PRECAUTIONS TO BE TAKEN BEFORE CLIMBING POLES OR WORKING FROM STRAND- OR POLE-SUPPORTED EQUIPMENT

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1. GENERAL

1.01 This section covers methods of testing poles to determine whether or not they are capable of withstanding the loads to which they will be subjected during climbing and while working aloft. It also covers recommended procedures which will help prevent accidents associated with climbing and working on poles or strand-supported equipment. Observance of the principles and precautions in this section will help ensure the safe performance of work on poles.

1.02 This section is reissued to include information formerly found in Sections 620-132-010 and 620-133-010, to make references to Section 621-215-015 and to correct minor deviations. Since this issue is a general revision the arrows ordinarily used to indicate changes have been omitted.

1.03 All employees who will work on poles or strand-supported equipment must be familiar with the procedures contained in the Bell System Practices covering the use of:

(a) Body belts

(b) Safety straps

(c) Climbers

(d) Insulating gloves and other protective equipment.

1.04 Pole failures may occur as a result of various causes although poles which have been given an approved preservative treatment will usually retain their strength for many years, a treated pole may occasionally be encountered which will have a relatively short life because of an inadequate preservative treatment or other unusual conditions. Therefore, it is necessary to exercise care in checking the conditions of all poles, including those which appear to be sound. The failure of a pole is usually due to one or more of the following causes:

(a) Decay of the pole at or below groundline.

(b) Storm damage.

(c) Mechanical damage, such as might result from a vehicle collision.

(d) Termites, carpenter ants or other insects.

(e) Lightning damage or fire damage.

(f) Woodpeckers.

(g) Application of excessive loads or creating unbalanced loads which are excessive under the existing conditions. These excessive loads may result from the use of improper or inadequate construction or maintenance methods.

2. PRELIMINARY VISUAL EXAMINATION

2.01 All poles must be visually examined before any work operation is begun which involves climbing the pole, placing a ladder against the pole or strand, hanging an aerial platform, riding the strand (Section 627-295-500), etc. While making the visual examination, check the following conditions:

(a) Any unexplained leaning of a pole. This may be due to failure of the pole at or below groundline.

(b) Insufficient depth of setting. This may be due to erosion of the earth around the pole as a result of heavy rainfall, flood water, road widening, etc, and would affect the stability of the pole. The depth of setting can frequently be checked by reference to the brand which is present at a distance of ten feet (measured to the bottom of the brand) from the butt of poles 50 feet or less and 14 feet on poles 55 feet orr more. Do not rely upon the brand mark to determine the depth of setting of non-Bell System poles.

(c) Evidence of collision damage particularly when the pole is at an exposed location along a highway.

(d) Presence of fungus growth in cracks or protruding from the pole surface or on areas near groundline where the wood appears water-soaked in contrast to surrounding wood. These symptoms usually indicate a condition of advanced decay in the interior of the pole.

(e) Presence of termite or carpenter ant infestation, evidenced by mud channels or debris in the cracks, wood dust at the base of the pole, or movement of ants when the pole is struck with a hammer or other tool.

(f) Bent, loose, or missing pole steps.

(g) Wide seasoning cracks which could result in loosening of pole steps and present a climbing hazard.

(h) Evidence of compression wood indicated by short horizontal cracks along one side of the surface of the pole, or by curling of wood away from the pole surface.

(i) Presence and distribution of large knots, excessive knot clusters, climber gaff splinters, unauthorized signs, aerials, clotheslines, and nearby interfering tree growth.

(j) Presence of large stones, ground irregularities, and debris at base of pole.

(k) Presence of conduits or vertical runs on pole which might interfere with use of pole steps or climbing.

(l) Broken wires in adjacent span.

(m) Excessively tight or excessively slack drop or line wires on one side of pole.

(n) Contact or insufficient separation between telephone and power wires or other plant on the pole, or in the span or spans adjacent to the pole.

(o) Woodpecker holes.

(p) Evidence of lightning or fire damage.

(q) Presence of markings or pole tags placed by pole inspector to indicate an unsafe pole or pole to be replaced.

(r) Presence of ice on the pole surface or pole steps which might result in hazardous climbing.

(s) Shell rot decay on cedar poles.

3. RESULTS OF VISUAL EXAMINATION

3.01 If any conditions listed in Part 2 are found, they must be considered in connection with the results of the tests described in Part 4 and necessary precautions taken.

4. METHODS OF TESTING POLES

4.01 The following tests will provide important information in addition to that obtained from the visual examination.

4.02 ***In any case where suitable means for determining the condition of a pole and bracing it when necessary are not available and there is any question about the pole being sufficiently strong to permit safe climbing and safe working, do not climb the pole.*** Inform your supervisor about the condition and refer to Part 7.

