GUYING

METHODS OF INSULATING

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1. GENERAL

1.01 This section covers the descriptions of strain insulators and their use in insulating guys.

1.02 This section is revised to add references to 6.6M strand.

1.03 Normally, the work plans will indicate whether guys are to be insulated or grounded. Information on situations which require insulating of guys is contained in Section 621-405-011 and should be used in the absence of local instructions.

1.04 In selecting the size of guy insulator, it is necessary to consider both the voltage of the power conductors creating the exposure and the size of the guy strand. In most cases, the work plans will indicate the voltage of the power line involved. If this information has been omitted, it should be obtained either from your supervisor or the power company.

1.05 The voltage of power lines is sometimes expressed in terms of voltage to ground and sometimes in terms of voltage between wires. When guy insulators are used, they must be adequate for the ***full voltage between conductors***. Note that voltage between conductors of a three phase power system is 1.73 times the voltage to ground. For example, a three phase line carrying 14,400 volts to ground, has a voltage of 25,000 between conductors. Guy insulators used on such a line would have to be good for 25,000 volts.

1.06 The practice of insulating only for the single phase voltage (ie, voltage to ground) should, in general, be limited to single phase spur lines serving a single customer on private property. Single phase lines on through roads, etc, are likely to be reinforced with the second and third phase conductors as power loads grow. In order to avoid adding or replacing insulators, these lines should be considered as being three phase lines when selecting the size of guy strain insulator.

2. SIZES AND RATINGS OF STRAIN INSULATORS

2.01 Table A lists the sizes of current standard commercial insulators and the conditions under which each may be used. These are so called "single-fin" type insulators. Their general appearance is shown in Fig. 1. Insulators are ***not*** marked to identify either their mechanical or electrical ratings. However, ratings can be readily determined by measuring the length and diameter of insulators and comparing the measurements with Table A.

TABLE A

SINGLE FIN INSULATOR SPECIFICATIONS

MAXIMUM SIZE OF GUY	MAXIMUM VOLTAGE	MINIMUM LENGTH (INCHES)	MINIMUM DIAMETER (D) (INCHES)
10M and Smaller	13,500	3-1/4	2-3/8
16M and Smaller	15,000	4-1/8	2-3/4
25M and Smaller	18,000	5-1/4	3-1/4

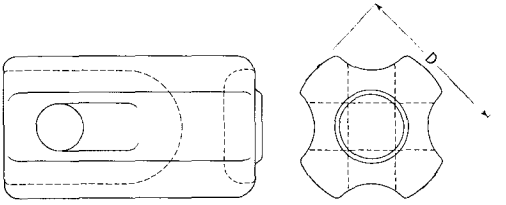

Fig. 1—Insulator—Single Fin Type

2.02 Insulators for 25M strand were also furnished in the so called "multiple-fin" type and these may be reused. Their general appearance is shown in Fig. 2. Multiple fin insulators should not be used unless they measure at least 6-1/2 inches by 3-3/8 inches. Such insulators carry a rating of 23,000 volts.

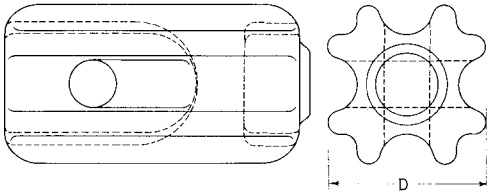

Fig. 2—Insulator—Multiple Fin Type

2.03 "Wire" size insulators (2-1/4 inches by 1-1/2 inches) have been used in the past where no voltage rating is necessary and wire guys have been employed. These insulators have no voltage rating and should not be used in any situation where a voltage rating is required. If wire guys are placed in a situation where they must be insulated, use insulators of the size required by the voltage involved. (See Table A).

2.04 If it is necessary to insulate against voltages higher than the rating of a single insulator, use two or more insulators in series. For example, if it is necessary to insulate a 10M guy against a 25,000 volt exposure, use two 10M strain insulators. An exposure of 50,000 volts would require three 25M insulators in series.

3. LOCATING INSULATORS

3.01 Where guys are placed so one crosses or is above another guy, insulators should be located so they will not become ineffective if one guy sags down upon the other.

