

**BELL SYSTEM PRACTICES**  
**Outside Plant Construction**  
**and Maintenance**

**SECTION G21.161**  
**Issue 1, February, 1939**  
**AT&T Co. Prov. Std.**

## **PLACING POLES**

### **PROTECTING POLES AGAINST LIGHTNING**

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#### **1. GENERAL**

- 1.01 This section describes the installation of lightning protection wires on poles.
- 1.02 Place protection wires only where authorized by the detail plans or other instructions. These installations will generally be confined to localities where severe lightning occurs at certain seasons of the year and where the poles are so exposed that damage could be expected if the poles were not protected.
- 1.03 In the following instructions no distinction is made between guys with strain insulators and those without strain insulators nor between guys attached to anchors installed in earth and those attached to rock anchors.
- 1.04 Attach protection wires to poles by means of 3/4-inch galvanized staples. The staples should, in general, be spaced at intervals of about 18 inches. The spacing should be closer, however, where required to keep the wire securely in position.

1.05 A gap is provided in the protection wires so that a man working on open wire will not be connected to ground through the protection wire and so that aerial cables will be free from scattered ground connections. Experience has shown that lightning will discharge over the protection wire even when there is a gap in it.

1.06 The location of the vertical run on the pole depends on the types of attachments on the pole. In general, on poles carrying open wire only, the vertical run is located on the face portion of the pole in such a position as to clear the crossarms, as shown in Paragraph 3.01. On poles carrying cable only, the vertical run is located on the face or back of the pole, as shown in Paragraph 4.01.

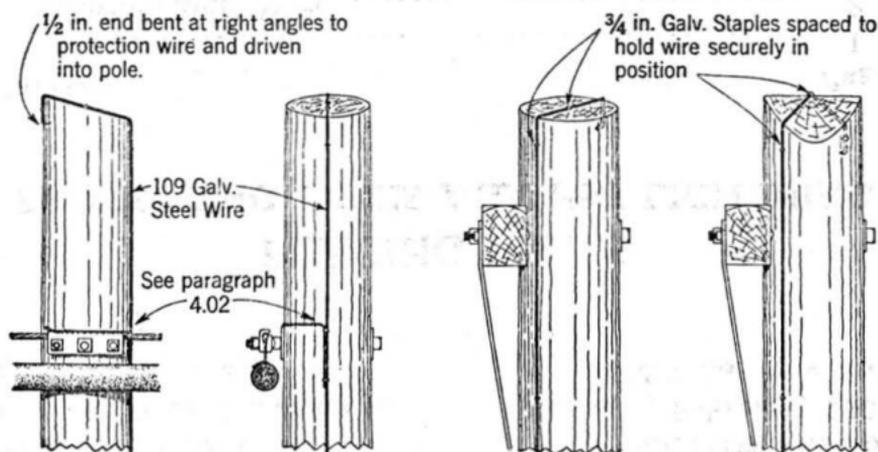
## 2. TERMINATING WIRE

### General

2.01 Wherever the protection wire or a portion of it terminates, a 90° bend should be made in the wire about 1/2 inch from the end and the end should be driven into the pole so as to reduce the possibility of injury to workmen or others.

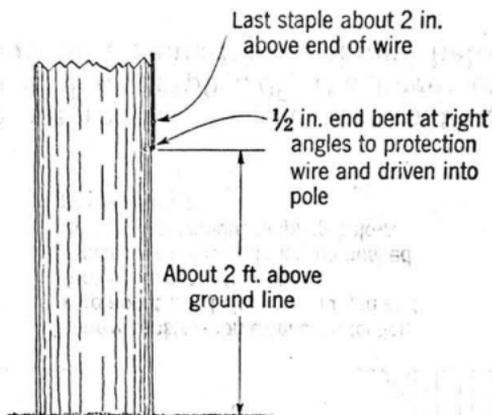
### Terminating Wire at Roof of Pole

2.02 The termination of the wire at the roof of the pole under several different conditions is shown in the following illustration. In terminating the protection wire, pass it directly across the roof of the pole from the point at which the vertical run meets the roof, extend it down the opposite side of the pole a distance of about 2 inches, turn the end in and staple it.

