Curved	E Curved	E Curved
Suspension Clamp Spacing (Between washer and clamp)	1.6 or Less	1 Nut	2 Nuts	1 Nut	1 Nut	2 Nuts ²	1 Nut
	Over 1.6	2 Nuts	Pole Strand Connector	2 Nuts	2 Nuts	Pole ² Strand Conn.	2 Nuts
Reinforcing Strap	1.6 or Less	None ⁴	C	None ⁴	S	Two C	C
	Over 1.6	S	C	C	S	Two C	C
Strap Attachment	1.6 or Less	None	1/2 in. x 4 1/2 in. Drive Screw	None	1/2 in. x 4 1/2 in. Drive Screw	5/8 in. Bolt	1/2 in. x 4 1/2 in. Drive Screw
	Over 1.6	1/2 in. x 4 1/2 in. Drive Screw	5/8 in. Bolt	1/2 in. x 4 1/2 in. Drive Screw	1/2 in. x 4 1/2 in. Drive Screw	5/8 in. Bolt	1/2 in. x 4 1/2 in. Drive Screw

- Notes: 1 See Part 7 for use of clamps with reinforcing links
 2 Pull 10 ft or more. Less than 10 ft use 1 or 2 nuts depending on cable diameter.
 3 At RR Crossings use corner clamp if pull exceeds 5 feet.
 4 Reinf. Strap required for down pull of 10 percent or greater.
 5 Where pull exceeds 50 feet, the strand must be dead ended and guyed each way as outlined in Section 627-240-212.
 6 When B Guy Hook is also attached to suspension bolt, then guy size controls bolt size.

CAUTION: Only B Cable Suspension Clamps and B Corner Suspension Clamps shall be used with 6.6M strand.

2.02 The types and sizes of hardware required for supporting 16M and 25M suspension strands are listed in Table B.

TABLE B

SUSPENSION STRAND HARDWARE FOR 16M AND 25M STRAND

HARDWARE	CABLE DIA	16M SUSPENSION STRAND			25M SUSPENSION STRAND		
		PULL				PULL	
		LESS THAN 5 FT	5 FT TO 50 FT ³		LESS THAN 5 FT	5 FT TO 40 FT ³	
			PULL TOWARD	PULL AWAY		PULL TOWARD	PULL AWAY
Suspension Clamp ¹	All Sizes	B Cable	B Corner ⁴	B Corner ⁴	B Cable	B Corner ⁴	B Corner ⁴
Suspension Bolt Size	All Sizes	10M 5/8 in.	16M 3/4 in.	16M 3/4 in.	10M 5/8 in.	16M 3/4 in.	16M 3/4 in.
Washer	All Sizes	B Curved	E Curved	E Curved	B Curved	E Curved	E Curved
Suspension Clamp Spacing (Between washer and clamp)	1.6 or Less	1 Nut	2 Nuts ²	1 Nut	1 Nut	2 Nuts ²	1 Nut
	Over 1.6	2 Nuts & Washer	Pole ² Strand Conn.	2 Nuts & Washer	2 Nuts & Washer	Pole ² Strand Conn.	2 Nuts & Washer
Reinforcing Strap	All Sizes	S	Two C	C	S	Two C	C
Strap Attachment	All Sizes	1/2 in. x 4 1/2 in. Drive Screw	5/8 in. Bolt	1/2 in. x 4 1/2 in. Drive Screw	1/2 in. x 4 1/2 in. Drive Screw	5/8 in. Bolt	5/8 in. Bolt
<p>Notes: 1 See Part 7 for use of clamps with reinforcing links.</p> <p>2 Pull 10 ft or more. Less than 10 ft use 1 or 2 nuts depending on cable diameter.</p> <p>3 Where pull exceeds 50 feet for 16M Strand or 40 feet for 25M Strand, the strand must be dead ended and guyed each way as outlined in Section 627-240-212.</p> <p>4 16M Guy is largest that may be attached to the same bolt as a corner suspension clamp.</p>							

3. CABLE SUSPENSION BOLTS

3.01 Cable suspension bolts are available in hot-dip galvanized steel (types A, B, and C) and are marked in accordance with the maximum size of guy with which the bolt may be used. The marks appear on the heads of type A bolts, and on the shanks of type B bolts. Type C bolts are not

marked. The suspension bolts are illustrated in Fig. 1, and the characteristics of the bolts are given in Table C.

3.02 The suspension bolts are used in pole line construction for mounting B cable suspension clamps and securing crossarms and other fixtures to poles.