4.03 Each method of testing has certain limitations and may not be applicable under the conditions existing at certain locations. It is important, therefore, to make a selection of the tests that are applicable and most suitable under the existing conditions. The tests are as follows:

(a) Pike pole test (Fig. 1)

(b) Prod and sounding test

(c) Boring test

(d) Hand line test.

4.04 The necessity for testing occurs principally under ***any*** of the following conditions.

(a) At dead-end poles.

(b) In longer span cable or open wire construction.

(c) Where there is a downward change in grade at a pole.

(d) Where the line is carrying a small number of telephone wires or a small number of both power and telephone wires.

(e) Where drop wires are attached, especially where the pull from them is unbalanced.

PIKE POLE TEST

4.05 The pike pole test is applied by making a vigorous effort to rock the pole back and forth in a direction at right angles to that of the line by pushing the pole with a 12-foot or longer pike pole. If practicable, the pike pole should be held at an angle of about 45 degrees (Lead/Height = 1) with the pole, as shown in Fig. 1. If the pole cracks or breaks, the test should be discontinued immediately and the pole should be regarded as unsafe for climbing.

Caution: Do not rock a pole so hard as to cause the wires to swing together and thus introduce trouble in the circuits.

4.06 If in certain cases (particularly in connection with the longer spans of telephone open wire and power wires) it is found impracticable to rock the pole without causing the wires to swing together, the pole should be given a steady push with the pike pole, applying as heavy a push as possible. If the pole withstands such a push, it should also be subjected to the prod and sounding test before being climbed.

4.07 If a 16-foot pike pole is available, its use is preferred to that of a shorter size, inasmuch as it enables the push to be applied at a higher point on the pole and is more effective. When a 16-foot pike pole is not available, use a standard 14-foot or 12-foot pike pole or a standard 1-3/4 inch test-pike, fitted with two extension sections of the large tree pruner handle. As an alternative to the 1-3/4 inch test-pike, a standard 1-1/4 inch test-pike may be used, and it should be fitted with a tapered section and one extension section of a large tree pruner handle.

4.08 The pike pole test cannot effectively be applied to poles that have attachments such as wires, guys, push braces, etc, arranged in such a manner as to take the thrust of the pike, rather than permitting the thrust to be transferred directly to the pole. Some locations where such conditions are encountered are guyed corner poles, junction poles, side storm guyed poles, etc.

4.09 Many of the small poles in suburban or rural leads, carrying eight wires or less have sufficient strength from a service standpoint, but can be broken by applying the pike pole test too vigorously. In applying the test to small poles, exercise reasonable care to prevent breaking those which are in serviceable condition and can be climbed safely. (See 4.16 and Caution in 4.05.)

4.10 Pavement or frozen ground surrounding poles sometimes tends to hold poles firmly, even though they may be badly deteriorated. Where such conditions exist, the pike pole test may not reveal the hazardous conditions and it is desirable to apply temporary supports to the pole, if there is any question as to the soundness of the pole.

Warning: The pike pole test shall not be applied to poles which, if they were to break, would cause damage to nearby property or result in contact between telephone plant and electric light or power wires, or introduce some other hazardous situation.

