

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

SECTION G34.110.2
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B URBAN WIRE
PLACING

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1. GENERAL

1.01 This section replaces Section G31.612.1, and describes methods of placing B Urban Wire. Other information concerning **the placing of** this wire may be found in other sections of the practices as follows:

- (a) Protection and Grounding—G38 Series
- (b) Guying—G23 Series

Note: The 109E support wire of B Urban Wire which is bonded to a grounded cable or to a multigrounded neutral within 1/4 mile from a guy location is considered an effective ground for guys. Guys electrically connected to the support wire or attached to a pole carrying a support wire shall be grounded or insulated in accordance with the practices "Grounding or Insulating Exposed Guys," considering B Urban Wire as open wire.

1.02 When determining **ground clearances as well as clearance and separations from other plant** for B Urban Wire, use those specified for aerial cable.

1.03 The 109E steel support wire may be cut with the wire cutter, which has been provided for cutting 109E steel line wire or with 9-inch side cutting pliers. It is rather difficult to cut with 8-inch pliers.

2. DESCRIPTION

2.01 B Urban Wire consists of 16 twisted pairs of polyvinyl chloride insulated conductors, bunched into four groups of four pairs each, stranded around a 109E steel polyethylene insulated support wire. The conductors are color coded for identification. An over-all spaced serving of yarn binds the wire to facilitate handling during installation. The conductors are 24-gauge (0.020") annealed copper.

3. PRECAUTIONS

3.01 The safety precautions contained in the sections "Safeguards to be Taken before Climbing Poles, Precautions—General, and Precautions—Aerial Work" shall be observed.

3.02 Do not ride or place a ladder against B Urban Wire.

3.03 The following precautions shall be observed when placing B Urban Wire on joint use poles, at power line crossings, and in non-joint use situations involving electric induction from power lines.

(a) **Joint Use Construction:** Prior to placing the initial section of wire, when placing from a moving reel or prior to sagging when placing from a stationary reel, connect the support wire and each conductor to an effective ground such as a grounded metallic cable sheath, a multigrounded neutral, or a metallic public water system. Additional sections of wire shall be grounded either as indicated for the initial section or by bonding the support wire and all conductors of both sections. Adequate precautions shall be taken as covered in the practice "Wire Stringing Precautions—Jointly Used Lines" to prevent the wire from contacting power conductors. Rubber gloves shall be worn during stringing and tensioning operations and during the operation of grounding the support wire and conductors when the wire has been placed from a stationary reel.

(b) **Power Crossings:** Temporary ties or supports as covered in the practice "Wire Stringing Precautions—Electric Light or Power Crossings" shall be used to prevent contact with the electric conductors in the crossing span. Rubber gloves shall be worn during stringing and tensioning operations.

(c) **Electric Induction from Power Lines:** In joint use construction or in non-joint use construction where electric induction is sufficient to require drainage, the precautions contained in Paragraph 3.03(a) will also serve to reduce the effect of electrical induction. In non-joint use construction, where grounds as specified in Paragraph 3.03(a) are not available, connection of the conductors and support wire to ground such as anchor rods, down guys or ground rods should be made.

3.04 The polyethylene jacket should be removed from the 109E support wire when using the wire grip or dead ending, to prevent possible slippage of the support wire when tension is applied.

3.05 **Friction tape shall not be used on B Urban Wire.** At locations where the polyethylene jacket on the support wire is damaged or has been removed, the insulation should be restored by applying two half-lapped layers of 3/4-inch DR tape followed by two half-lapped layers of D Vinyl Tape. D Vinyl Tape should be kept under tension while it is being applied, except for the last two turns, which must be applied without tension, in order to prevent the tape from unwinding. It will not be necessary to apply tape at dead ends, splices, clamp attachments, etc, where the conductors are enclosed in a B Cable Guard and are not in contact with the bare support wire or clamp.

3.06 Vehicular traffic should not be allowed to pass over the wire during placing operations. The wire should be suspended temporarily above roads, driveways, etc, or adequately protected by planks or other means to prevent damage to the conductor insulation.

3.07 B Urban Wire should be placed with minimum sags only when necessary to provide clearance. The use of recommended or increased sags will reduce the wire tension and facilitate the placing operations.

3.08 Due to the small size of conductors and thin insulation, care must be exercised in the handling and placing of the wire. Exposure of conductors to abrasive action such as caused by whipping branches, brush, or rubbing against trees, guy wires, clamps, etc, may be prevented by use of a B Cable Guard or B Wire Guard around the group of conductors. When B Urban Wire is being pulled in from a stationary reel, care must be taken to prevent dragging over obstructions in the span or on the ground.

3.09 B Urban Wire should not be pulled through B Wire Supports.

4. PLACING

4.01 When practicable B Urban Wire should be placed along the lead from a moving reel, raising and laying the wire inside the loop of the B or C Wire Brackets.