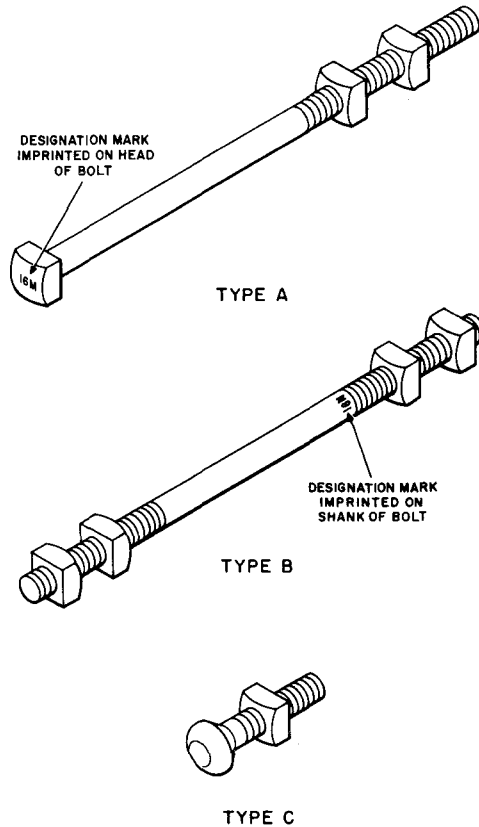


Fig. 1—Cable Suspension Bolts.

TABLE C
CHARACTERISTICS OF CABLE SUSPENSION BOLTS

BOLT TYPE	BOLT SIZES (INCHES)		MAXIMUM SIZE OF GUY FOR WHICH MARKED BOLT MAY BE USED	MARKING
	DIA.	LENGTH		
A	5/8	8,10,12,14,16 18,20,22,24	10M	10M
A	3/4	10,12,14,16,18	16M	16M
A	1	12,14,16,18,20,22	25M	25M
B	5/8	10,12,14,16,18, 20,22	10M	10M
B	3/4	10,12,14,16,18, 20	16M	16M
C	5/8	2-1/2	—	—

3.03 The types of suspension bolts are used as follows:

Type A

- (a) For attaching one cable suspension clamp to a pole.
- (b) With a B guy hook for attaching a guy to a pole.
- (c) With a B guy hook for attaching a guy and a suspension clamp on opposite sides of a pole.

- (d) With two B guy hooks for attaching a guy and a suspension strand dead end on opposite sides of a pole.

Type B

- (e) For attaching two suspension clamps, one on each side of the pole.

Type C

- (f) For attaching suspension clamps at strand crossovers.

3.04 Suspension clamps may be attached to both ends of an existing type A cable suspension

bolt by using a B clamp support (Fig. 2) as outlined in Section 627-220-204.

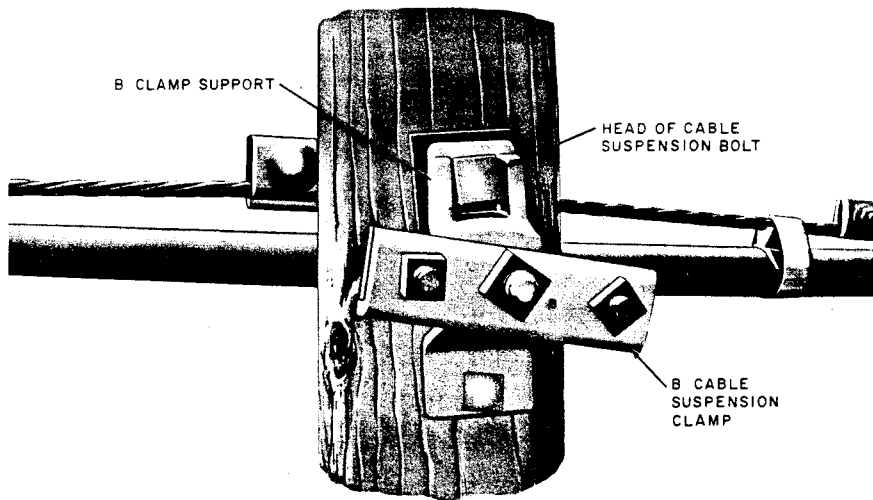


Fig. 2—B Cable Suspension Clamp Mounted on B Clamp Support

3.05 On poles that will carry telephone attachments only or on joint use poles when specified by outside plant engineer, Type B cable suspension bolts should be placed if a second strand will be required later.

3.06 Where type A cable suspension bolts are used, they should be of sufficient length to extend at least two complete threads beyond the outer nut. Where type B cable suspension bolts are used, they should extend about 4 inches beyond each side of the pole. Select a length of bolt that will not extend more than 1-1/2 inches beyond the outer nut.

3.07 The hole for a 5/8-inch bolt shall be bored with an 11/16-inch bit. For a 3/4-inch bolt use 13/16-inch bit, and for a 1-inch bolt use a 1 1/16-inch bit.

4. CABLE SUSPENSION SCREWS

4.01 The cable suspension screw (Fig. 3) is for use in attaching a B cable suspension clamp to a jointly used pole where the use of a cable suspension bolt would result in improper clearance from an electric supply vertical run or bracket and where it is impractical to have the supply attachment moved to provide clearance for the bolt. The installation of a cable suspension screw is illustrated in Fig. 4.