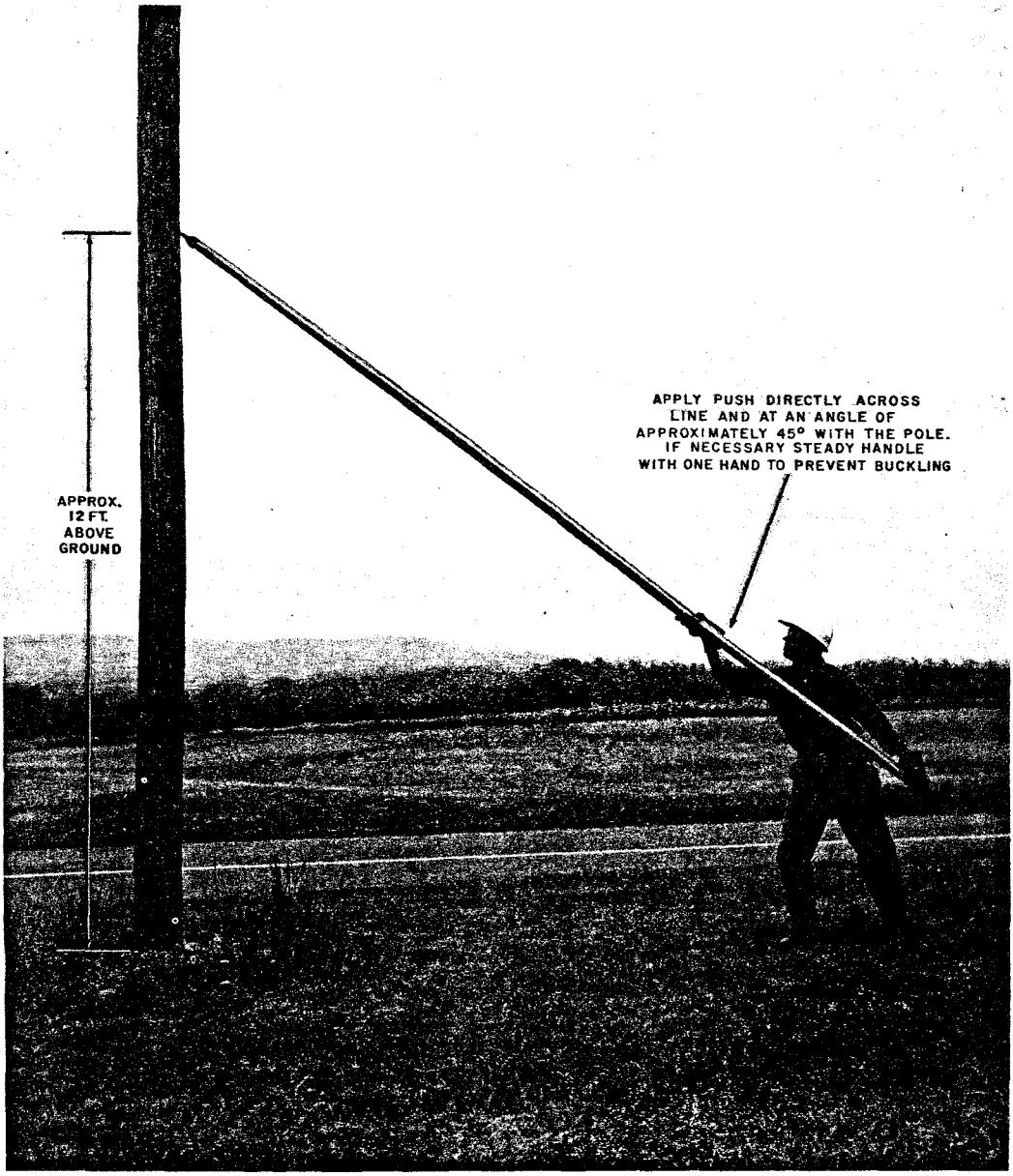


Fig. 1—Pike Pole Test

PROD AND SOUNDING TEST

4.12 The prod and sounding test may be used where it is impractical to apply the pike pole test. It consists of two parts:

(1) exploring the condition of a pole at or below the groundline with a prod

(2) sounding the pole with a hammer from the groundline up to as high as can be reached.

BELOW GROUNDLINE

4.13 The tool used for the prod portion of this test is a pole inspector's prod or screwdriver having a 5-inch or longer blade. Do not use a heavy, pointed tool, such as a digging bar, because of the damage such a tool can cause to the treated sapwood of a sound pole, thus reducing the effectiveness of the preservative treatment and exposing the interior of the pole to decay attack.

4.14 The section of maximum decay is normally encountered between the groundline and about 12 inches below the groundline. Where possible excavate sufficient earth from around the pole to permit a more satisfactory examination of the pole. If the pole is set in pavement, or it is impracticable to remove any earth, the prod should be applied as close to the groundline as practicable, at an angle of approximately 45 degrees with the pole. The test should be made at many locations around the complete circumference of the pole. The presence of general sapwood decay or decay pockets will usually be evident from this test.

4.15 If the prod test indicates the presence of extensive decay place temporary supports, regardless of the original circumference of the pole, unless, in accordance with Part 5 no supports are required.

4.16 If there is no indication of decay or other reduction of strength in the prod and sounding tests and the pole has been subjected to a moderate pike pole test where conditions permit its use, ***25-foot or shorter poles*** in straight sections of rural lines carrying eight or less 104 copper or stronger wires with no downward change in grade, and measuring 13 inches or more in circumference at the groundline, may be climbed without placing temporary supports.

4.17 The prod test is not considered as satisfactory as the pike pole test and it should not be completely depended upon to furnish information as to the soundness of the pole.

ABOVE GROUNDLINE

4.18 The sounding test consists of applying blows with a hammer to the pole surface completely around the pole from points close to the groundline to as high as can conveniently be reached. The presence of a hollow heart condition or advanced internal decay can usually be recognized by the characteristic hollow or dull sound resulting from the blows on the wood. A pole free from decay usually sounds clear and the hammer usually rebounds noticeably when the pole is struck sharply and squarely. Wet surfaces due to recent rains, wet interior near the groundline due to high soil moisture, wide cracks, or shakes in the pole near the surface may change the sound of a solid pole. Care must be taken not to mistake the altered sound due to these causes for the sound associated with internal decay.