4.02 B or C Wire Brackets should be used to support the wire while it is being pulled in from a stationary reel. In order not to damage the wire while pulling it over the wire brackets, a 3/8-inch rope of sufficient length to reach well beyond the average span should be used to pull in the wire. Tension can be maintained in the wire to prevent sagging down and dragging over obstructions in the span or on the ground, by use of a line wire payout reel equipped with a B Reel Brake or with a B Line Wire Reel. This reel is placed between the wire reel and the first pole of the wire run, and a single turn of the wire is made around the reel. The B Urban Wire should not be passed through the loop on the brake lever arm.

4.03 When the section of wire has been pulled into place the B Urban Wire should be checked or braked to hold the wire at the pulling-in tension until the support wire has been dead ended at the far end of the run and the tensioning gear attached at the end near the reel.

4.04 In pulling wire through a B Wire Bracket, when the pull of the wire is away from the pole and there is danger of the wire escaping from the bracket, a 1/2-inch by 6-1/2-inch drive screw equipped with a B wooden bushing, and placed along side of the bracket, may be used as a temporary keeper.

4.05 At highway crossings, driveways, etc, where a workman on the pole can pull the wire up by hand sufficiently for clearance, a D drop wire clamp may be used to snub the wire temporarily.

5. SAGGING WIRE

5.01 Sag Tables for B Urban Wire are contained in Section G34.110.4.

5.02 During final sagging operations where **recommended** sags are used, wire should not be tensioned around corners exceeding 5 feet or pulled over B or C Wire Brackets where there is a downward change in grade exceeding 10 per cent. If **minimum** sags are used, the wire should not be tensioned around corners exceeding 2 feet or over wire brackets where there is a change in grade exceeding 5 per cent. Where such conditions exist it will be necessary, to sag the wire by sections. Each section should consist of those spans between corner poles or an end pole and a corner pole. Starting at one

end of the lead, each section should be sagged progressively to the other end.

5.03 If sagging the wire as described in Paragraph 4.05 will provide adequate clearance for all conditions, this method may be used to sag the entire lead. Further details of this method are described below:

(a) A workman on the pole should pull up the wire by hand until sufficient clearance has been obtained. The wire should not be pulled by a workman on the ground as the conductor insulation may be damaged when the wire is pulled across the supporting attachment or the tension may be great enough to cause the D Drop Wire Clamp to damage the conductor insulation. After the wire has been pulled to the required sag, a D Drop Wire Clamp should be placed around the wire as far out from the pole as can be reached conveniently. A hand-line should be passed through the tail of the clamp and fastened to the pole or crossarm at the approximate location where the supporting attachment for the wire has been placed.

(b) Separate the conductors from the 109E steel support wire and fasten the support wire in the supporting attachment. Place a B Cable Guard around the group of conductors.

5.04 Three-inch double sheave rope blocks or a chain hoist may be used to sag B Urban Wire as given in the following method:

(a) Secure the rope blocks or chain hoist to the pole or crossarm at the approximate location where the wire is to be attached. If existing attachments on the pole or crossarm are not adequate to support the unbalanced load caused by the sagging operations, a temporary arm guy or head guy should be placed.

(b) The workman on the pole should pull the wire up by hand as far as possible and snub with a D Drop Wire Clamp. Remove polyethylene jacket from 109E steel support wire and place wire grip. Complete the sagging operation with the rope blocks or chain hoist. Replace insulation on support wire as indicated in Paragraph 3.05.

(c) Separate the conductors from the support wire and fasten the support wire in the supporting attachment. Place a B Cable Guard around the conductors.

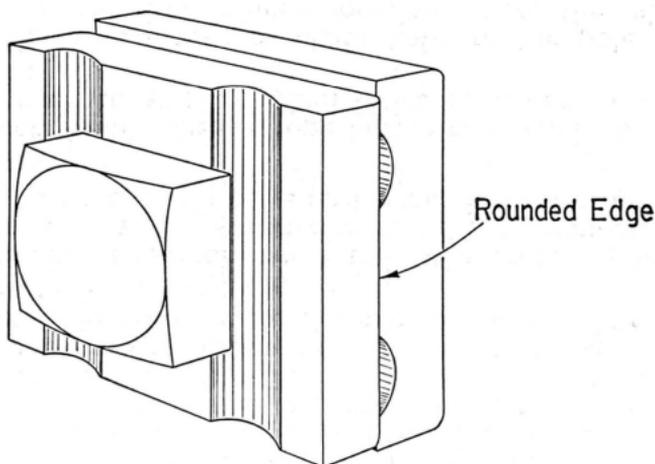
(d) Leave the rope blocks or chain hoist and temporary guy in place until the wire sagging operations have been completed beyond that point.

(e) After the wire has been sagged in any one section, group of sections or along the entire lead and dead ended, permanent attachments should be made as described in Part 6.

6. ATTACHING 109E STEEL SUPPORT WIRE AT POLES AND CROSSARMS

6.01 The 109E steel support wire may be dead ended by the wrap method, or on a thimble eye nut, or on a B dead-end bracket.

6.02 The Wirewise, the offset dead-end sleeve, or the one-bolt clamp may be used for dead ending the 109E steel support wire. When the one-bolt clamp is used it should be assembled as shown to provide a secure clamping arrangement. The polyethylene insulation should be removed from the support wire so that the clamp is placed on the bare steel wire to prevent any possible slippage of the wire through the clamp.