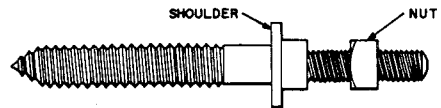


Fig. 3—Cable Suspension Screw

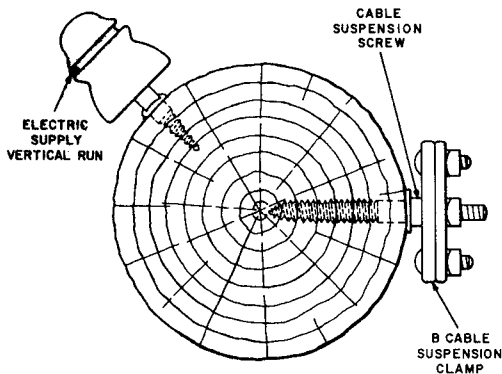


Fig. 4—Installed Cable Suspension Screw

4.03 Do not use a cable suspension screw under the following conditions:

- (a) At railroad crossings.
- (b) In a bolt hole larger than 11/16-inch in diameter.
- (c) Where the pole shows evidence of heart rot or where it appears that there would be a tendency for the screw to loosen due to excessive checking of the pole. Excessive checking may occur in dry areas where the pole timber is exposed to excessive drying out.

Note: Where a cable suspension screw is to be placed in a hole from which a 5/8-inch bolt has been removed, carefully examine the condition of the timber. If there is any evidence of decay at that point, place the suspension screws at least 4 inches above or below the bolt hole, provided that sound timber is encountered. If the amount of decay is extensive, consideration should be given to replacing the pole.

4.04 Install the cable suspension screw as follows:

- (1) Bore a lead hole in the pole 5 inches deep, using an 11/16-inch bit. Locate the lead hole to obtain proper separation between telephone

plant and the nearest electric supply attachment as covered in the sections on Joint-Use Separations.

- (2) Turn the cable suspension screw into the lead hole, using a lineman's wrench, until the entire surface of the shoulder of the screw bears firmly against the pole. Where difficulty is experienced in turning the screw, apply soap or lubricating oil to the threads. **Do not drive the screw into the pole** as such driving weakens the wood fibers and impairs the holding power.

5. SUSPENSION CLAMPS

5.01 The B cable suspension clamp (Fig. 5) is used to support suspension strand:

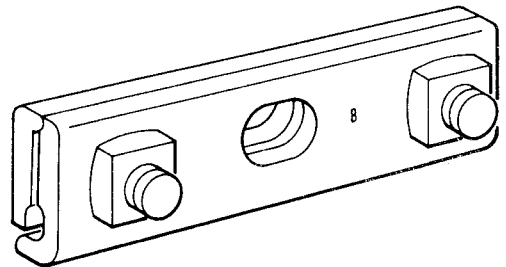


Fig. 5—B Cable Suspension Clamp

- (a) At all in-line poles and at corners with less than a 10-foot pull with 6M or 6.6M suspension strand and less than a 5-foot pull with larger sizes of suspension strand.
- (b) At all poles where reinforcing links are used. (For use of reinforcing links, see Part 7.)

Note: Only clamps marked with a "B" shall be used with 6.6M strand.

5.02 Place the suspension clamp so the strand groove will be below the bolt. The lip of the suspension clamp should be toward the pole, except where the pull of the suspension strand is toward the pole. In the latter case reverse the bolts that hold the clamp together so the bolt heads are toward the pole.

5.03 The B corner suspension clamp (Fig. 6) is used to support suspension strand:

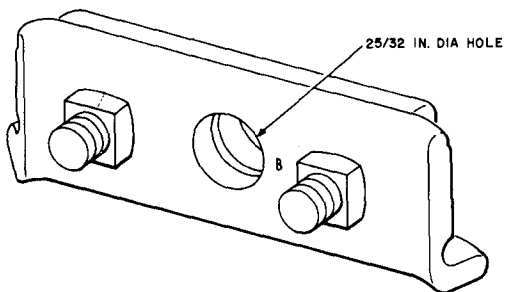


Fig. 6—B Corner Suspension Clamp

- (a) At corners where the pull is 10 to 50 feet with 6M or 6.6M suspension strand, 5 to 50 feet with 10M and 16M suspension strand, and 5 to 40 feet for 25M suspension strand. Any corners greater than these must be dead ended and guyed each way as outlined in Section 627-240-212.
- (b) At railroad crossings where the pull is 5 to 50 feet regardless of the size of suspension strand.

Note: Only clamps marked with a "B" shall be used with 6.6M strand.