BORING TEST

4.19 The boring test consists of boring a hole in the pole at a point where internal decay is suspected by means of a 3/8 inch wood boring bit or by means of an increment borer. The condition of the wood can be determined by an examination of the chips or core brought out by the bit. The presence of a hollow heart condition is revealed by the bit breaking through the wood.

4.20 If a hole is bored in a pole and it is concluded that the pole is in sound condition and the pole is to be left in plant, the hole shall be plugged by means of a wooden plug. [Ordering information is as follows: Plug, Wooden (length) inches. Plugs come in 2-, 3-, 4-, or 6-inch lengths. Order the length desired].

HAND LINE METHOD

4.21 The hand line method consists of applying a series of pulls to a pole with the object of rocking the pole back and forth. In applying this test, use 3/8 inch or larger rope, attached to the pole at such a height that the pull can be applied at right angles to the direction of the line and at an angle of about 45 degrees with the pole. The same use limitations and precautions applying

to the pike pole test, apply to this method of testing. In attaching the rope to the pole, the pole shall not be climbed, but the rope is to be thrown over a fixed attachment such as a pole step. A crossarm cable and strand, or a loop shall be made at the base of the pole and moved into position by means of a convenient tool, such as a wire raising tool.

5. CONDITIONS WHICH REQUIRE NO TESTING OR SUPPLEMENTARY SUPPORT

5.01 It is unnecessary to make tests or to apply a temporary support before climbing a pole if ***any*** of the following conditions exist throughout the work operations, unless visual inspection indicates otherwise:

(a) The pole is storm guyed on four sides.

(b) The pole carries two or more storm side guys and a load as described in 5.02(b).

(c) The pole is part of an H fixture provided with head and back guys.

(d) The pole is not in a straight section of a line, but is an adequately guyed corner pole and carries a load as described in 5.02(b).

5.02 It is also unnecessary to make tests or to apply a temporary support before climbing a pole if ***all*** of the following conditions exist throughout the work operations and the proposed work operations do not involve placing a heavy unbalanced load on the pole:

(a) The pole is in a straight section of line, but is not a dead-end pole.

(b) The pole is carrying a 6M or larger suspension strand securely clamped to it and to each adjacent pole and will remain so attached throughout the work operations.

(c) There is no downward change in grade at the pole.

(d) Neither adjacent span length is in excess of 165 feet.

5.03 It is also unnecessary to make tests or to provide supplementary supports before climbing a pole if the following conditions exist:

(a) Instead of carrying a suspension strand, the pole carries ten or more copper, copper-steel, or steel line wires which will remain securely tied at the pole and at each adjacent pole throughout the work operation.

(b) All the other conditions described in 5.02(a), (c), and (d) exist.

5.04 It is unnecessary to make tests before placing any strand-supported equipment if the following conditions exist:

(a) The poles supporting the span and the poles at the far end of the adjoining spans form a straight section.

(b) The suspension strand in the span is 6M or larger and is securely clamped to the two adjacent poles on each side of the span, and will remain attached to these four poles throughout the work operation.

(c) There is no downward change in grade at the poles at each end of the span.

(d) The span length and the adjacent span lengths are not in excess of 165 feet each.

6. PRECAUTIONS

6.01 ***No work aloft shall be started unless the employee is satisfied that the pole line structure has adequate strength to support the load resulting from working aloft and the load which will result from the intended work operations. If the strength of the pole line structure is in doubt, temporary or permanent supports must be applied before starting work.***

6.02 ***Poles at each end of an aerial span in which a ladder is to be placed, an aerial platform hung, or a cable car ridden shall be visually examined as described in this section and tested as described in Part 3, and Section 627-295-500.***

6.03 An end pole in a line, even through head guyed, should always be examined and tested before climbing since the guy and the end spans do not contribute any stability to the pole in a direction across the line.

6.04 Temporary suppports adequate to support the pole shall always be placed before removing any attachments from a pole that is to be removed or replaced because of deterioration.

6.05 Swinging rapidly around a pole imposes an additional load on any pole and shall be avoided.

6.06 Where a work operation is planned which is likely to result in a sudden impact load on a pole or an adjacent pole which jars or shakes the pole, an employee shall remain off the pole to avoid being shaken off by the impact of the load. If the impact of the load would be likely to break the pole, temporary guys should first be placed to take the impact.

6.07 ***Heavy unbalanced loads, such as those caused by placing or removing conductors or strands under tension at unguyed poles or inadequately guyed corners or deadends, may cause even a pole in good condition to fail.*** Therefore it is important to plan the work operations so the poles will not be subjected to excessive and/or unbalanced loads. The use of guys or braces provides a means of preventing excessive unbalanced loads. Typical operations for which temporary or permanent supporting of poles may be required are as follows:

(a) Removal of guys.

(b) Untying wires.

(c) Releasing wires or strand under tension. ***Do not cut while under tension.***

(d) Placing additional wires or strand.

(e) Tensioning wires or strand.