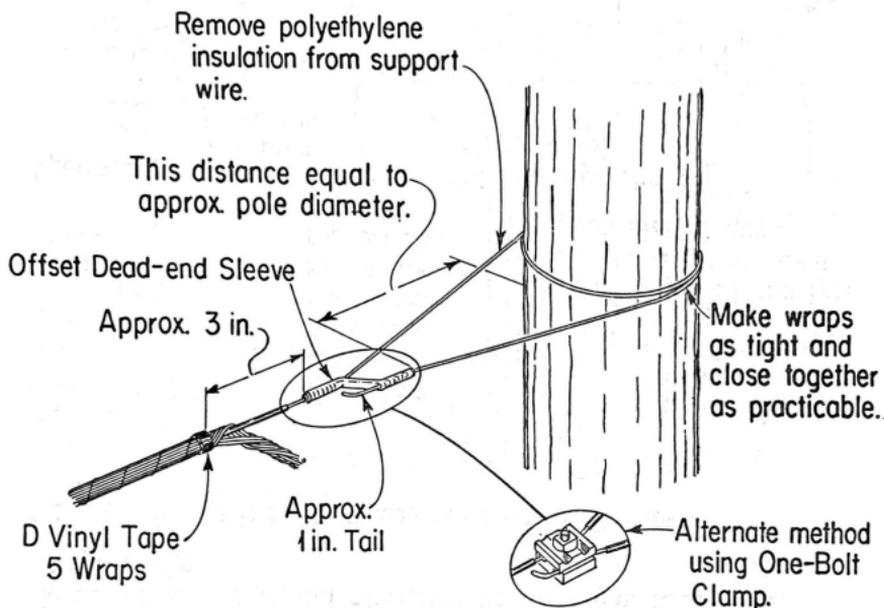
One half of the clamp should be reversed and clamp reassembled so that grooves on each half are at right angle to each other.

6.03 A one-inch tail should be left beyond the edge of the offset dead-end sleeve or the one-bolt clamp and bent toward the main wire as shown in the illustrations.

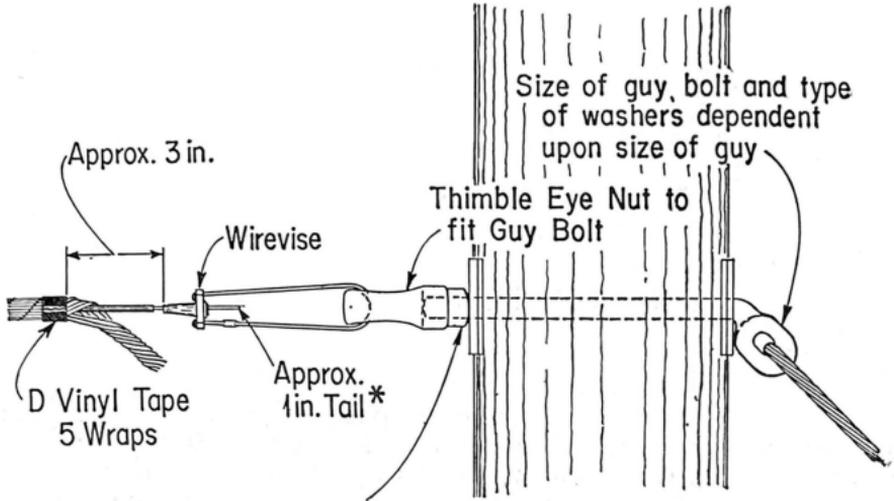
6.04 The offset dead-end sleeve or the 109E S Steel Sleeve should be applied with a 51 JE Nicopress tool, as covered in the section of practices relating to pressed sleeve joints in open wire (G31 Division).

6.05 The 109E steel support wire may be joined when splicing two lengths of B Urban Wire by use of the Wirelink or the 109E S Steel Sleeve.

6.06 The wrap method should, in general, be used on non-joint poles. The sketch below covers the method of placing a wrap dead end.



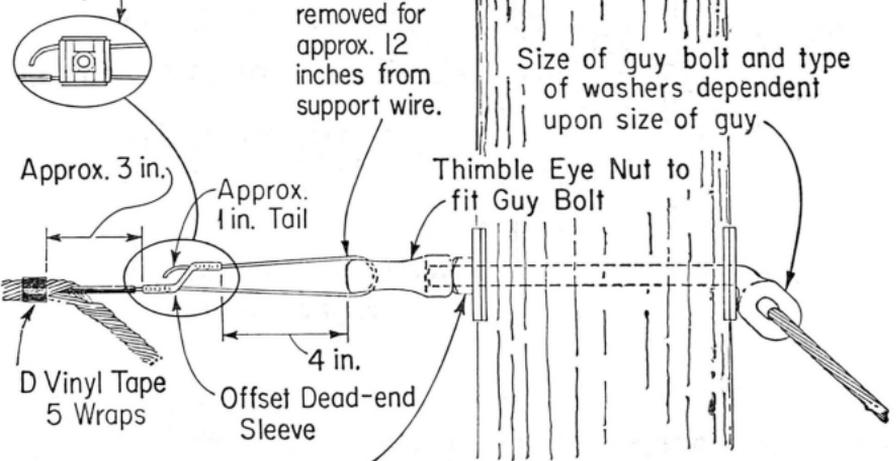
6.07 The thimble eye method of dead ending the 109E steel support wire should be used when a new or existing guy bolt is suitably located. The following illustration shows the thimble eye method of dead ending.