5.04 The corner suspension clamp bolts must be reversed when the strand pulls toward the pole.

6. REINFORCING STRAPS

6.01 The reinforcing straps shown in Fig. 7 are available in galvanized steel, types S, D, and C.

6.02 Reinforcing straps are used to prevent bending of the cable suspension bolt or cable suspension screw:

- (a) Where the cable is supported by 10M or larger suspension strand.
- (b) Where the cable is supported on 6M or 6.6M suspension strand in accordance with Table A.

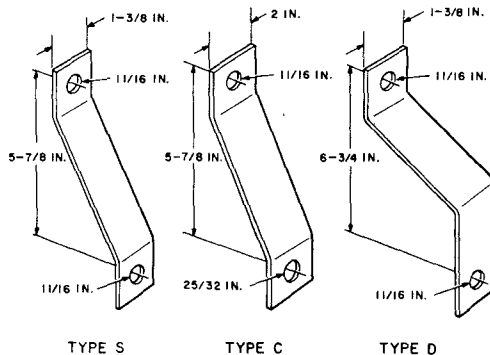


Fig. 7—Reinforcing Straps

(c) Where there is a downward change in grade of 10 percent or greater.

6.03 Use one S reinforcing strap where a strap is required to support a cable suspension screw or a 5/8-inch cable suspension bolt except as follows:

- (a) When used with a B sheave support (6.06).
- (b) When used with 10M strand where the corner pull is toward the pole.

6.04 Where the corner pull is toward the pole, use two S reinforcing straps to support 5/8-inch A cable suspension bolts used with 10M strand and use two C reinforcing straps to support 3/4-inch bolts for 16M and larger suspension strand.

6.05 Use one C reinforcing strap for all other conditions where support is required for 3/4-inch suspension bolts.

6.06 Use one D reinforcing strap with a B sheave support as outlined in Section 627-350-212.

6.07 A 5/8-inch A cable suspension bolt is required to attach the top of a reinforcing strap under the following conditions:

- (a) Where two reinforcing straps are used to support the bolt.
- (b) When a pole strand connector is used as a suspension clamp spacer.

- (c) Where the cable suspension bolt is less than 22 inches from the pole top.
- (d) At corners where the pull is 5 to 40 feet and 25M suspension strand is being used.
- (e) At railroad crossings.
- (f) Where there is a downward change in grade of 10 percent or greater with 10M or larger suspension strand.

Note: Use reinforcing links, rather than straps, where a cable suspension screw is used.

- (g) Where two suspension strands on opposite sides of the pole are attached to a single suspension bolt and both require reinforcing straps.
- 6.08** A 1/2-inch by 4-1/2 inch drive screw is used to attach the top of a reinforcing strap under all conditions except those outlined in 6.07.
- 6.09** Install the strap, using a drive screw, as follows:

- (1) Place the strap and nut on the suspension bolt or screw and hold the strap so that the top is about 1 inch from the pole.

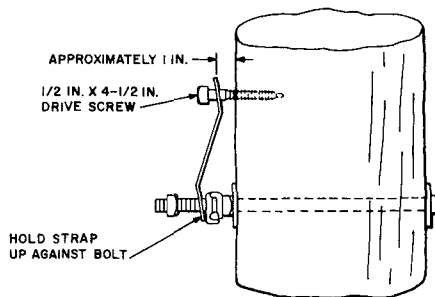


Fig. 8—Installing Reinforcing Strap Using Drive Screw

- (2) Use the top hole as a guide, drill a 5/16-inch lead hole 2 1/2-inch deep, and drive in the drive screw. The installation at this point is illustrated in Fig. 8.

Caution: Diameter of pole should be considered for placing bolt instead of drive screw.

- (3) Tighten the nut on the suspension bolt securely.
- 6.10** When using a bolt, install reinforcing strap as follows:
- (1) Bore an 11/16-inch hole for the strap bolt 5-7/8 inches above, and parallel to, the suspension bolt hole. Bore from strand side of pole.
 - (2) Place strap on the suspension bolt and run the nut up sufficiently to keep the clamp and strap from falling off. Do not tighten.
 - (3) Place 5/8-inch bolt in top hole, through the strap, and tighten strap to pole.
 - (4) Tighten nut on suspension bolt.
 - (5) A completed installation is illustrated in Fig. 9.

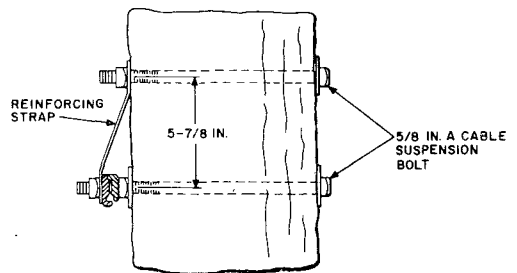


Fig. 9—Installing Reinforcing Strap Using Bolt

6.11 When a pole strand connector is used to space the clamp, use a nut and washer to space the reinforcing strap or straps from the pole, as illustrated in Fig. 10.