(f) Changing locations of wire or strand attachments.

(g) Loosening suspension clamps or guy clamps.

(h) Moving line because of road widening.

7. TEMPORARY SUPPORTS

7.01 Poles which have been found to be unsafe or are suspected of being unsafe for climbing or working on, shall either not be climbed at all or shall be climbed only after suitable temporary supports have been applied which will ensure safe climbing and working conditions. If suitable supports cannot be provided with the equipment at hand, refer the case to your supervisor.

7.02 The following methods of supporting poles temporarily may be used:

(a) Supporting pole with pole derrick (Fig. 2).

(b) Lashing old or weakened pole to new pole (Fig. 3).

(c) Temporary guying (Fig. 4).

(d) Bracing pole by means of pike poles (Fig. 5).

(e) Using a combination of bracing and guying (Fig. 6).

7.03 Where temporary supports are used to reinforce a pole, it is important that an employee does not climb to a level more than 10 feet (measured to the employee's feet) above the point at which the temporary supports are attached. If necessary to work at a greater height above existing supports, place additional supports at a point approximately 10 feet above those supports as shown in Fig. 2.

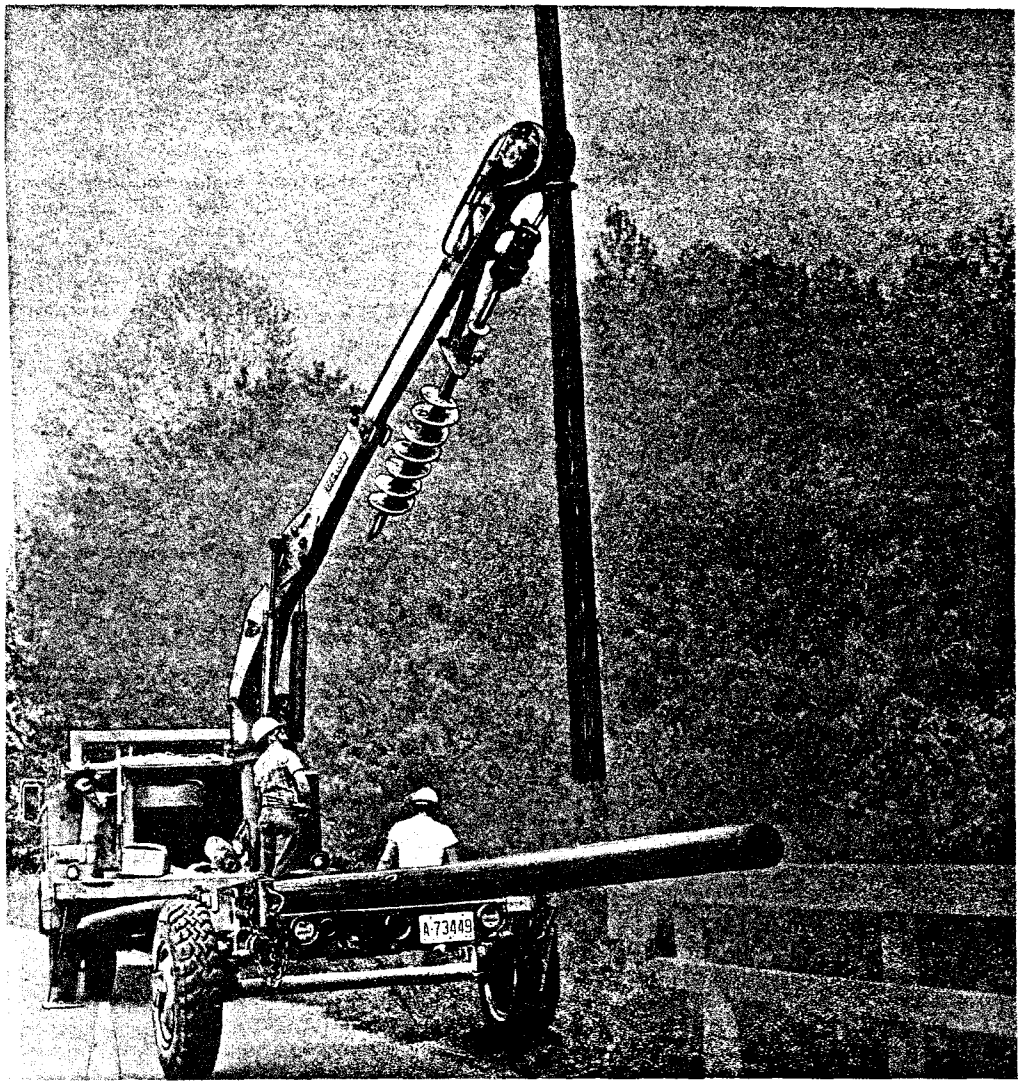


Fig. 2—Supporting Pole With Derrick

7.04 The various temporary methods of supporting poles are described in detail in the following:

(a) A weakened or old pole may be supported by lashing it to a new pole, if the new pole is set within 3 feet of it, or if the new pole has been placed in the old pole hole. The two poles shall be lashed together as shown in Fig. 3.