Square nut under eye nut may be omitted when length of bolt thread extending beyond pole is short enough to permit turning eye nut down to curved washer without interfering with placing of IO9E Steel Support Wire.

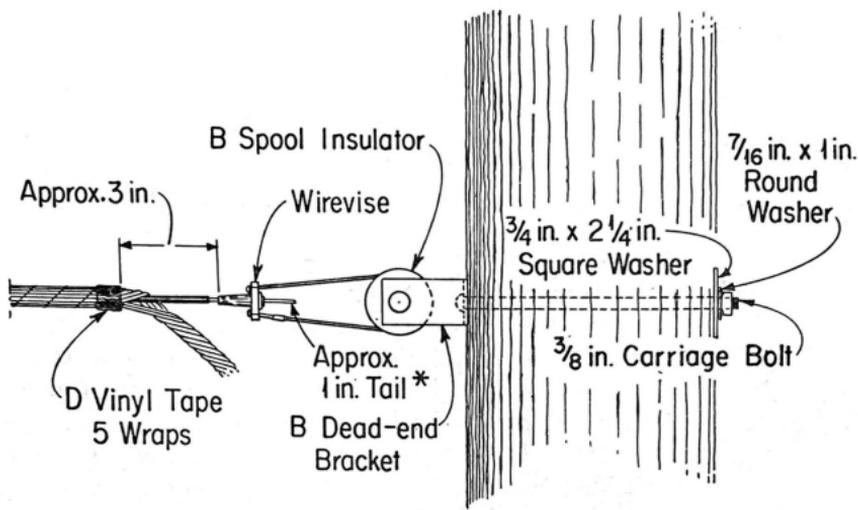
* If support wire is to be bonded leave approx. 6 in. tail.

Alternate method using One Bolt Clamp

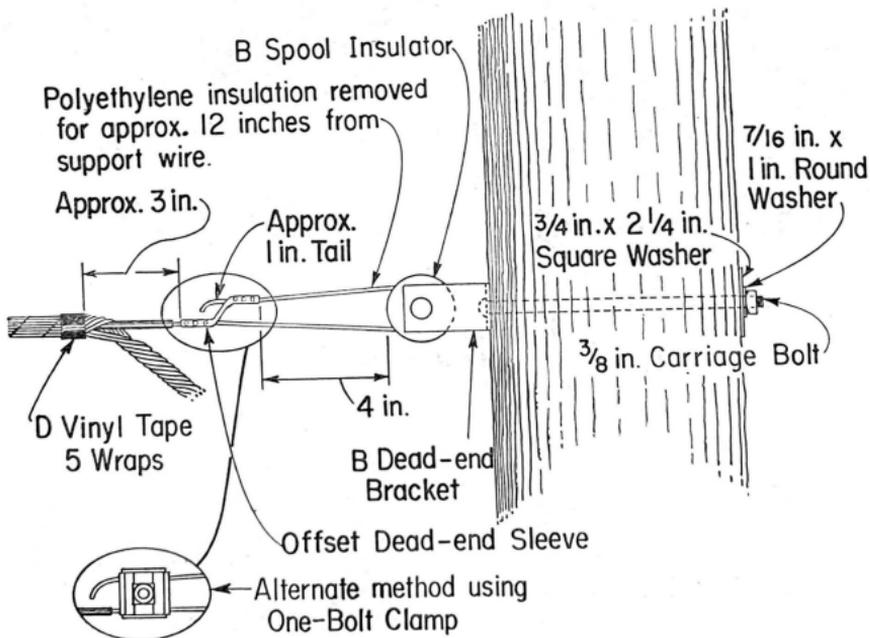


Square nut under eye nut may be omitted when length of bolt thread extending beyond pole is short enough to permit turning eye nut down to curved washer without interfering with placing of IO9E Steel Support Wire.