3.02 All guy strain insulators shall be installed at least 8 feet above the ground.

3.03 On nonjoint poles, guy strain insulators in pole-to-pole and stub guys shall be located outside of the "zone of exposure." (See Fig. 3.) The zone of exposure is defined as the space within a horizontal distance of 10 feet from a power conductor and extends both above and below the conductor. Strain insulators in anchor guys should be located outside of the zone of exposure.

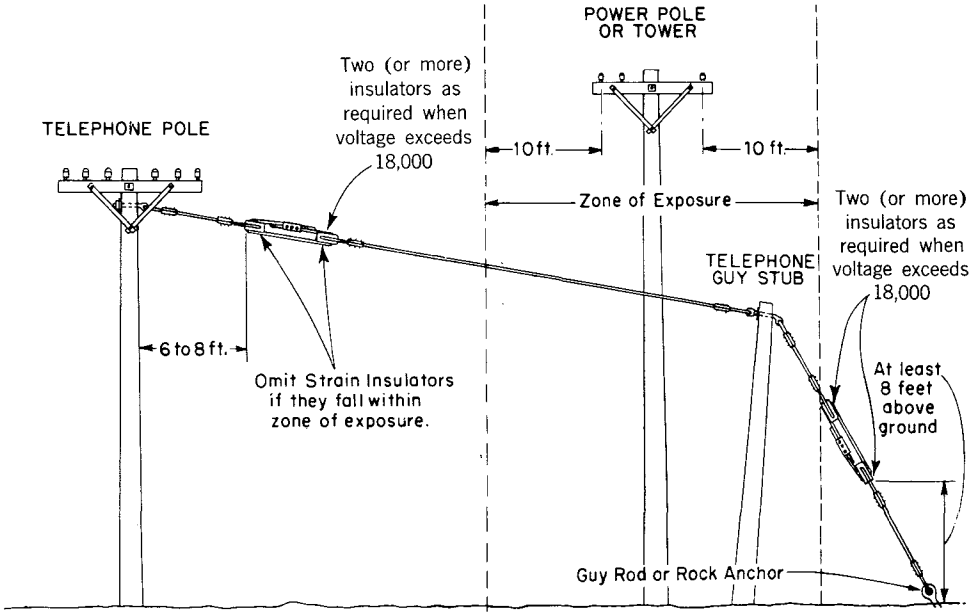

Fig. 3—Insulating Guys in Zone of Exposure—Voltages in Excess of 18,000

3.04 Guy strain insulators shall be located to provide the horizontal clearances from the pole as shown in Table B.

TABLE B

HORIZONTAL CLEARANCES FROM INSULATOR TO POLE

KIND OF GUY	POLE CARRIES CABLE OR MULTIPLE LINE WIRE	POLE CARRIES OPEN WIRE
Anchor	40 in. (if practical)	40 in. (if practical)
Pole-to-Pole or Pole-to-Stub	40 in. — 8 ft.	6 ft. — 8 ft.

3.05 On poles carrying power conductors ***below*** telephone attachments, place two strain insulators so one will be above the power conductor and one will be below. The upper insulator should be located 6 to 12 inches above the level of the power conductor. Avoid grounding the upper part of the guy. (See Fig. 4.)