(b) In order to place the upper lashing, climb the new pole. Do not, under any circumstances, work from the old pole until both upper and lower lashings have been completed. Rope lashings should be used only where the old pole is to be removed within a reasonable period of time (usually a few days) or where there might otherwise be an electrical hazard in passing the sling around the poles.

(c) A pole derrick can sometimes be used to advantage for temporarily supporting a pole (Fig. 2). When using a derrick for this purpose, the winch line shall be attached to the pole while working from the ground. Attach the winch line as high on the pole as practicable.

(d) The point of attachment of the winch line should, if practicable, be several feet or more above the balance point of the pole. The location of the balance point of a pole will vary with the taper and general shape of the pole. In a pole, such as a southern pine, which ordinarily has a uniform but small amount of taper, the balance point will be close to the midpoint of the pole. In a pole with a greater amount of taper or a heavy butt, the balance point will be somewhat lower. For example, in a 35-foot southern pine, Doublas fir, or western larch pole (all of which normally have a small taper), the balance point will usually be one to two feet below the midpoint, ie, about 19 feet below the top of the pole. In a 35-foot western cedar pole having a somewhat greater amount of taper or a heavy butt, the balance point may

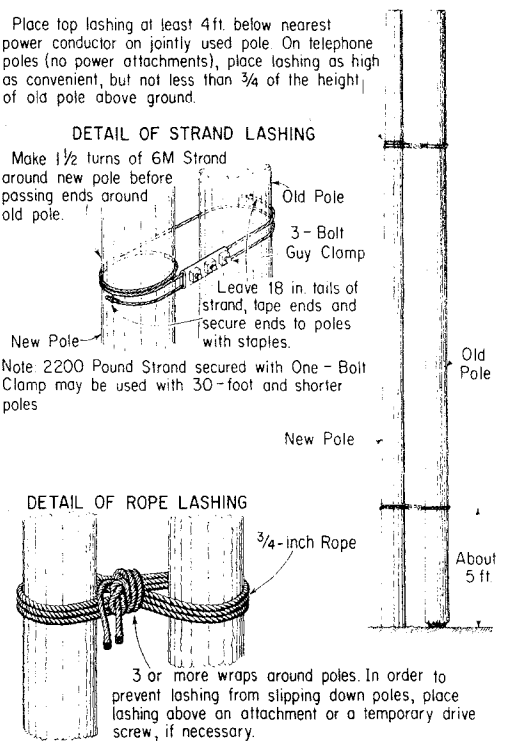


Fig. 3—Lashing Old Pole to New

be two to three feet below the midpoint. It should be noted, however, that ***the balance point of a pole broken off at the groundline is close to the midpoint of the portion of the pole projecting out of the ground*** and that if the pole carries any plant such as wires or cable, the balance point may be considerably higher, thus necessitating the use of supplementary rope guys as described in (e).

(e) If it is not practicable to attach the winch line sufficiently above the balance point to ensure stability of the pole with an employee in position on the pole, temporary rope guys should be attached to the pole either close to the ground line or far enough above the winch line attachment to ensure the required stability. The positioning of the temporary guys above the winch line should be done working from a point below the level of the winch line attachment, using a pike pole or a wire raising tool.

(f) A pole moving frame may be used in conjunction with a pole derrick instead of using temporary rope guys.

7.05 Rope or strand guys may be used as shown in Fig. 4. The temporary guys may be attached for anchorage purposes to other poles, trees, or stumps that are in sound condition, sufficiently strong and in the desired position for the attachment. Where such anchorages are not available, use can sometimes be made of one or more bars driven into the ground. The number of bars required depends upon the load and soil conditions. The use of two bars for each guy is generally recommended, although one will be sufficient if the load to be supported is very light and the ground into which the bar will be driven is firm.

(a) To facilitate the operation of attaching the guys to the pole, it may be advantageous in some cases, to support the pole temporarily by three or four pike poles or a pole derrick. In other cases, the rope guys may be raised into position by means of a wire raising tool. ***Do not climb an unsupported questionable pole.***