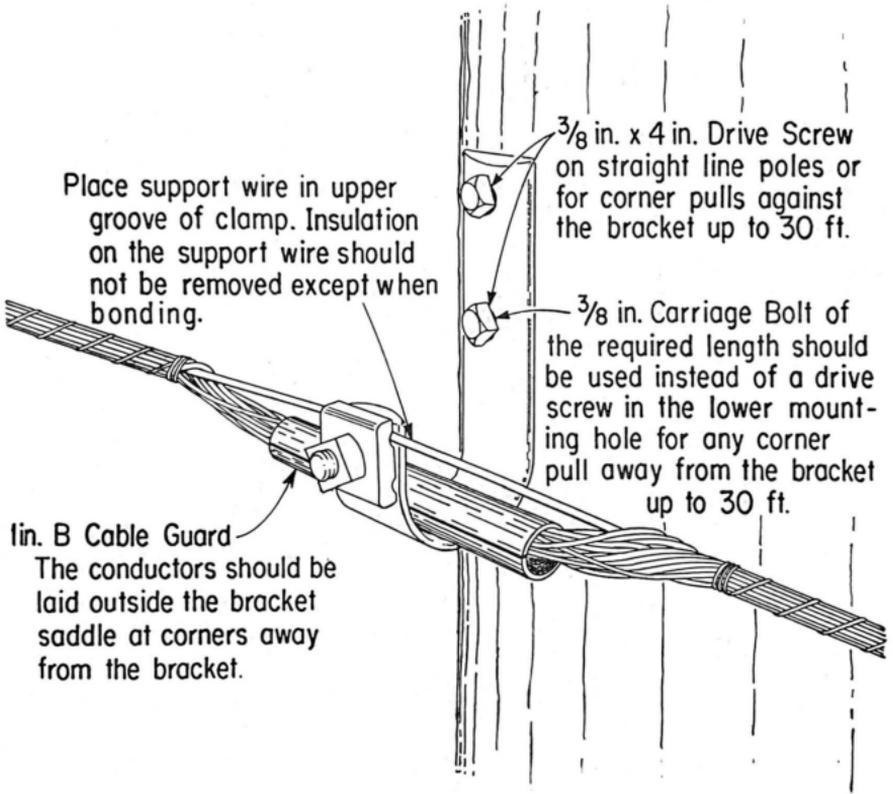
6.08 The B dead-end bracket should be used to dead end the 109E steel support wire at any location where the wrap method or thimble eye method is not suitable. The following sketch illustrates the use of the B dead-end bracket.



* If support wire is to be bonded leave approx. 6 in. tail.



6.09 The B Wire Bracket should be used as a pole attachment to support B Urban Wire on straight sections of the line and at corner poles having 30-foot pull or less. The bracket should be attached to the pole as shown in the following sketch.



Place support wire in upper groove of clamp. Insulation on the support wire should not be removed except when bonding.

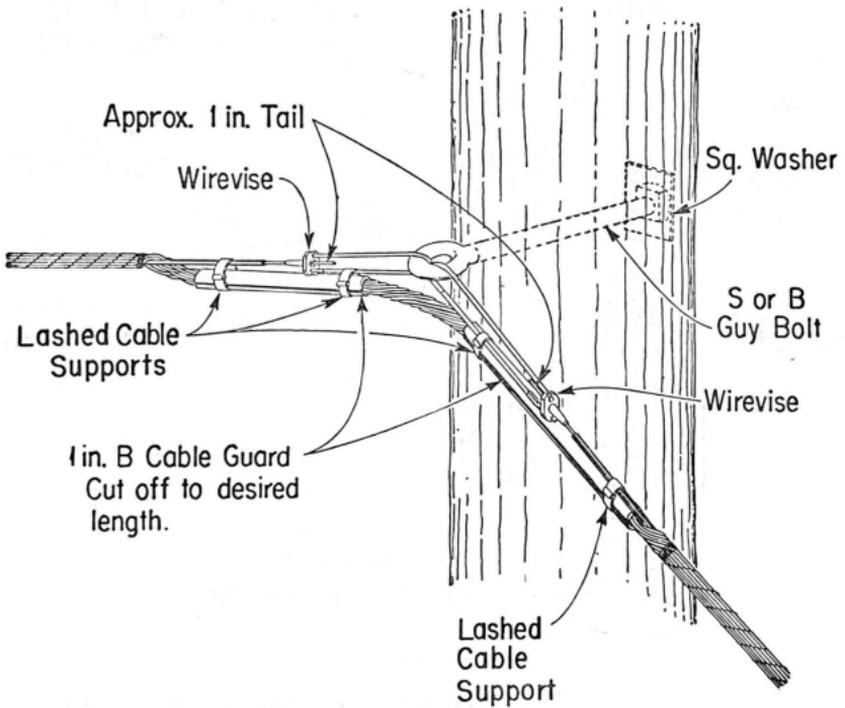
$\frac{3}{8}$ in. x 4 in. Drive Screw on straight line poles or for corner pulls against the bracket up to 30 ft.

$\frac{3}{8}$ in. Carriage Bolt of the required length should be used instead of a drive screw in the lower mounting hole for any corner pull away from the bracket up to 30 ft.

$\frac{1}{2}$ in. B Cable Guard
The conductors should be laid outside the bracket saddle at corners away from the bracket.

