BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

SECTION G52.120.1
Issue 1, April, 1957
AT&TCo Standard

AERIAL CABLE GRADE CLAMPS

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1. GENERAL

1.01 This section replaces Issue 3 of G52.120. It covers the requirements for placing grade clamps, except where additional clamps are placed in connection with tension splicing operations or for bonding purposes, as provided for in Sections G71.530 and G10.345.1 respectively. It has been reissued in order to cover the use of aerial cable supports in place of aerial cable rings in certain locations and eliminates the use of lead tape when using the B Adjustable Grade Clamp.

1.02 Grade clamps are used only on ring supported lead sheathed cables.

2. B ADJUSTABLE GRADE CLAMP FOR SMALL SIZES OF CABLES

2.01 This clamp consists of a channel shaped steel frame to which is riveted a retaining lug and an annealed stainless steel strap of suitable length for encircling cables not greater than 1.25 inches in diameter when supported in 1-1/2-inch rings on either 6,000 pound or 10,000 pound strand. Small rounded projections on the inner surface of the strap have been provided to obtain increased gripping power. The sides of the channel are notched at the upper end and two L shaped bolts having nuts on both ends are provided. The nuts on the upper ends of the bolts secure the strand in the notches of the clamp and those on the lower ends tighten the strap

around the cable by means of a clamping saddle which slides on the two bolts.

3. SIZES OF GRADE CLAMPS FOR THE LARGER CABLES

3.01 The following sizes of grade clamps are to be used for securing the various sizes of cables larger than 1.25 inches in diameter which are supported in larger than 1-1/2-inch rings.

Size of Grade Clamp	Size of Cable Ring	Outside Diameter of Cable in Inches	
		Min.	Max.
2-1/2 in. A	2-1/2 in.	1.25	1.50
2-1/2 in. B	2-1/2 in.	1.51	1.70
2-1/2 in. C	2-1/2 in.	1.71	2.00
3 in.	3 in.	2.01	2.40
3-1/2 in.	3-1/2 in.	2.41	2.70
4 in.	4 in.	3.10	3.30

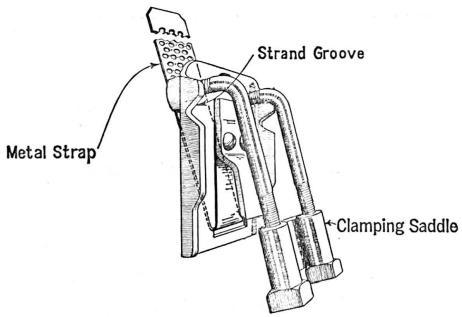
4. LOCATIONS OF AERIAL CABLE RINGS AND CABLE SUPPORTS AT GRADE CLAMPS

4.01 The locations of the rings and supports adjacent to grade clamps are shown in Section G52.135.2.

5. METHOD OF INSTALLING GRADE CLAMPS

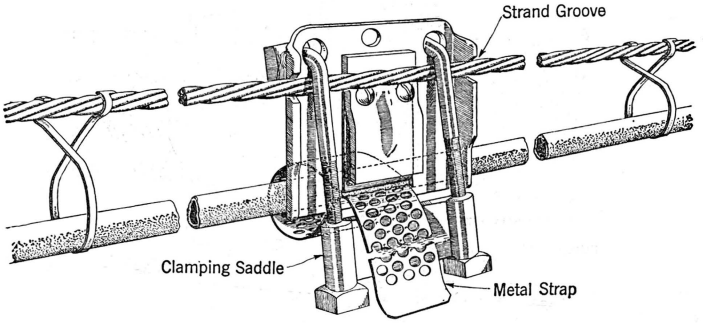
5.01 Install B Adjustable Grade Clamps as follows:

(1) Loosen nuts on lower ends of the bolts so that clamping saddle can be placed over the suspension strand.



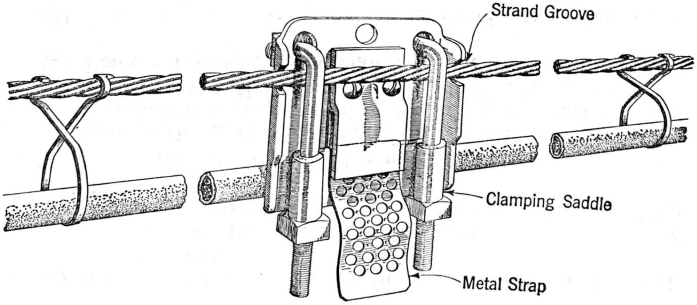
(2) Tighten slightly the nuts on the upper ends of the bolts which secure the clamp on the strand.