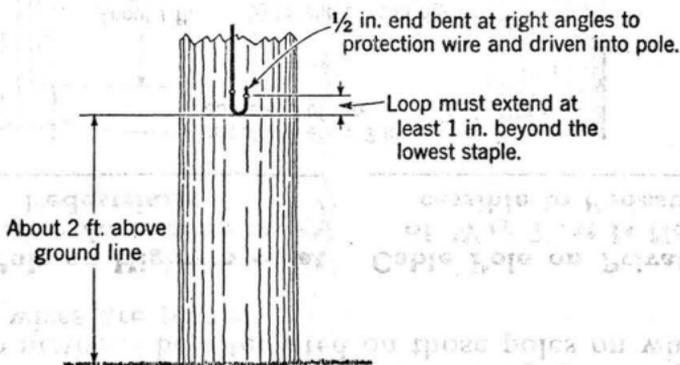


## Terminating Wire at Base of Pole Carrying Open Wire Only

2.03 Two alternative methods of terminating the lower end of the protection wire on a pole carrying open wire only are shown in the following illustration and in Paragraph 2.04. It is desired to obtain a comparison between the two methods, and it is suggested that unless otherwise instructed by your supervisor, the two methods be alternated on those poles on which protection wires are placed.



2.04 As an alternative to the terminating arrangement shown in Paragraph 2.03 the lower end of the protection wire may be terminated as shown below.



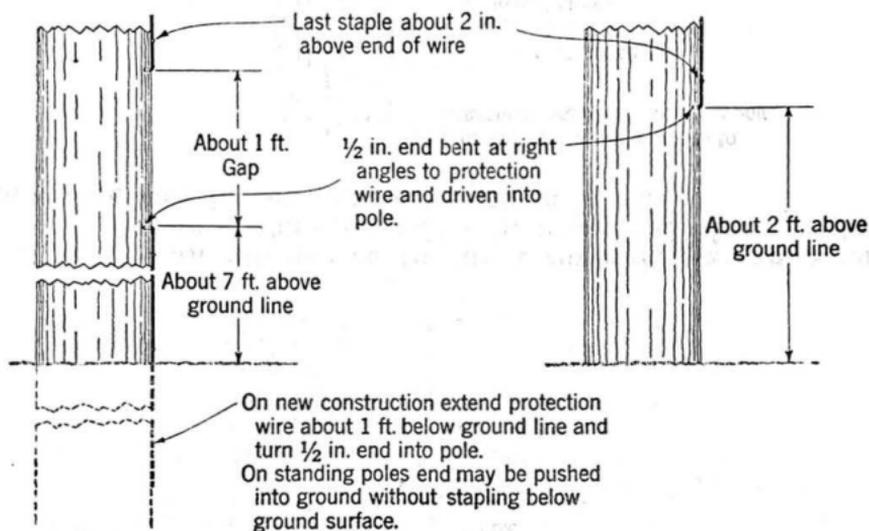
## Terminating Wire at Base of Pole Carrying Cable

2.05 In the case of a pole carrying cable the requirements for terminating at the base of the pole depend on whether the pole is on private right of way and is inaccessible

to pedestrians or is on a highway or at another location accessible to pedestrians. The methods of terminating the protection wire on cable poles are shown below: Two alternative methods are shown. (See Paragraph 2.06.) It is desired to obtain a comparison between the two methods, and it is suggested that unless otherwise instructed by your supervisor, the two methods be alternated on those poles on which protection wires are placed.

### Cable Pole on Highway or at Location Accessible to Pedestrians

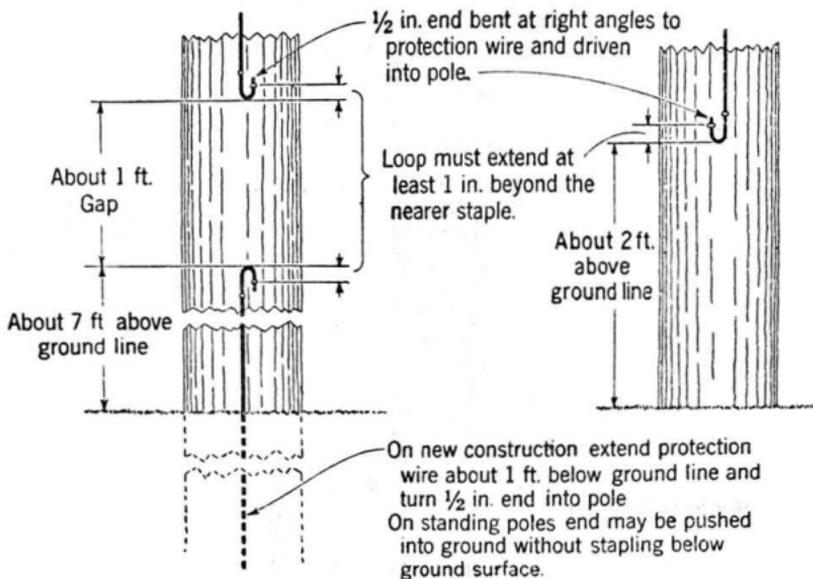
### Cable Pole on Private Right of Way That Is Not Accessible to Pedestrians