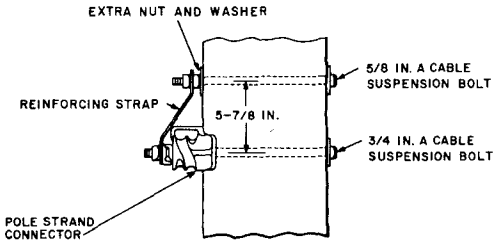


Fig. 10—Nut and Washer Used to Space Reinforcing Strap

7. REINFORCING LINKS

7.01 Use reinforcing links as follows:

- (a) On poles where it is necessary to reinforce the cable suspension bolt and where there is a guard arm or where, for other reasons, it is impractical to employ a reinforcing strap.
- (b) At corners where cable suspension screws are used and the pull away from the pole is 10 feet or more for 6M or 6.6M suspension strand or 5 feet or more for larger strand.
- (c) Where a cable suspension screw is used to support 10M and larger suspension strand and there is a downward change in grade of 10 percent or greater.

7.02 Use S reinforcing links where the pole diameter is 7 inches or less at the point of attachment and L reinforcing links where the pole diameter is more than 7 inches.

7.03 When required, place the reinforcing links after the strand has been run out but *before* it is tensioned so the links will support any corner pull or downward change in grade as shown in Fig. 11.

7.04 Where a guard arm is used, attach the links as far above the level of the suspension strand as the clearance between the link and the guard arm will permit. An installation of reinforcing links at guard arms is shown in Fig. 12.

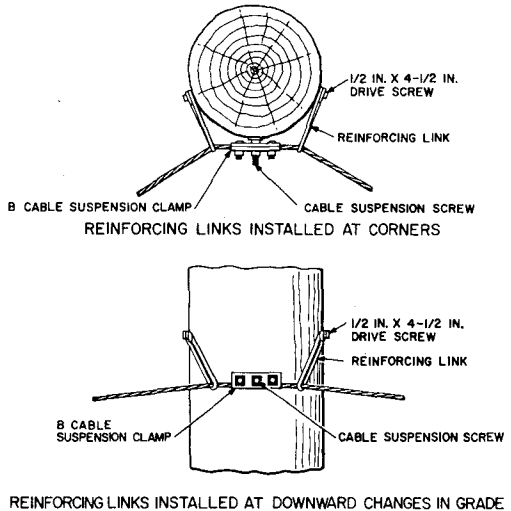


Fig. 11—Reinforcing Links Installed on Pole

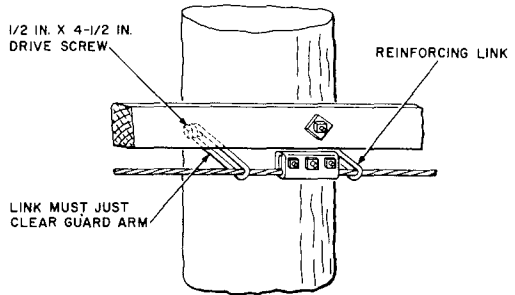


Fig. 12—Reinforcing Links Installed at Guard Arm Location

8. POLE ATTACHMENTS—GENERAL

8.01 If the pole line is to carry telephone plant only, the cable shall be placed on the road side unless otherwise specified.

8.02 On jointly used poles *when proper arrangements have been made with the power company*, or when the detail plans or other instructions so specify, the telephone cable should be placed on the road side of poles to facilitate lashing.

8.03 Where two cables are to be supported by B cable suspension bolts, it is desirable to keep each cable on the same side of the pole line throughout its length.

8.04 When attaching suspension bolts, the following must be considered:

(a) The cable should be attached as low on the pole as practical and still provide proper clearances for the cable and for any drops that are to be placed below the cable.

(b) Where a tree limb interferes and permission cannot be obtained to remove the limb, locate the suspension bolt, if practical, so that the strand and cable will pass under the interfering limb rather than above it.

(c) Locate the suspension bolt to avoid a change in grade over 10 percent whenever possible. In no case should the change in grade exceed 20 percent when the strand is supported with corner suspension clamps. However, a change in grade of 50 percent for 6M or 6.6M strand and 30 percent for 10M strand can be accommodated by using a B sheave support reinforced with a D reinforcing strap.

(d) Where the pole is stepped or bored for steps before the suspension strand is placed, locate the bolt 6 inches below the step nearest to grade, to avoid having to shift pole steps.

(e) Where two or more suspension strands are to be installed on the same side of a pole line, locate the bolts 24 inches apart if sufficient space is available on the pole, but not less than 12 inches apart. In no case shall the suspension strands have less than 12 inches of vertical separation at any point in the span.

8.05 The illustrations in this section show poles carrying telephone attachments only. Attachments to jointly used poles are made in the same manner except that the bolt location is also determined by clearance requirements and space allocation on the pole.