(3) Place the strap around the cable and pass the end of the strap through the slot and over the saddle.



(4) Pull the strap tight around the cable, using pliers and prying against the saddle. Bend the strap down flat over the saddle.

(5) Tighten the nuts on the lower ends of the bolts so that the saddle is drawn up and tightens the strap around the cable. Tap the strap with a lineman's wrench as it is tightened so that it conforms to the surface of the cable. In tightening the nuts each nut should in turn be taken up a little at a time so as to force up the saddle evenly on both bolts. The projections on the inside of the strap should be embedded in the cable sheath to obtain maximum holding power.



(6) Bend back the excess length of strap against the back of the clamp.

(7) Tighten the upper nuts which secure the clamp on the strand and also the lower nuts that tighten the strap around the cable.

5.02 Install the larger Grade Clamps as follows:

(1) Loosen the nuts of the bolts on the clamping members a sufficient amount to permit placing the two sides of the clamp around the cable so as to enclose it.

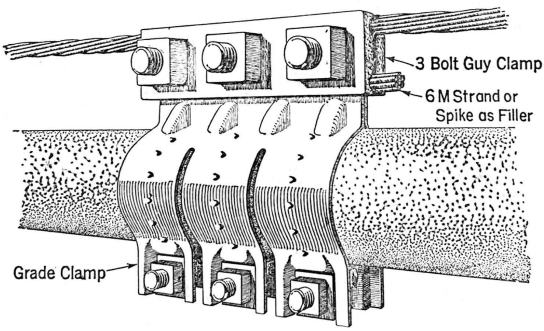
(2) Place a three-bolt guy clamp on the suspension strand as shown in the following illustration.

(3) Place the upper parts of the grade clamp in the lower groove of the guy clamp.

(4) Tighten the bolts of the three-bolt clamp. The bolts should be set up as tight as those of clamps used in securing strand dead ends.

(5) Tighten the bolts of the grade clamp so that the indentations on the inner sides of the clamps are seated in the cable sheath. As the bolts are tightened, tap the portions of the grade clamp which fit around the cable with the end of a lineman's wrench so that they will conform to the surface of the cable. Tighten the bolts until the lugs of the clamp sides touch or bend at such an angle as to bend the bolts slightly.

(6) A typical installation is shown below:



Note: A piece of 6M strand or spike may be used as a filler. If pointed end of spike extends beyond end of three-bolt guy clamp, cut off end of spike to avoid personal injury.

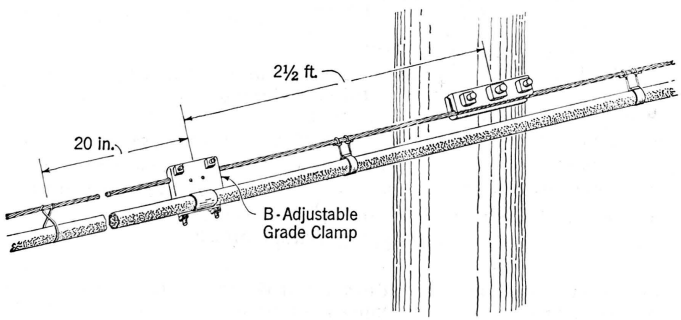
6. LOCATIONS OF GRADE CLAMPS

6.01 On grades, clamp the cable to the strand by means of grade clamps, in accordance with the following table.

Per cent Grade (No. feet rise in 100 feet measured along the cable)	Poles at Which Clamps are to be placed
5 — 10	Pole at top of grade and every second pole on grade.
Over 10	Pole at top of grade and every pole on grade.

6.02 If the grade varies in steepness along a slope, so that on some portions the percentage grade exceeds 10 per cent, while in others it is less, consider the slope as divided into sections according to the percentage grade and place grade clamps in each section as required above. Locate the clamps in accordance with Paragraph 6.03.