**2.06** As an alternative to the terminating arrangement shown in Paragraph 2.05, the lower end of the protection wire may be terminated as shown below.

### Cable Pole on Highway or at Location Accessible to Pedestrians

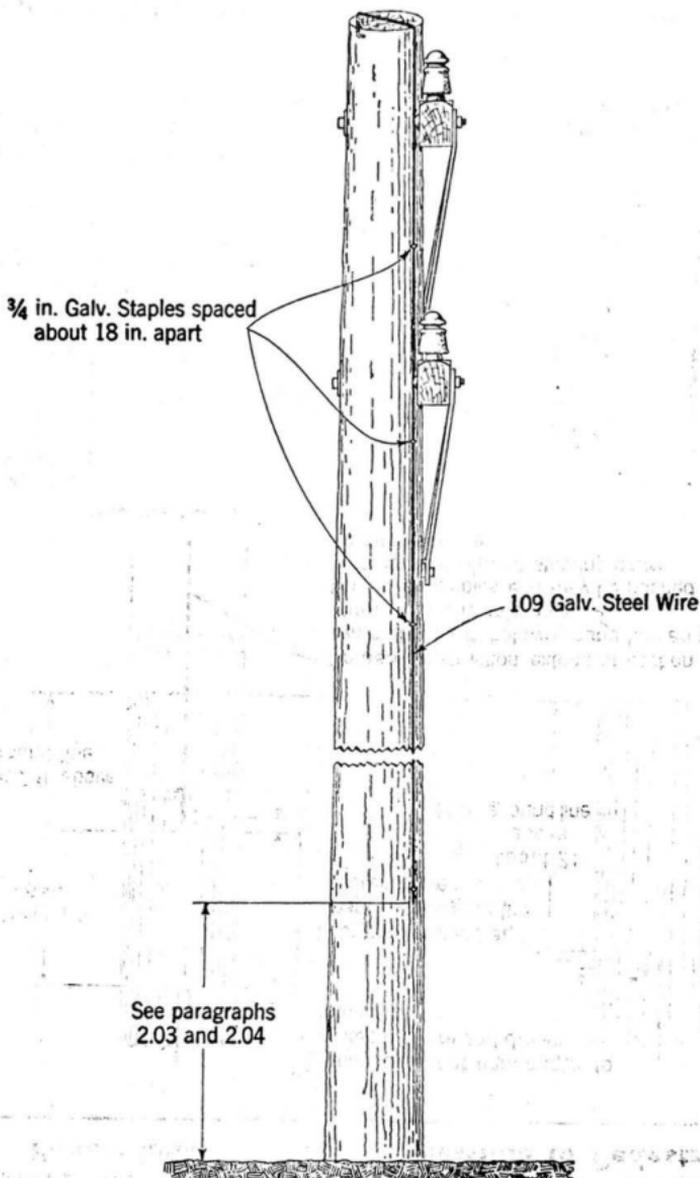
### Cable Pole on Private Right of Way That Is Not Accessible to Pedestrians