8.06 Various methods of attaching guys are covered in the 621 Division of the Bell System Practices. The methods shown in this section are for illustrative purposes only and may be substituted as required by local conditions.

9. POLE ATTACHMENTS—IN-LINE POLES

9.01 On poles that will carry telephone attachments only, locate the cable suspension bolt as shown in Fig. 13 through 15. In all cases locate the suspension bolts so that the clearance requirements, as outlined in the 620 Division of the Bell System Practices, will be met for all attachments.

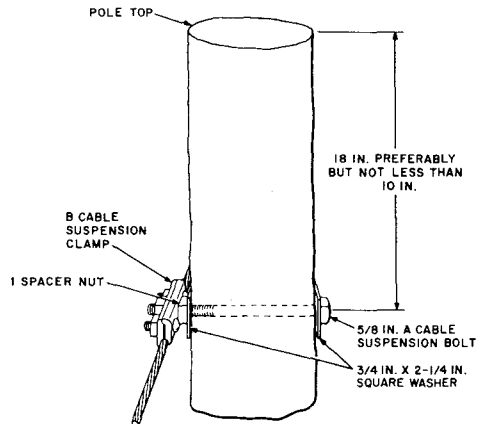


Fig. 13—Pole Attachment for 6M or 6.6M Suspension Strand With No Reinforcing Strap

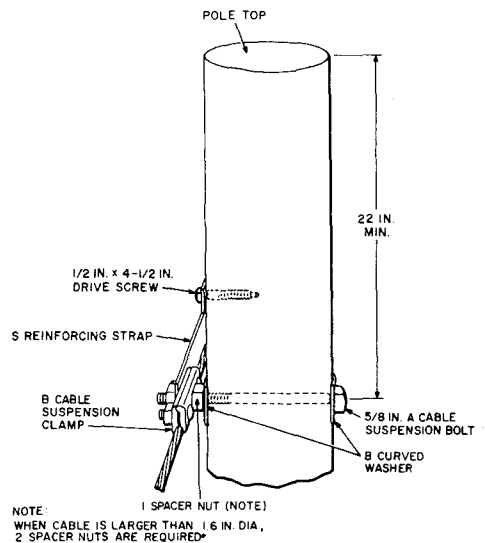


Fig. 14—Pole Attachment with Reinforcing Strap Attached with Drive Screw

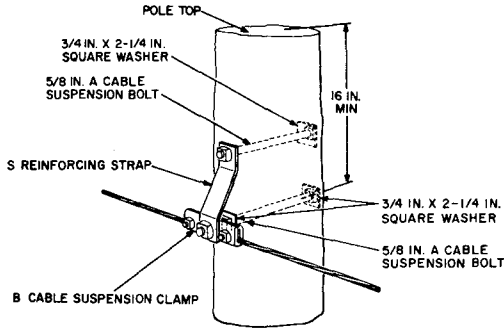


Fig. 15—Pole Attachment with Reinforcing Strap Attached with Cable Suspension Bolt

9.02 Attach 6M or 6.6M strand as illustrated in Fig. 13 where a reinforcing strap is not required.

9.03 Attach suspension strand as illustrated in Fig. 14 where a drive screw is used to attach the reinforcing strap (6.08).

9.04 Attach suspension strand as illustrated in Fig. 15 where a cable suspension bolt is required to attach the reinforcing strap (6.07).

10. POLE ATTACHMENTS—CORNER CONSTRUCTION

10.01 A suspension clamp and B guy hook may be attached on opposite sides of a pole with the same cable suspension bolt where the strand pulls away from the pole. The bolt size in this case is determined from Table A or B or by the size of the guy *whichever is greater*.

10.02 Suspension strand shall be attached to poles as described in Tables A and B and as illustrated in Fig. 16 through 24. These illustrations also show the minimum distance between the attachment and the top of poles which carry telephone attachments only.

11. GRADE CHANGE—CONSTRUCTION

11.01 When the grade changes between 20 and 50 percent for 6M or 6.6M strand and

between 20 and 30 percent for 10M strand, the cable and strand can be attached to the pole by using a B sheave support reinforced with a D reinforcing strap.