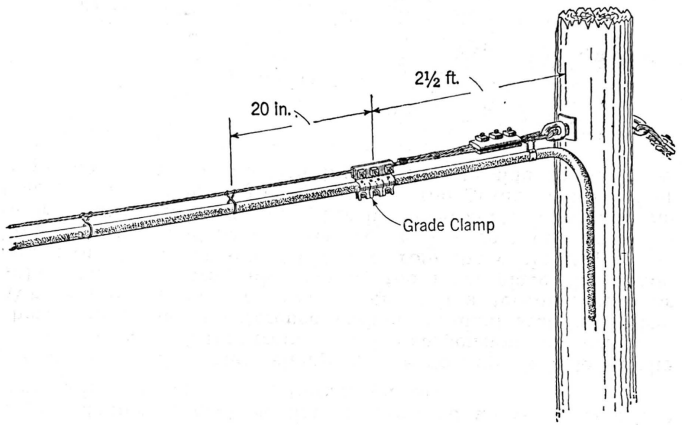
6.03 Place the grade clamp on the downgrade side of the pole, 2-1/2 feet from the cable suspension bolt, provided there will be no interference with a terminal stub or splice. Where there would be interference with a terminal stub or splice on the downgrade side of the pole, place the grade clamp on the upper side 2-1/2 feet from the cable suspension bolt if there would be no interference. Where there would be interference with a stub or splice if placed 2-1/2 feet from the bolt on either side of the pole, space the grade clamp 7 feet from the suspension bolt on the downgrade side of the pole.



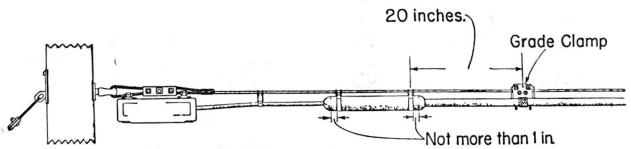
Note: If the grade clamp is placed on the upper side, place cable supports at the normal ring locations between the pole and the grade clamp.

6.04 Where an aerial cable terminates or a branch cable connects to the main cable and where an aerial cable connects to an underground cable, submarine cable or an underground dip, place grade clamps on the cable as shown below.

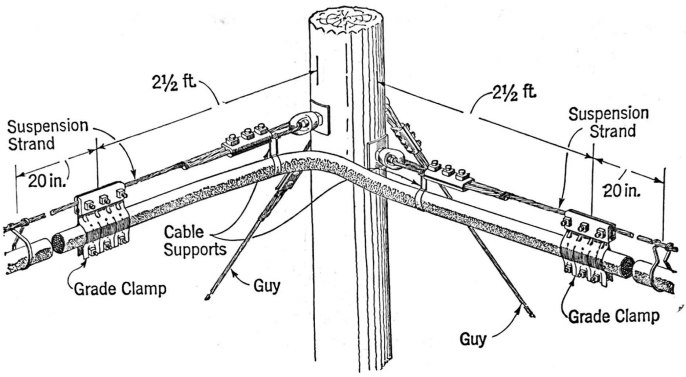
(a) Place the grade clamp 2-1/2 feet from the pole provided that there will be no interference with a terminal stub or splice.



(b) Where there would be interference with a stub or splice if placed 2-1/2 feet from the pole, place the clamp 7 feet from the pole or 20 inches beyond splice support as illustrated.



6.05 At a corner pole place a grade clamp each side of the pole, as shown in the following. Where there will be no interference with a terminal stub or splice, place the clamp 2-1/2 feet from the pole. Where there would be interference with a stub or splice, if placed 2-1/2 feet from the pole, place the clamp 7 feet from the pole.

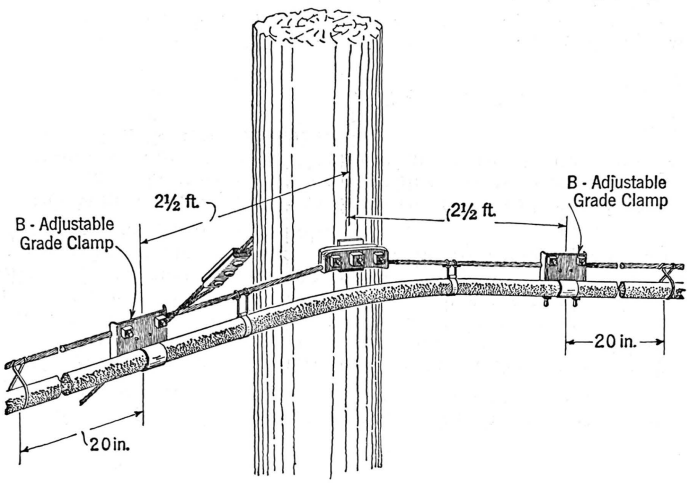


Note: The adjustable grade clamps for the smaller cables are placed at the same locations as shown above.