### 3. INSTALLING PROTECTION WIRES ON POLES CARRYING OPEN WIRE ONLY

#### No Guy on Pole

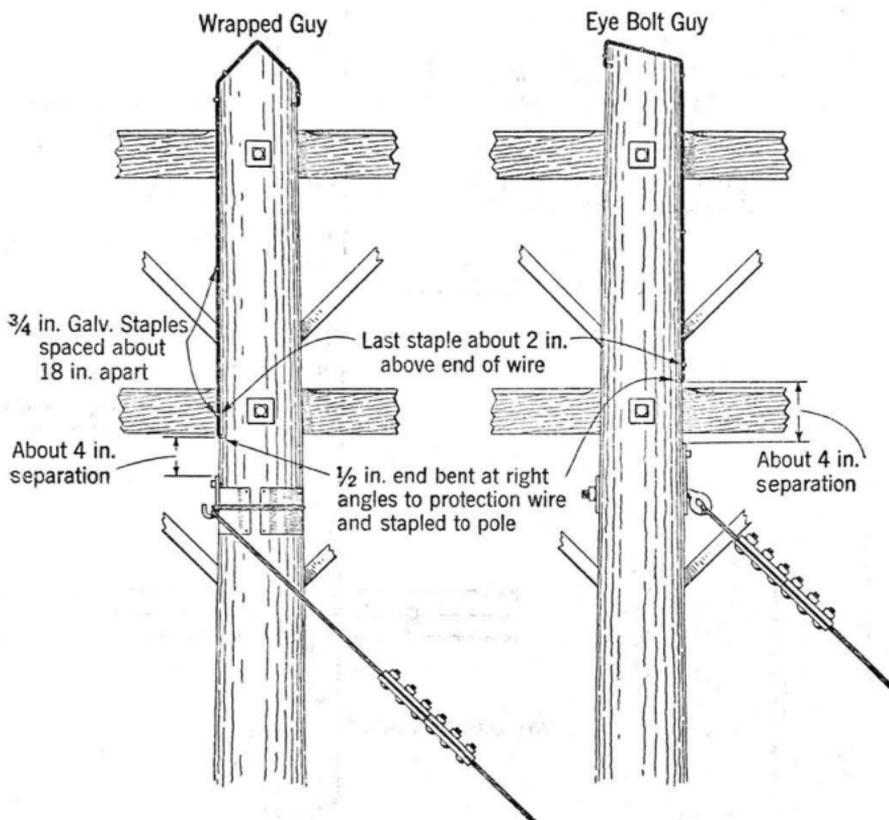
3.01 Place protection wire as shown in the following illustration.



## Anchor Guyed Open Wire Pole

3.02 If the guy or the hardware in contact with the guy is above the second crossarm position, no protection wire is required.

3.03 If the guy and associated hardware are below the second crossarm position, locate the vertical run directly above the portion of the guy hardware that is highest on the pole. Terminate the protection wire so as to provide approximately a 4-inch separation from the guy hardware, as shown in the following illustration.