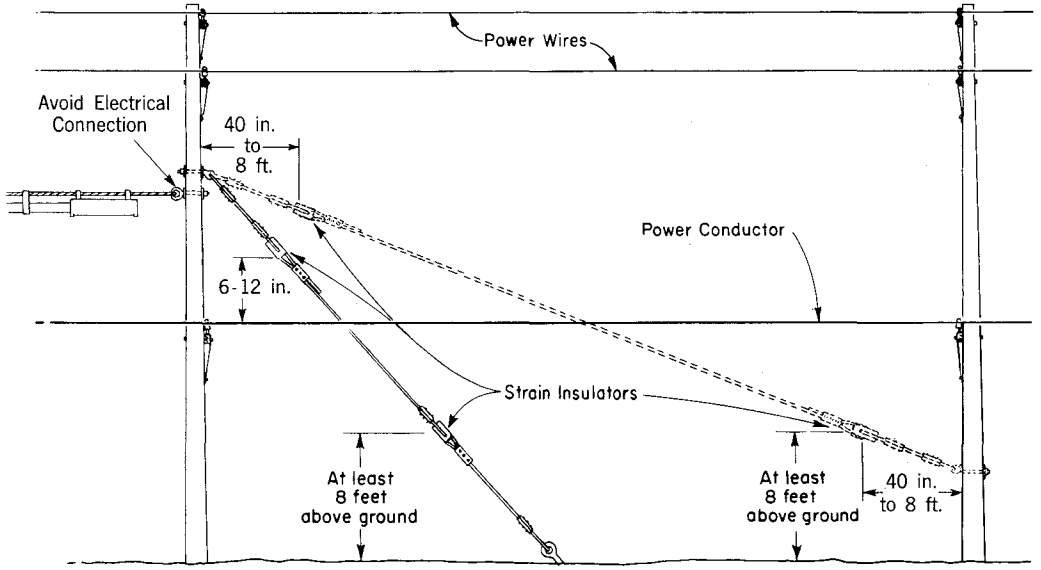

Fig. 4—Insulating Guys for Attachments Above Power Conductors

3.06 The examples in Fig. 5 and 6 further illustrate the application of the requirements governing the location of guy strain insulators.

Note: Where there is not sufficient space to place strain insulator between guy stub and zone of exposure as shown, it shall be placed in the down guy at least 8 feet above ground.

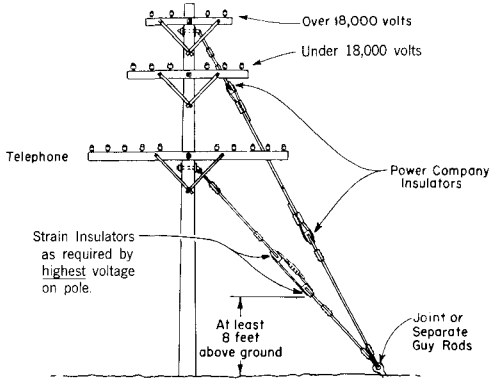

Fig. 5—Insulating Guy on Jointly Used Pole

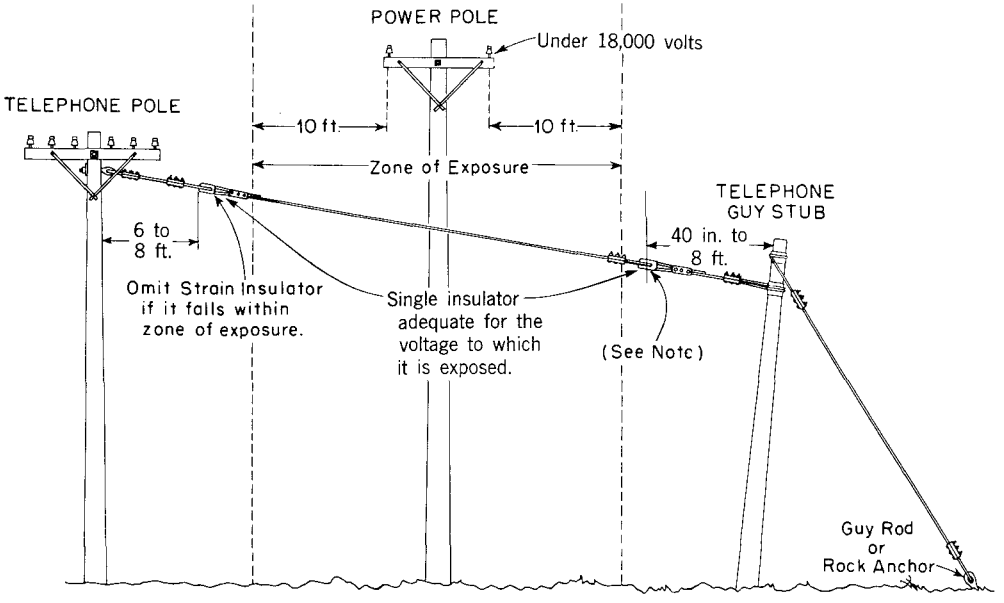

Fig. 6—Insulating Guys in Zone of Exposure—Voltages Less than 18,000

4. METHODS OF INSTALLING STRAIN INSULATORS

4.01 Strain insulators shall be installed as follows:

(a) ***Galvanized Wire Guy:*** Serve galvanized wire back on itself. (See Fig. 7)

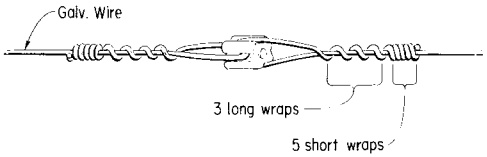

Fig. 7—Installing Strain Insulator in Wire Guy

(b) ***2200 Pound Strand:*** Use a one-bolt guy clamp on each side of the insulator. (See Fig. 8.)