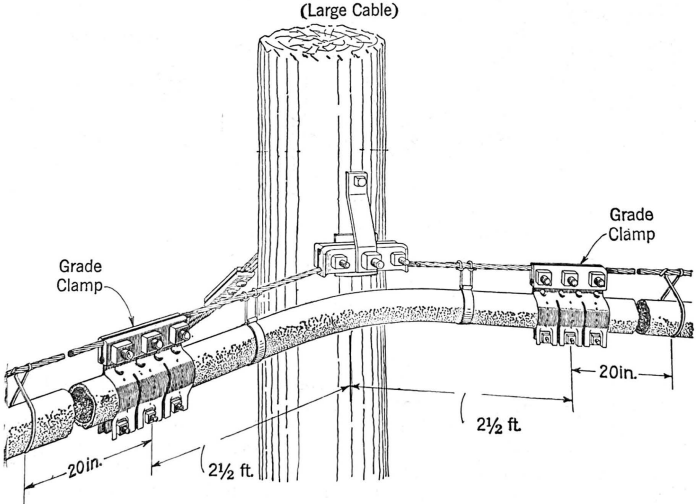
6.06 At corner poles where the strand is not dead-ended, place grade clamps in accordance with the following. Place the clamps 2-1/2 feet from the cable suspension bolt provided there will be no interference with a terminal stub or splice. Where there would be interference with the terminal stub or splice if placed 2-1/2 feet from the bolt, place the clamp 7 feet from the suspension bolt.

(a) Where the pull is away from the pole, and over 5 feet, place clamps on all sizes of cables, except interior block cables supported by 6,000 pound or small strand. Pull is defined in Section G23.105.1.

PULL AWAY FROM POLE
(Small Cable)

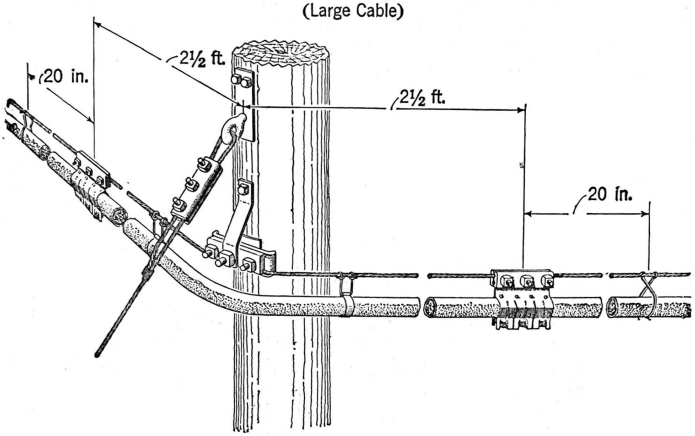


PULL AWAY FROM POLE
(Large Cable)

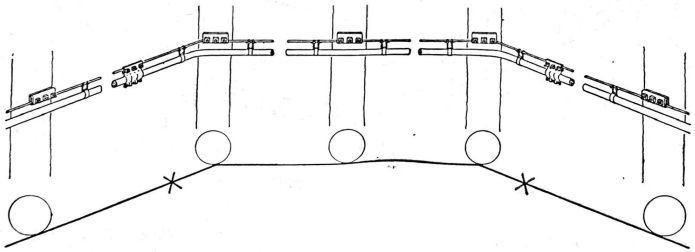


(b) Where a pull toward the pole is over 5 feet, place clamps on all sizes of cables, except interior block cables supported by 6,000 pound or smaller strand.

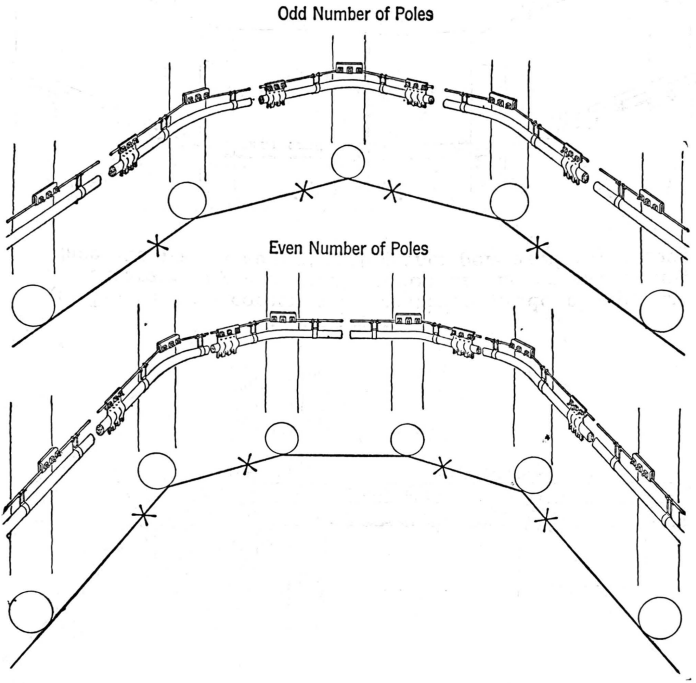
PULL TOWARD POLE
(Large Cable)



(c) Where two corner poles requiring grade clamps are separated by a straight section of one or two spans, place one grade clamp at each corner pole as shown below.