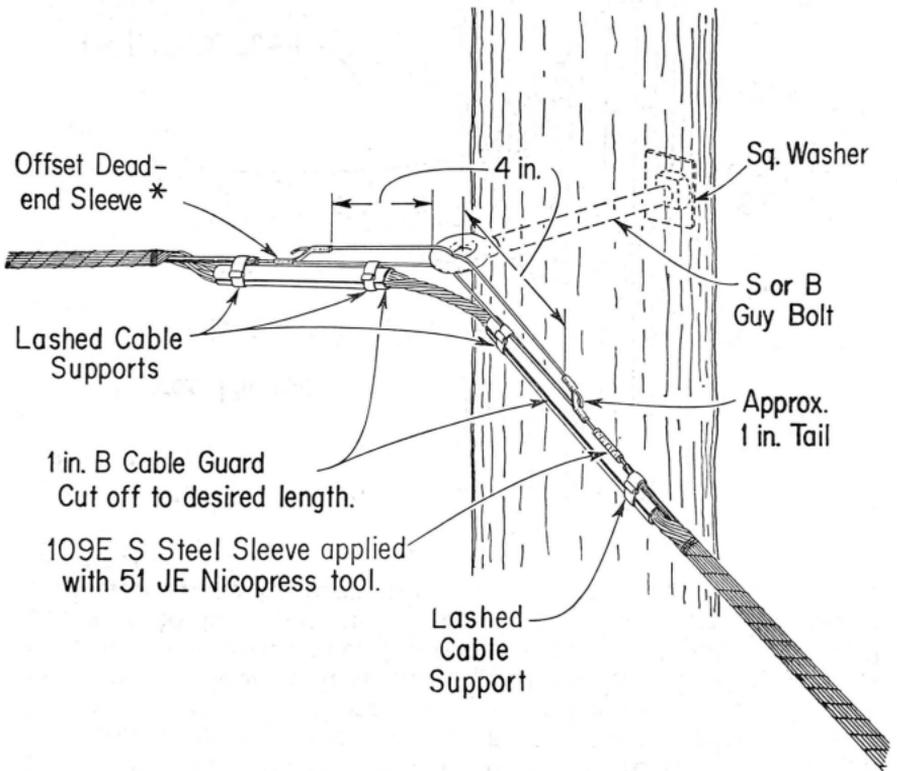
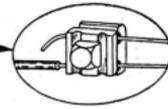
6.10 At corner poles with pull exceeding 30 feet, the 109E steel support wire should be dead ended on a guy bolt. Two methods of making this type of attachment are described below:

(a) In this method the wire is pulled up to the desired sag from one direction and the steel support wire cut at a location which will allow it to be dead ended in a Wirevise as shown below. When the dead end in this direction is complete a length of steel support wire is cut out which will allow it to be dead ended in a Wirevise from the other direction so as to form the conductors around the corner as shown.



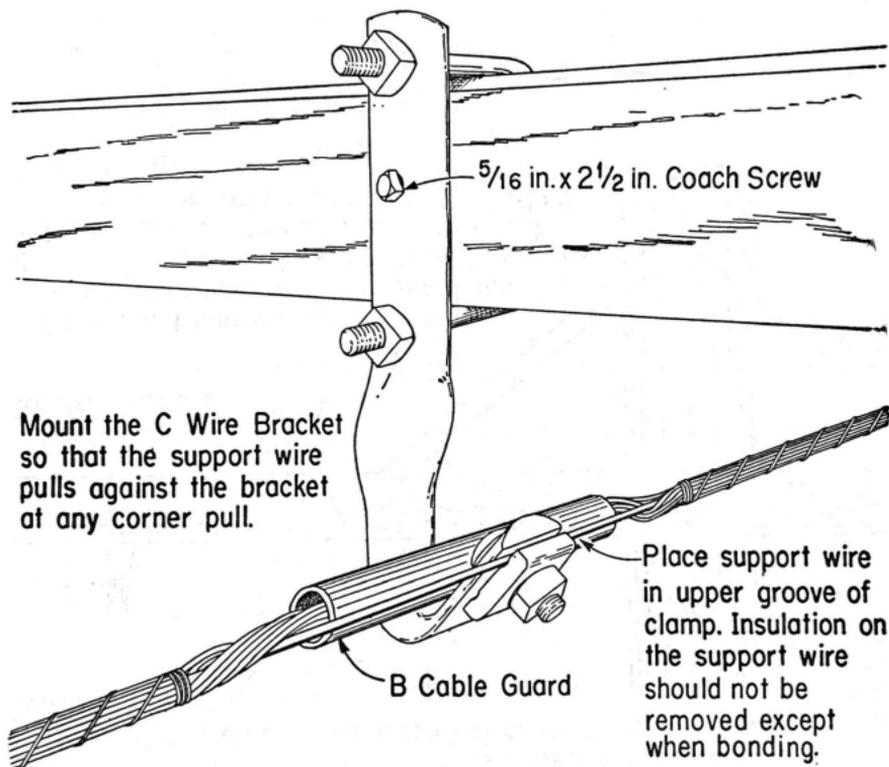
(b) In the sketch below, the wire in the span to the left is pulled up to the desired sag and the steel support wire is cut about 7 inches beyond the eye of the guy bolt and dead ended as shown. A piece of 109E wire about 18 inches long is joined by means of a 109E S Steel Sleeve applied with a 51 JE Nicopress tool, to the steel support wire in the span to the right. This 109E wire is then dead ended in the eye of the guy bolt in a location such that the slack in the conductors is taken up sufficiently to permit the conductors to lie along the support wire as shown.