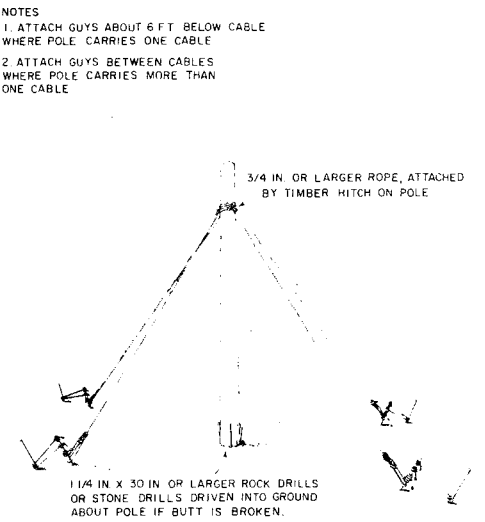
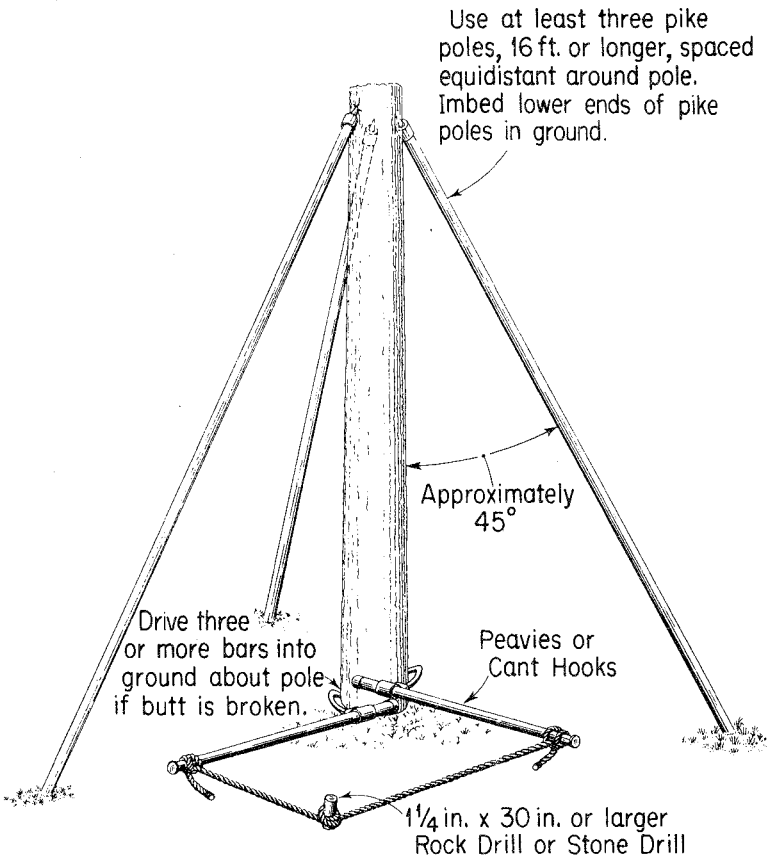


Fig. 4—Temporary Guying

7.06 Pike poles placed as shown in Fig. 5 can be used for bracing purposes. Either three or four pike poles should be used, and they should be evenly distributed around the pole. The pole should be prevented from rotating and thus disengaging the pike poles, by means of two cant hooks placed as indicated in Fig. 5.

7.07 Where the slope of the ground, right-of-way, or other conditions are such that three or four temporary guys or pike pole braces cannot be placed, a combination of a rope guy and two pike pole braces placed as shown in Fig. 6 can sometimes be used to advantage. The pole should be prevented from rotating and thus disengaging the pike poles, by means of two cant hooks, placed as indicated in Fig. 6. The rope guy may be raised from the ground into position by means of a wire-raising tool. ***Do not climb the pole to attach the guy.***



Place clove hitch on bar driven into ground. Draw rope taut and place clove hitch on handle of each peavy or cant hook.