(d) Where there are more than two corner poles in succession requiring grade clamps, place the clamps as shown below.



6.07 Before placing the grade clamps at corner poles, obtain a minimum clearance of 1 inch between the cable and pole. In placing new cable the required clearance can be provided by placing a few folds of heavy canvas or other material under the rope mat usually placed at corner poles to protect the cable while it is being pulled into the rings. Where the clearance cannot be provided by this method, pull the cable away from the pole with tension splicing jacks or chain hoist as follows:

(1) Place a grade clamp on one side of the pole.

(2) Place the tension splicing clamp on the strand about 1 foot beyond the location of the grade clamp to be placed on the other side of the pole. Do not tighten the bolts of the clamp more than finger tight at this time.

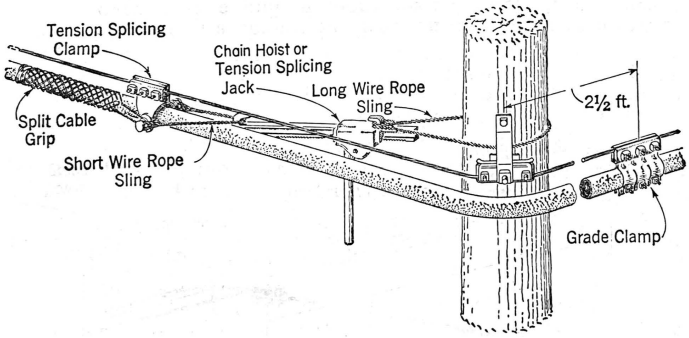
(3) Place a split cable grip on the cable beyond the tension splicing clamp and connect the eyes of the cable grip to the inner grooves of the buttons on the sides of the clamp.

(4) Pass the long sling around the pole and connect its two eyes to the hook on the traveling head of the jack. Hook the eyes of the short sling on the outside grooves of the buttons on the clamp and then connect to the hook on the end of the rack bar of the jack.

(5) Take up on the jack until the desired clearance at the pole is obtained.

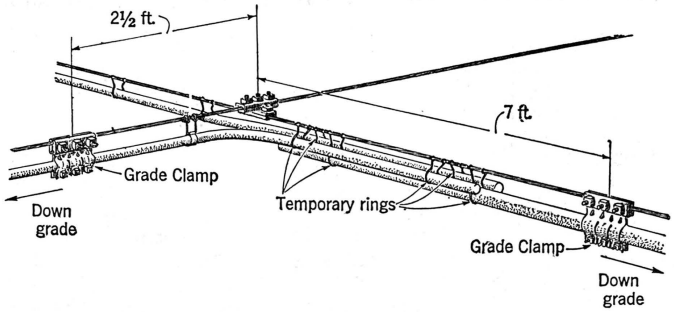
(6) Tighten the bolts of the tension splicing clamp if it is desired to remove the jack and pulling equipment before placing the grade clamp.

(7) Place the grade clamp at the proper location in accordance with the above.



6.08 If there is a grade at a crossover, place grade clamps on each cable where there will be a tendency for the cable to creep downhill. Place the clamps 2-1/2 feet from the crossover point provided that there will be no interference with a splice. Where there would be interference with a splice, place

the clamp 7 feet from the crossover point. If there is no grade, place grade clamps on cables that terminate at the crossover. Locate the clamps in accordance with the above.



6.09 If there is a change in direction of a cable at a crossover, with a pull of more than 5 feet, place a grade clamp on the cable at each side of the crossover point. Locate the clamps in accordance with Paragraph 6.08.

6.10 Place grade clamps on the cable at loading coil fixtures as follows:

(a) At single pole loading fixtures, place a grade clamp (each side of the pole) 7 feet from the through bolt.

(b) At H loading coil fixtures, place a grade clamp beyond each pole of the fixture. Place the clamp 7 feet from the through bolt.

6.11 At railroad crossings, place a grade clamp at each crossing pole. Locate the clamp approximately 2-1/2 feet from the through bolt and on that side of the pole away from the crossing.

6.12 At pressure testing plugs, place a grade clamp 2-1/2 feet from each end of the sleeve.

6.13 Slack spans should be treated the same as other spans and grade clamps should be placed only where required in accordance with the above provisions. Grade clamps should be placed, however, at the pole or poles adjacent to the slack span. These clamps should be placed on the side of the pole away from the slack span and should be located in accordance with the above provisions.