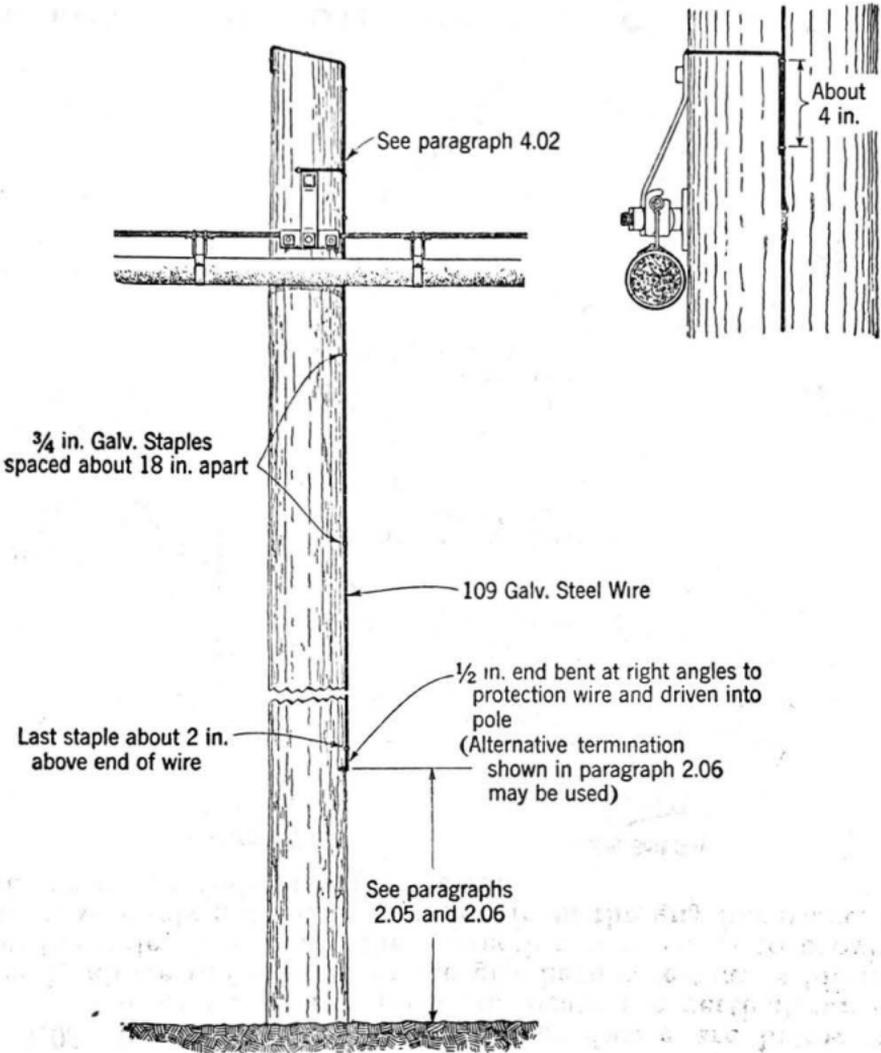


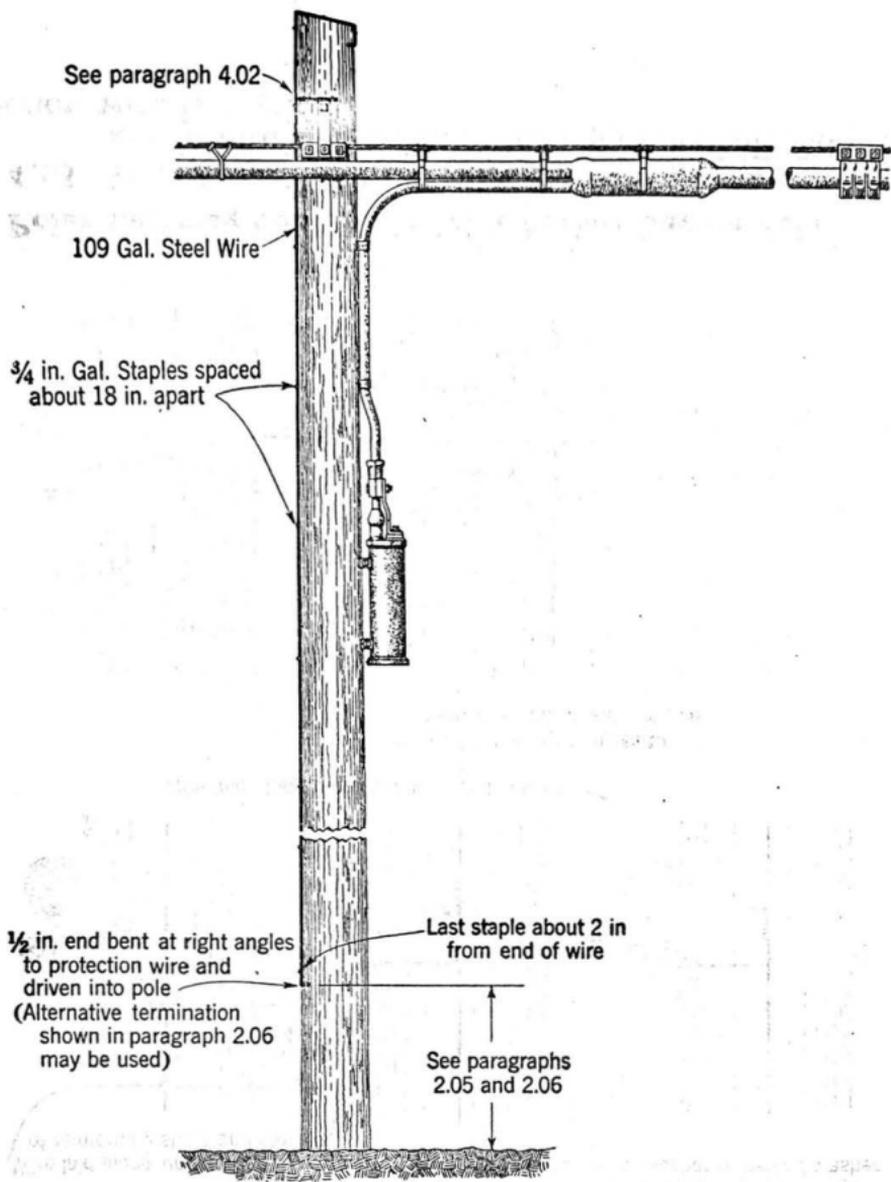
## 4. INSTALLING PROTECTION WIRES ON CABLE POLES WITH NO OPEN WIRE ON POLES.