Fig. 5—Bracing Pole With Pike Poles

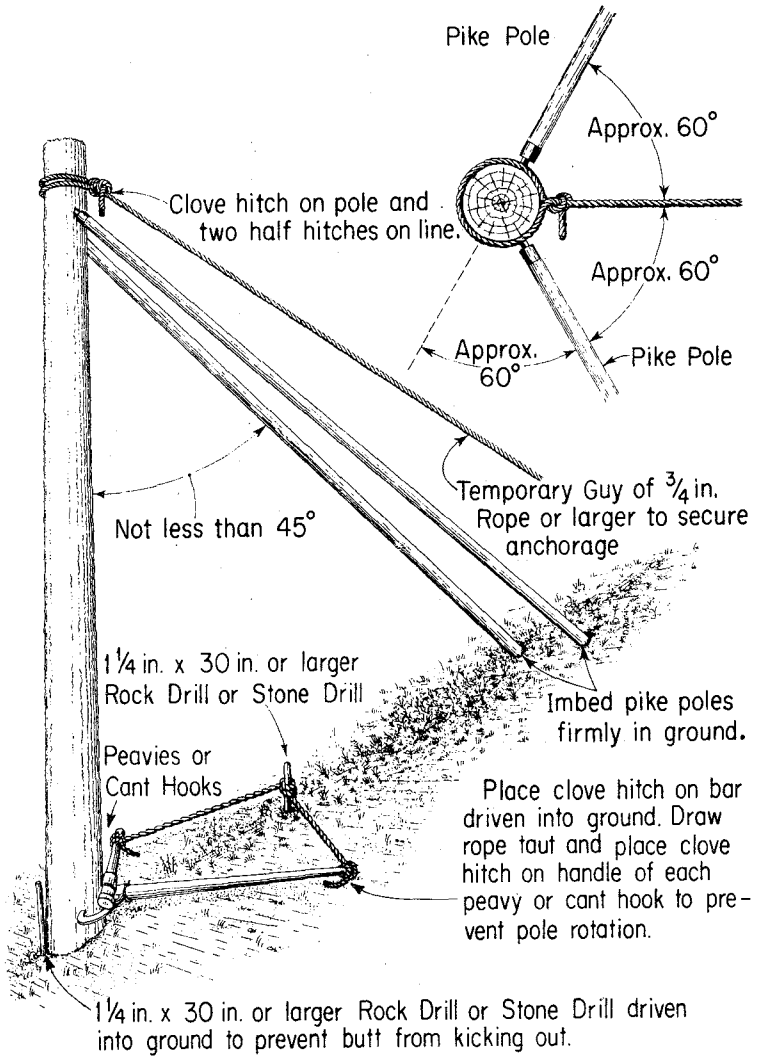


Fig. 6—Using Combination of Brace and Guy

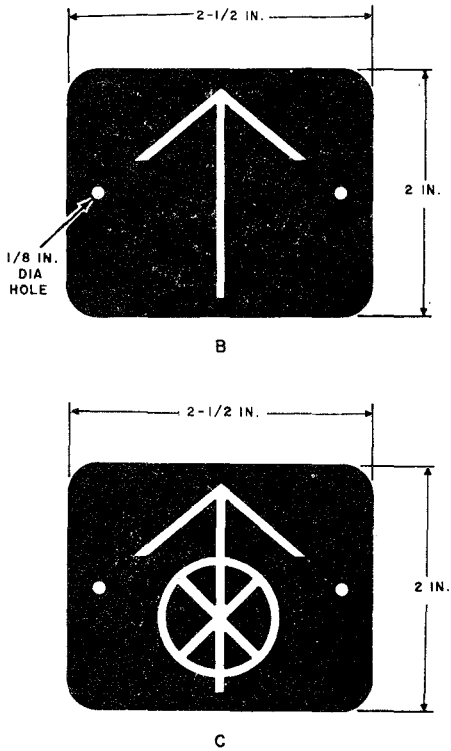
8. REPORTING POLES FOUND TO BE UNSAFE FOR CLIMBING

8.01 Poles found to be unsafe for climbing by the previously described tests should be marked immediately with a B or C pole tag, as described in Part 9. The unsafe condition shall be reported promptly to your supervisor.

8.02 If the pole has been broken, resulting in an unsafe condition and requiring immediate support, temporary supports shall be applied, if practicable, immediately to prevent the pole from falling. If suitable bracing means are not available, steps shall be taken to warn passers-by or traffic away from the location until a safe condition can be restored and a report of the condition shall be made promptly to your supervisor.

9. MARKING DEFECTIVE POLES

9.01 All poles recommended for replacement shall be plainly marked to indicate that they are defective. Because of the transfer of personnel between operating companies during storm breaks or other restoration work, the method for marking poles is uniform throughout the Bell System. Two aluminum tags, designated as B and C pole tags have been standardized for this purpose (see Fig. 7).



B AND C POLE TAGS

Fig. 7—B and C Pole Tags

9.02 The B pole tag has a white arrow on a red background. It is intended for marking defective poles which do not require immediate replacement, ie, defective poles which are not yet considered dangerous. It serves as a warning to the employees that the pole is defective and should not be climbed or worked on without following the recommendations of Part 2 and the appropriate tests, as described in Part 3 have been made.

9.03 The C pole tag is similar to the B pole tag (Fig. 7) except that an "X" inscribed in a circle is imposed on the shaft of the arrow. This tag is intended for marking poles which are in a dangerous condition and require immediate replacement. It serves as a warning to the employees that the pole is in a dangerous condition and shall not be climbed or worked on before being temporarily supported as described in Part 7.

9.04 Place one tag on the road side of the pole just below the pole number, if the pole is numbered, or at approximately 6 feet above groundline if the pole is not numbered. Place another tag at approximately the same height on the field side of the pole. If the pole is defective in the groundline section, place the tags so the arrow points downward. If the pole is defective in the upper portion, place the tags so the arrow points upward. If, however, the pole is defective in both the groundline section and in the upper portion place a double set of tags, one set with the arrow pointing downward and the other set with the arrow pointing upward. Attach the tags with pole tag nails.