*Alternate method using
One-Bolt Clamp



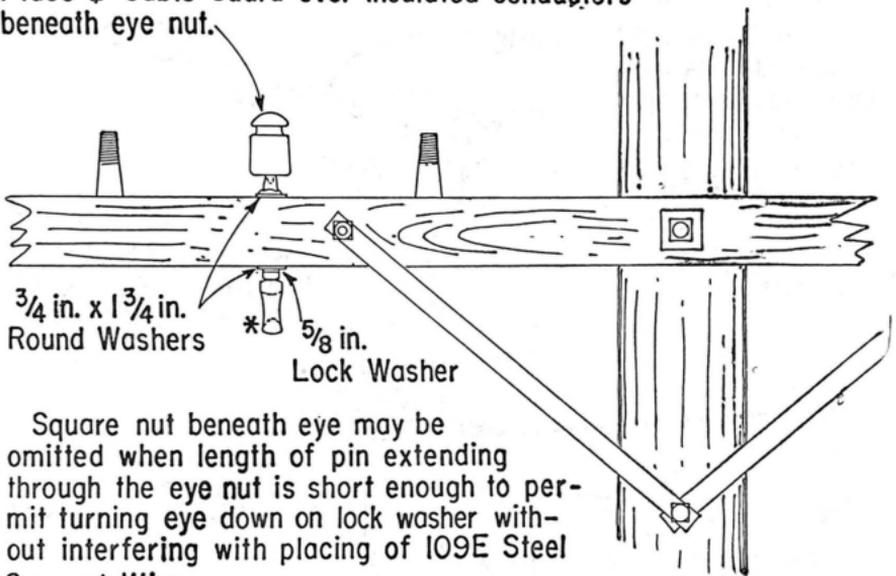
6.11 The C Wire Bracket may be used as a crossarm attachment to support the B Urban Wire along straight sections of the line and at corner poles having 30-foot pull or less. Attach the bracket as shown in the following sketch.

Place on arm as close to pole as possible in a position that the B Urban Wire clears the crossarm brace and is centered between line wires.



6.12 A steel insulator pin and thimble eye nut should be used as a crossarm attachment for B Urban Wire at corner poles with a pull exceeding 30 feet. The attachment should be made as shown in the following sketch.

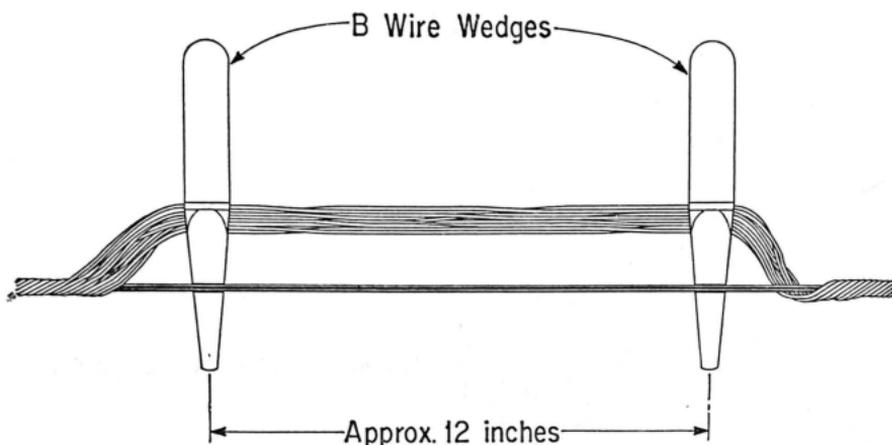
If crossarm is equipped with wood pins, replace a wood pin with B Wood Bushing and a B or CS Steel Insulator Pin. Place Thimble Eye Nut on pin and dead-end the 109E Steel Support Wire as shown in Par. 6.07. Place B Cable Guard over insulated conductors beneath eye nut.



Square nut beneath eye may be omitted when length of pin extending through the eye nut is short enough to permit turning eye down on lock washer without interfering with placing of 109E Steel Support Wire.

* B Urban Wire omitted for clarity.

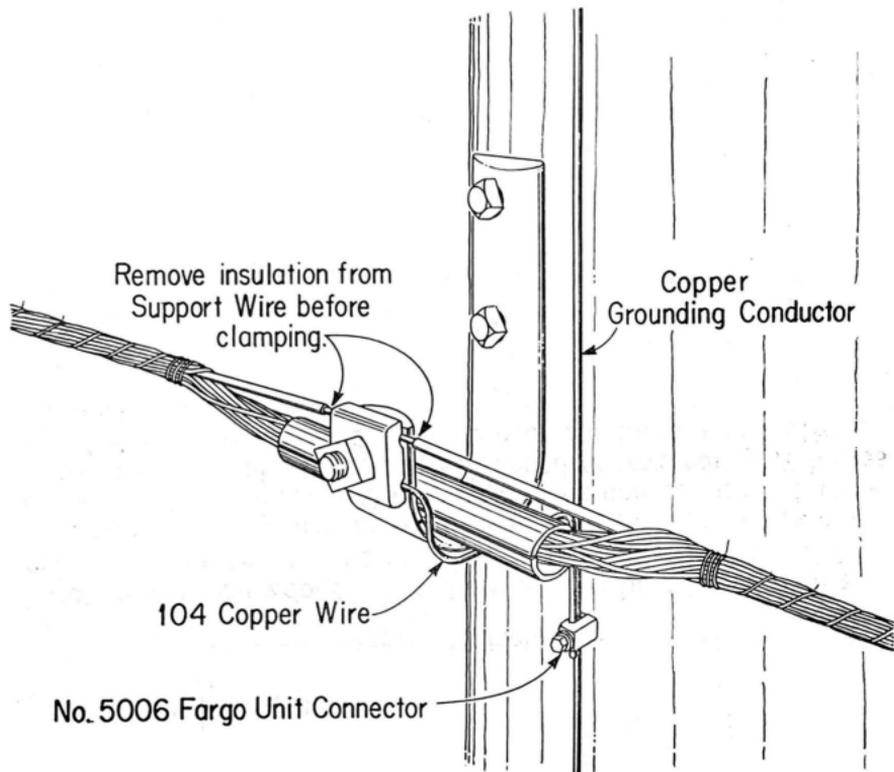
6.13 B Wire Wedges shall be used to separate the conductors from the support wire preparatory to attaching the support wire to the brackets. Wedges should be inserted in the following manner.