Pole Carrying Cable With No Open Wire, No Guy on Pole, No Loading Coil Case, or With Loading Coil Case Support on Face or Back of Pole

4.01 Locate the vertical run on either the face or back of the pole. If there is a loading coil case mounted on the face of the pole, locate the protection wire on the back

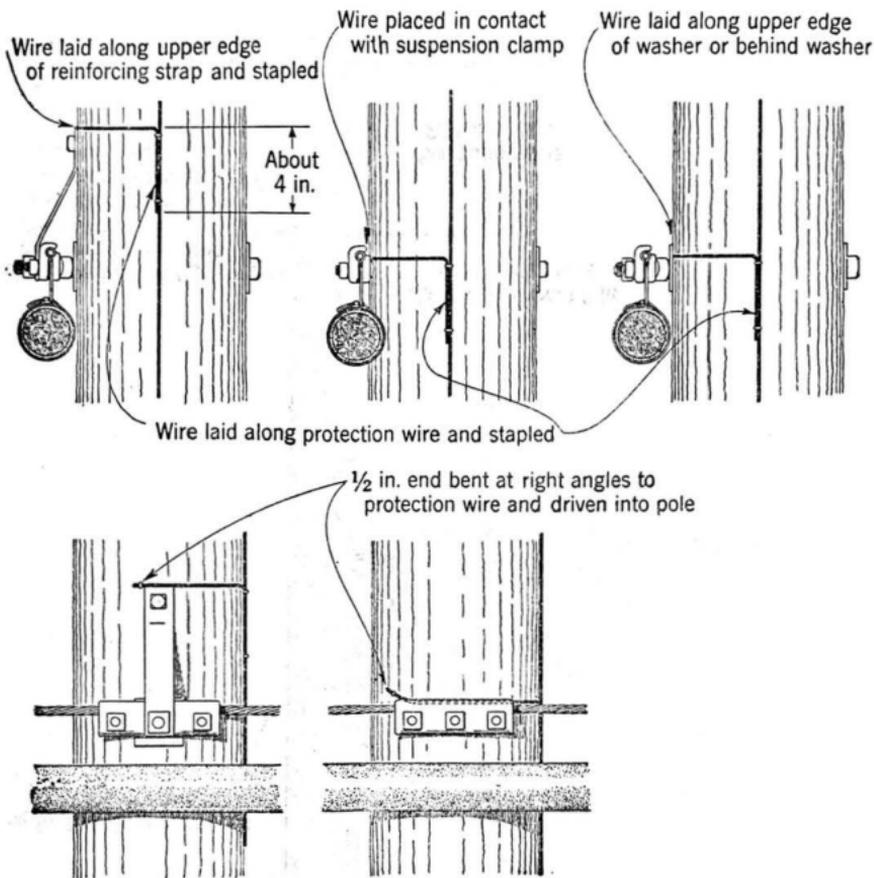
and vice versa. This location enables the protection wire to pass the cable with satisfactory clearance and permits a convenient connection to be made between the protection wire and the hardware used in attaching the suspension strand to the pole. No connection is needed between the protection wire and the loading case support.





4.02 Connect the protection wire to a convenient portion of the hardware used in attaching the suspension strand. This connection may be made by laying the wire along the upper edge of the reinforcing strap or along the upper edge of the washer between the suspension clamp and the pole. In the case of a new installation, the connection may be made by passing the connecting wire behind the