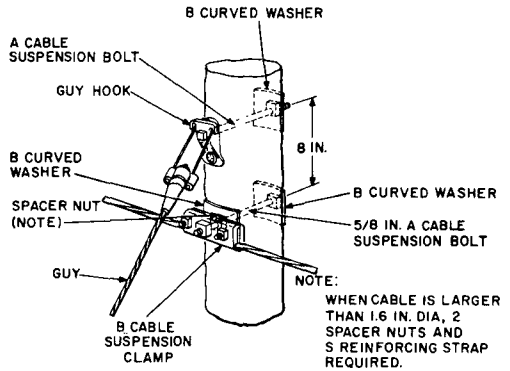


Fig. 16—6M or 6.6M Suspension Strand—Pull Less Than 10 Feet

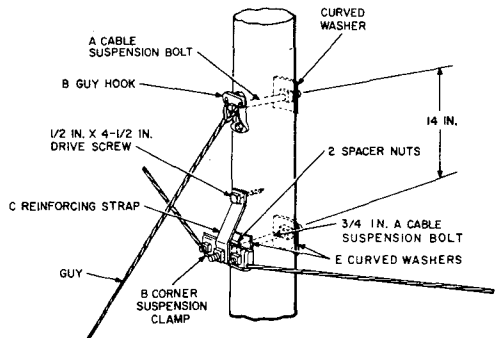


Fig. 17—6M or 6.6M Suspension Strand with Spacer Nuts—Pull Toward Pole—10 Feet to 50 Feet

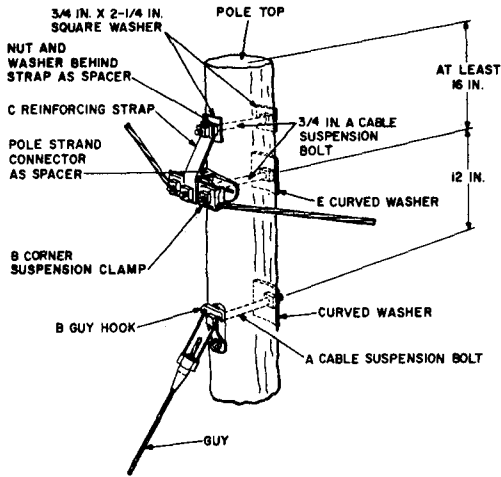


Fig. 18—6M or 6.6M Suspension Strand with Pole Strand Connector as Spacer—Pull Toward Pole 10 Feet to 50 Feet

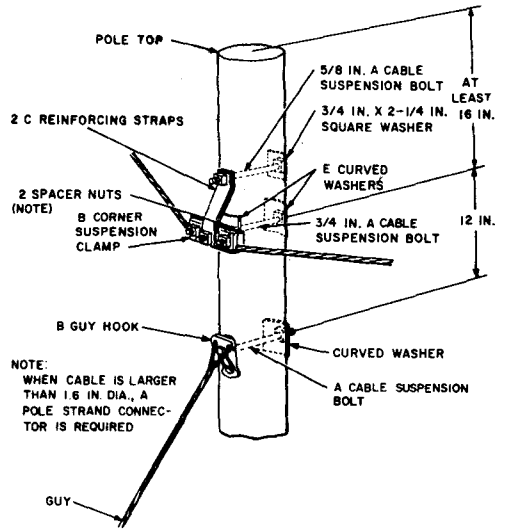


Fig. 20—10M Suspension Strand with Spacer Nuts—Pull Toward Pole—5 Feet to 50 Feet

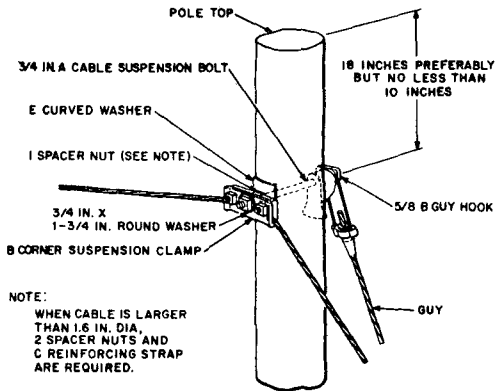


Fig. 19—6M or 6.6M Suspension Strand—Pull Away From Pole—10 Feet to 50 Feet

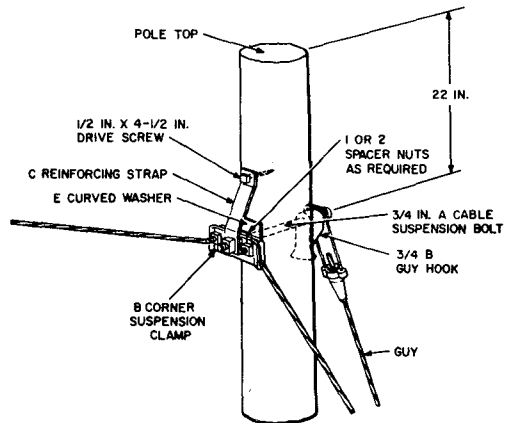


Fig. 21—10M Suspension Strand—Pull Away From Pole—5 Feet to 50 Feet

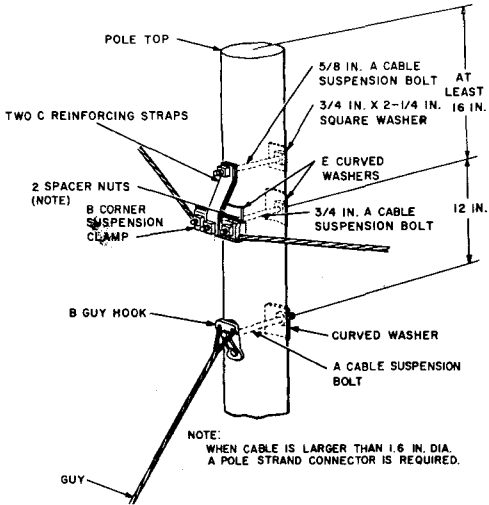


Fig. 22—16M or 25M Suspension Strand with Spacer Nuts—Pull Toward Pole—5 Feet to 50 Feet with 16M—5 Feet to 40 Feet with 25M