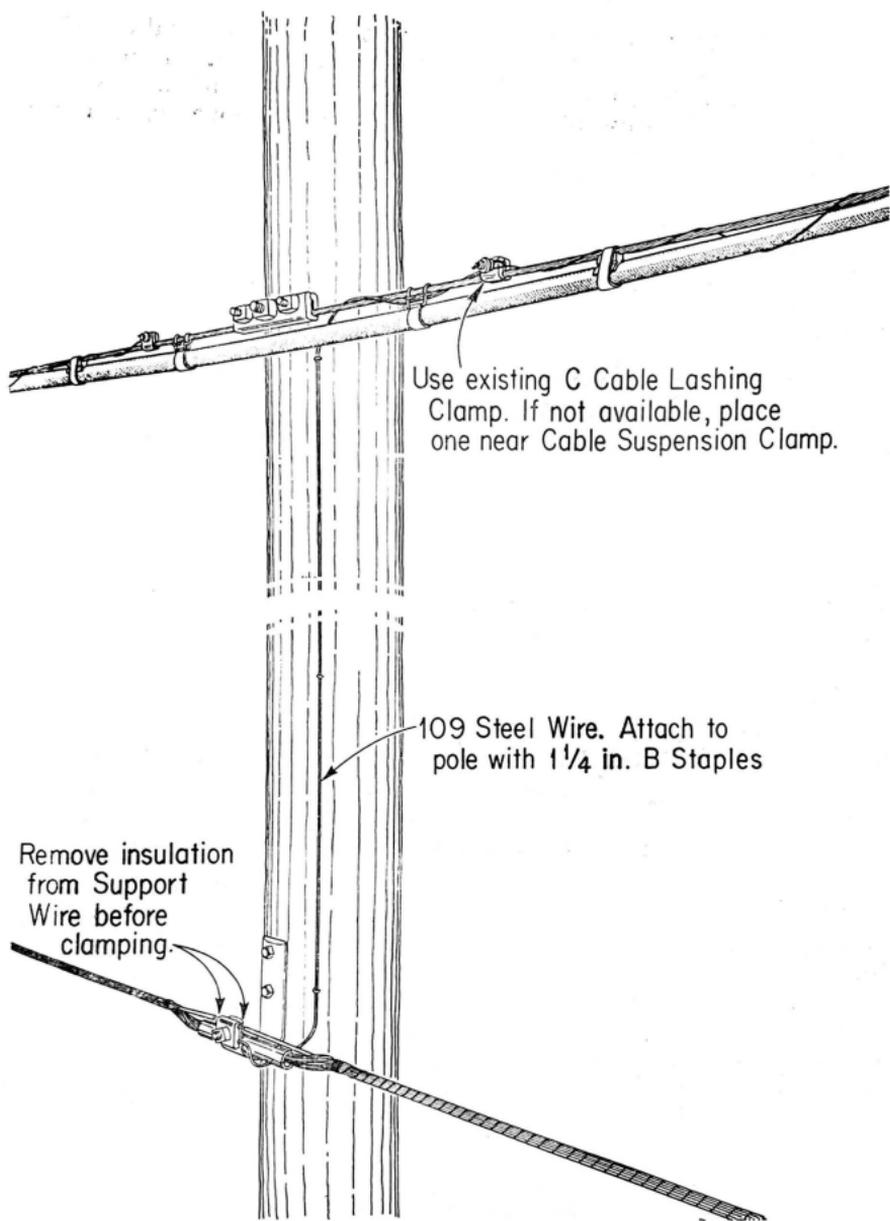


Before inserting wedges, grip the wire with both hands at the point where clamp is to be attached to the support wire. Twist with both hands against the lay of wire until the conductors are parallel to the support wire and the wedges can be inserted. Continue twisting until wedges can be spaced approximately 12 inches apart. Place 1-Inch B Cable Guard over conductors and attach support wire to bracket.

7. BONDING 109E STEEL SUPPORT WIRE

7.01 Bonding the 109E Steel Support Wire, when it is not dead ended, to a multigrounded neutral or to a cable is illustrated below.





Use existing C Cable Lashing Clamp. If not available, place one near Cable Suspension Clamp.

109 Steel Wire. Attach to pole with 1 1/4 in. B Staples

Remove insulation from Support Wire before clamping.