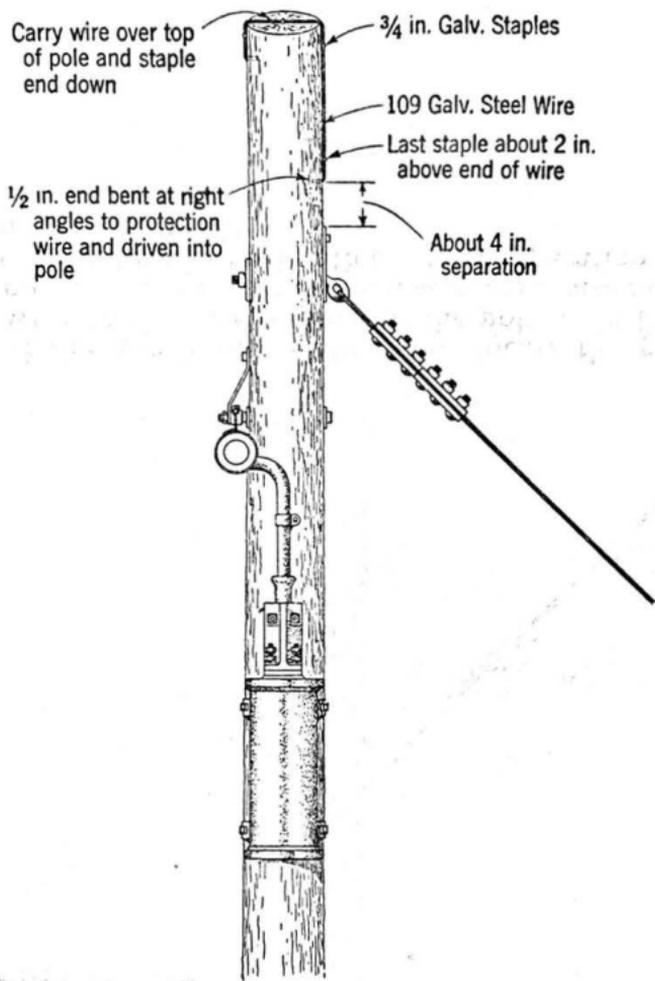
washer, suspension clamp or other hardware. The following illustrations show several ways of making the connection. If there are two cables on one suspension bolt, the connection should be made at only one end of the bolt. If there are cables at different levels on the pole, connections should be made to one of the suspension clamp attachments at each level.

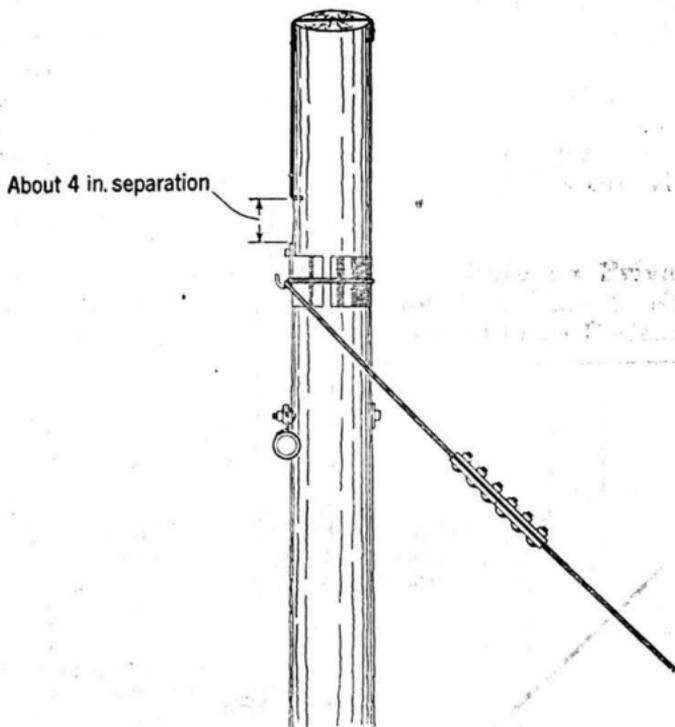


**Poles Carrying Cable Only With Anchor Guy on Pole**

4.03 If any portion of the hardware used in attaching the guy is within 18 inches of the top of the pole, no protection wire is required.

4.04 If there is no portion of the guy or associated hardware within 18 inches of the top of the pole, locate the vertical run directly above the portion of the guy hardware that is nearest the top of the pole. Terminate the protection wire so as to provide a 4-inch separation from the hardware. Do not connect the protection wire to the cable in this case or continue it down the pole.