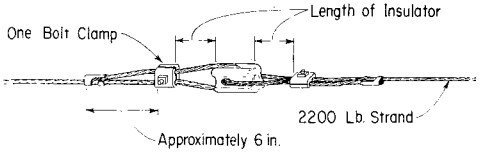

Fig. 8—Installing Strain Insulator in 2.2M Strand

(c) ***6000, ▶6600◀ , and 10,000 Pound Strand:*** Use one 3-bolt guy clamp, B strand grip or strandvise on each side of the insulator. (See Fig. 9) Tightening the bolts on three-bolt guy clamps should preferably be done with the clamps held in a vise.

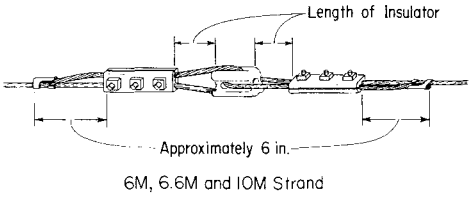

Fig. 9—Installing Strain Insulator in 6M, 6.6M and 10M Strand

(d) ***16,000 Pound Strand:*** Use a B strand grip on each side of the insulator. Alternatives: Use two 3-bolt guy clamps or a long bail strandvise on each side of the insulator. (See Fig. 10.)

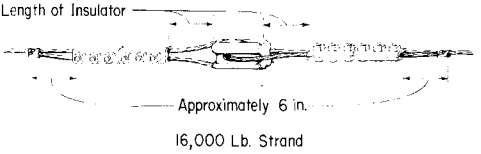

Fig. 10—Installing Strain Insulator in 16M Strand

(e) ***25,000 Pound Strand:*** Use a B strand grip on each side of the insulator. Alternatives: Use three 3-bolt guy clamps on each side of the insulator. (See Fig. 11.)

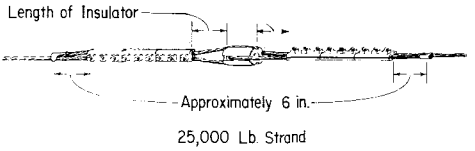

Fig. 11—Installing Strain Insulator in 25M Strand

(f) ***Strain Insulators In Series:*** Insulators placed in series shall be connected with loops of strand not less than the sizes shown in Table C. The use of B strand grips and the B strand connector to install strain insulators is shown in Fig. 12. Alternatives: Use 3-bolt guy clamps as shown in Fig. 13 or two long bail strandvises and a strand connector to close the loop connecting the insulators.

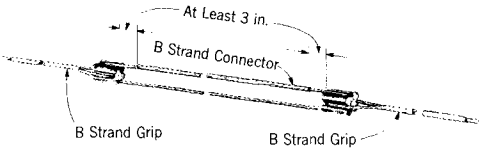

Fig. 12—Installing Strain Insulators in Series Using Strand Connector

TABLE C

MINIMUM STRAND SIZES REQUIRED FOR LOOPS

SIZE OF GUY STRAND	SIZE OF STRAND IN LOOP
6M, 6.6M, 10M	6M
16M	10M
25M	16M

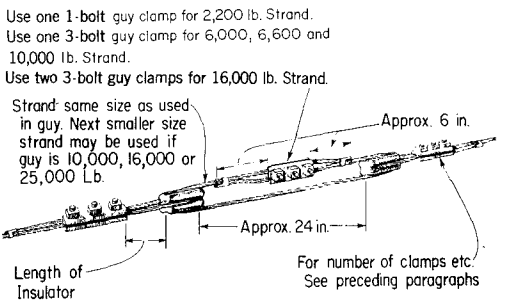

Fig. 13—Installing Strain Insulators in Series Using 3-Bolt Guy Clamps