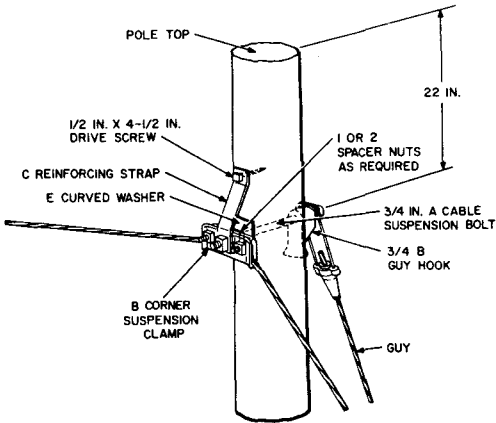


Fig. 23—16M Suspension Strand—Pull Away From Pole—5 Feet to 50 Feet

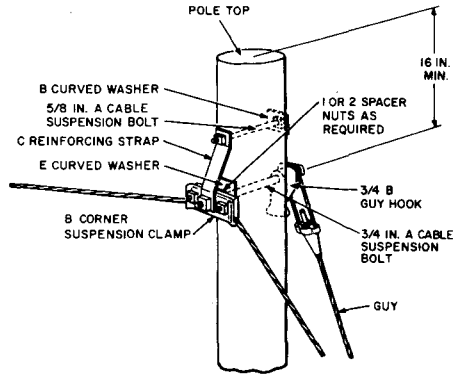


Fig. 24—25M Suspension Strand—Pull Away From Pole—5 Feet to 40 Feet

11.02 In addition to accommodating grade changes, the B sheave support and D reinforcing strap will also accommodate small corners when grade changes exist as listed in Table D.

TABLE D

LIMITS OF GRADE CHANGE AND CORNER PULL WHEN USING B SHEAVE SUPPORT		
GRADE CHANGE		PERMISSIBLE CORNER
%	FT OF PULL	FT OF PULL
25	12.5	0-10
30	15	0-12
35	17.5	0-14
40	20	0-16
45	22.5	0-18
50	25	0-20

11.03 As shown in Fig. 25, the D reinforcing strap is used with a B sheave support to prevent bending of the cable suspension bolt at both upward and downward grade changes exceeding 20 percent.

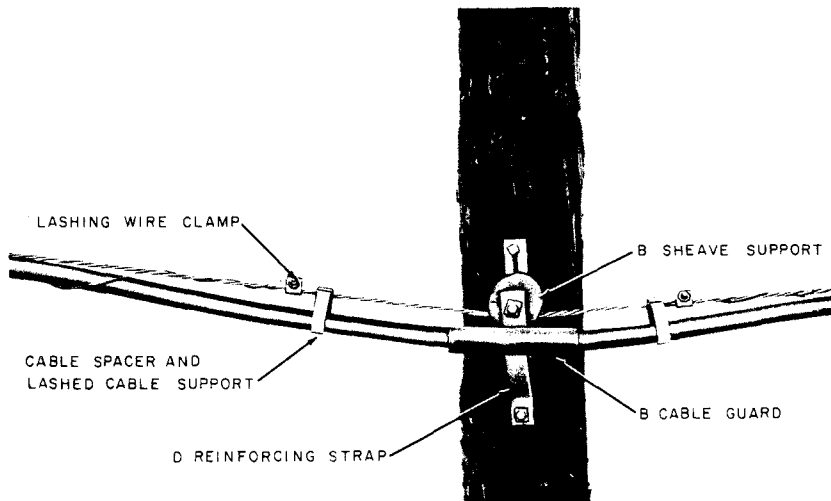


Fig. 25—B Sheave Support and D Reinforcing Strap Used to Support Strand and Cable at a Grade Change

11.04 Locate the strand so it bears only against the sheave groove and is always held captive. For upward changes in grade, the B sheave support should be mounted in an inverted position. It is important that during placing and in its final position, the strand must rest against the sheave and not against the keeper of the sheave support.

11.05 When lashing, the cable must pass outside the sheave assembly as shown in Fig. 25.

11.06 Secure the lashing wire on both sides of the attachment with lashing clamps. Install cable spacers and lashed cable supports as shown in Fig. 25.

11.07 Place a B cable guard on the cable at the point where it contacts the reinforcing strap.