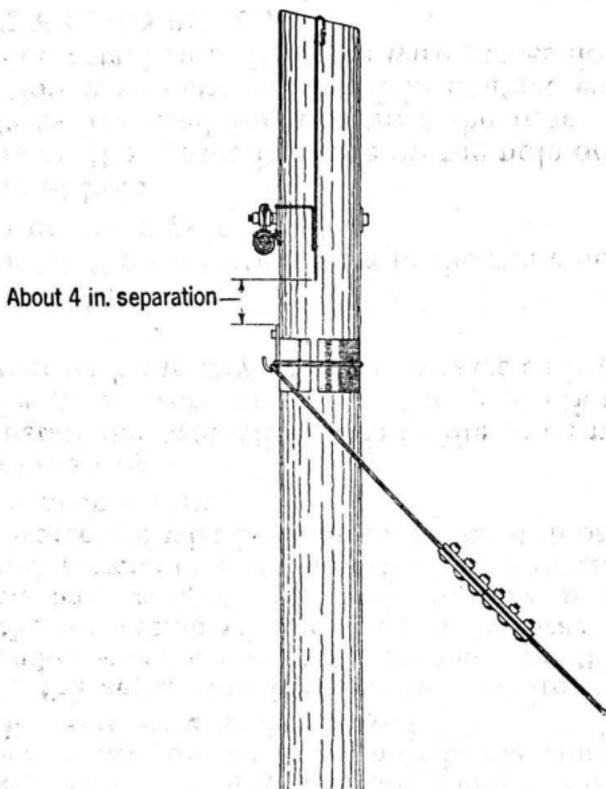


4.05 If the guy is below the cable, locate the protection wire on the face or back of the pole as in Paragraph 4.01. Connect it to the suspension clamp hardware as in Paragraph 4.02, and terminate it with a 4-inch separation from the guy as in Paragraph 4.04.

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### **Unguyed Pole Carrying Loading Coil Cases on Both Face and Back of Pole**

4.06 Select a location for the vertical run that will provide convenient working space for placing the protection wire as it passes by the main cable. Provide connection with the suspension strand hardware as shown in Paragraph 4.02. Swing the protection wire to the side of the pole immediately after it passes the cable. Contact with the loading coil case supports is not required but may be made if it is not convenient to avoid it.

### **Guyed Pole Carrying One or More Loading Coil Cases**

4.07 The protection wire should be carried only from the top of the pole to a point about 4 inches above the guy as described in Paragraph 4.04.

### **H Fixture Carrying Loading Coil Cases**

4.08 A protection wire should be installed on each pole of the fixture. The installation should be in accordance with the methods described in Paragraph 4.01 or 4.07.

## **5. INSTALLING PROTECTION WIRES ON POLES CARRYING BOTH CABLE AND OPEN WIRE**

### **No Guy**

5.01 Locate the vertical run on the pole as shown in Paragraph 3.01 where it passes by the crossarms. Swing it to the face of the pole as it passes by the cable, as shown in Paragraph 4.01. Provide a separation of about 4 inches between the suspension strand hardware and the protection wire, using a branch protection wire if necessary. The separation between the protection wire and cable sheath should be more than 4 inches. Continue the protection wire down the pole and terminate it as described in Paragraph 2.04.

### **Anchor Guy or Rock Guy on Pole**

5.02 Place the protection wire from the roof of the pole to a point about 4 inches above the top of the uppermost guy hardware, unless the guy is above the second cross-arm position. In the latter case, no protection wire is required.

## **6. GUYED OR BRACED POLES OTHER THAN ANCHOR GUYED POLES (CABLE OR OPEN WIRE)**

### **Pole With Guy-to-Stub and Stub-to-Anchor Guy**

6.01 If there is 4 inches or less separation between the stub-to-anchor guy and the pole-to-stub guy, place the protection wire on the guyed pole in the same manner as if the pole itself were anchor guyed.

6.02 If the separation between the pole-to-stub and the stub-to-anchor guy on the stub is more than 4 inches, connect the protection wire to the guy hardware and strand suspension hardware, if any, and continue it toward the ground and terminate it as described in Paragraph 2.03 or 2.05. No protection wire is required on the stub or pole which carries the anchor guy.

### **Pole-to-Tree Guy**

6.03 Install the protection wire in the same manner as if the poles were unguyed. The protection wire may be in contact with the guy or guy hardware as it passes down the pole.

### **Pole-to-Pole Guy**

6.04 Install the protection wire in the same manner as for an unguyed pole.

### **Push Braced Pole**

6.05 Install the protection wire on the pole only. If metal plates are used for attaching the brace to the pole, the protection wire may be placed in contact with the plate without being attached to it as the wire passes down the pole.

## **7. JOINTLY USED POLES**

7.01 Do not place protection wires on jointly used poles