

**CONSTRUCTION GUIDELINE****GUYING AND ANCHORING****GUYING AND BRACING**

When the loads to be imposed on supporting structures are greater than can be safely supported by the structures alone, additional strength shall be provided by the use of guys, braces, or other suitable construction. Such measures shall also be used where necessary to prevent undue increase of sags in adjacent spans as well as to provide sufficient strength for those supports on which the loads are considerably unbalanced, for example, at corners, angles, dead ends, large differences in span lengths, and changes of grade of construction.

Guys shall be installed prior to stringing conductors, but shall not be tightened excessively to the point where the poles are pulled out of line. Following the stringing, they shall be checked and, if necessary, adjusted to hold the pole in the plumb position. The number and size of guys required at a particular structure will depend on: the total conductor tension for all wires, the anchor lead, the deflection angle in the line and the pole height. Charts have been included which specify the number of guys required and the recommended distance from anchor to pole for various conditions. Where a joint use distribution and communication circuit is being built, the anchoring requirements of each circuit should be considered and combined where possible.

**POINT OF ATTACHMENT**

The guy or brace should be attached to the structure as near as is practical to the center of the conductor load to be sustained. However, on lines exceeding 8.7 kilovolts the location of the guy or brace may be adjusted to minimize the reduction of the insulation offered by nonmetallic support arms and supporting structures.

**GUY FASTENINGS**

Guys having an ultimate strength of 20,000 lbs. or more and subject to small radius bends should be stranded and should be protected by suitable guy thimbles or their equivalent.

**GUY INSULATORS****Properties of Guy Insulators:**

1. Material: Insulators shall be made of wet process porcelain, glass fiber reinforced plastic or other material of suitable mechanical and electrical properties.
2. Electrical Strength: The guy insulator shall have a rated dry flashover voltage at least double the nominal line voltage and a rated wet flashover voltage at least as high as the nominal line voltage between conductors of the guyed circuit. A guy insulator may consist of one or more units.
3. Mechanical Strength: The rated ultimate strength of the guy insulator shall be at least equal to the rated breaking strength of the guy in which it is installed.
4. Guy Grounding: If required the minimum ground wire size shall be #8 AWG copper wire.

**Insulators shall be installed as follows:**

1. All insulators shall be installed at least 8 ft. above the ground.
2. Where hazard would exist with one insulator, two or more guy insulators shall be placed so as to include, in so far as is practical, the exposed section of the guy between them.
3. Insulators shall be so placed that in case any guy sags down upon another, the insulators will not become ineffective.

**GUY MARKERS**

The ground end of anchor guys, exposed to pedestrian traffic, shall be provided with a substantial and conspicuous marker not less than 8 ft. long.

**NOTE:** Visibility of markers can be improved by the use of color or color patterns which provide contrast with the surroundings.

**ANCHOR RODS**

1. Anchor rods should be installed so as to be in line with the pull of the attached guy when under load.  
**EXCEPTION:** This is not required for anchor rods installed in rock or concrete.
2. The anchor rod assembly shall have an ultimate strength not less than that of the guy.

ORIGINATOR	STANDARDS COORDINATOR	STANDARDS SUPERVISOR	UNIT DIRECTOR
<i>Jim S. Horn</i>	<i>Charles F. Shaffer</i>	<i>Al Sternberg</i>	<i>Hardee Gray</i>

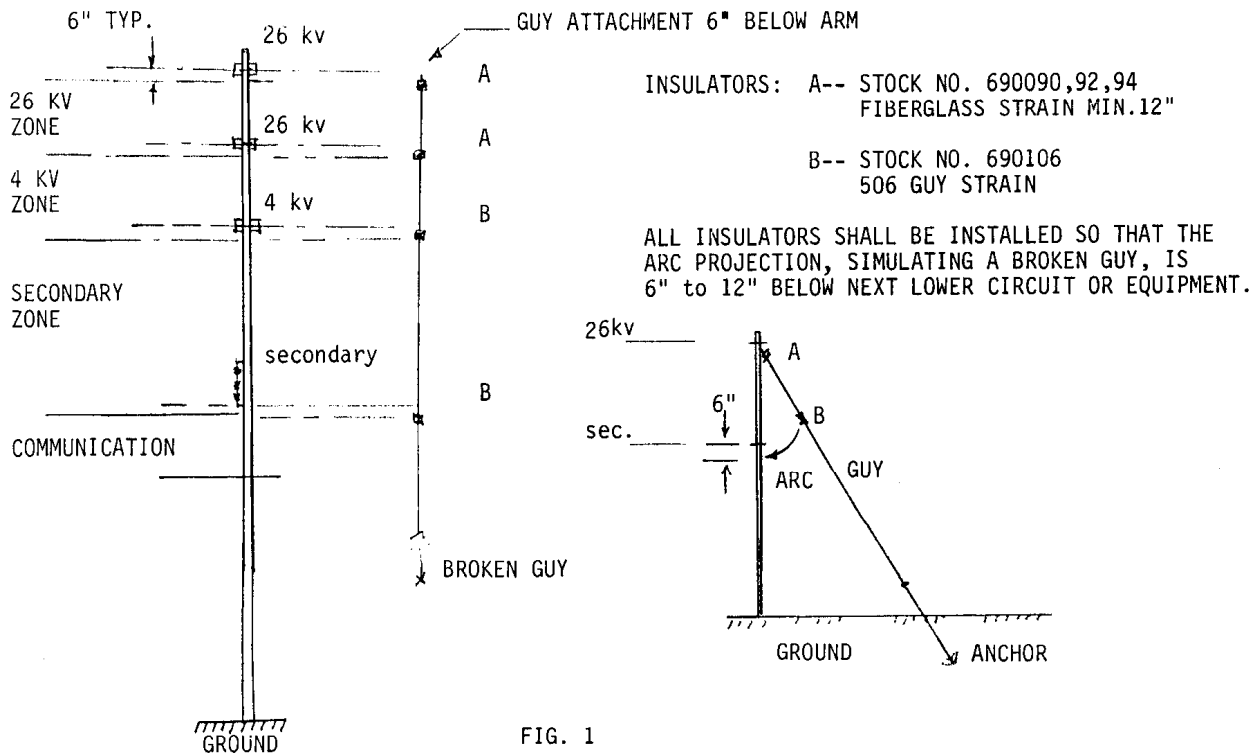
**STATEMENT OF PRINCIPLE**

Guy wires used to support distribution or transmission circuits and associated equipment, i.e. transformers, underground terminations, switching apparatus, shall be sectionalized with appropriate voltage class guy insulators.

The arc projection (location) of the guy insulators shall assure that in the case of a broken guy wire adjacent circuits or equipment on the same supporting structure are isolated from each other. This basic philosophy can be extended to meet unusual field conditions.

The following figures typify guying construction: Down guy tensioning charts for 10M and 20M guy wire for various anchor locations are included for quick reference.

**BROKEN GUY CRITERIA**



**GUY ATTACHMENT LOCATIONS**

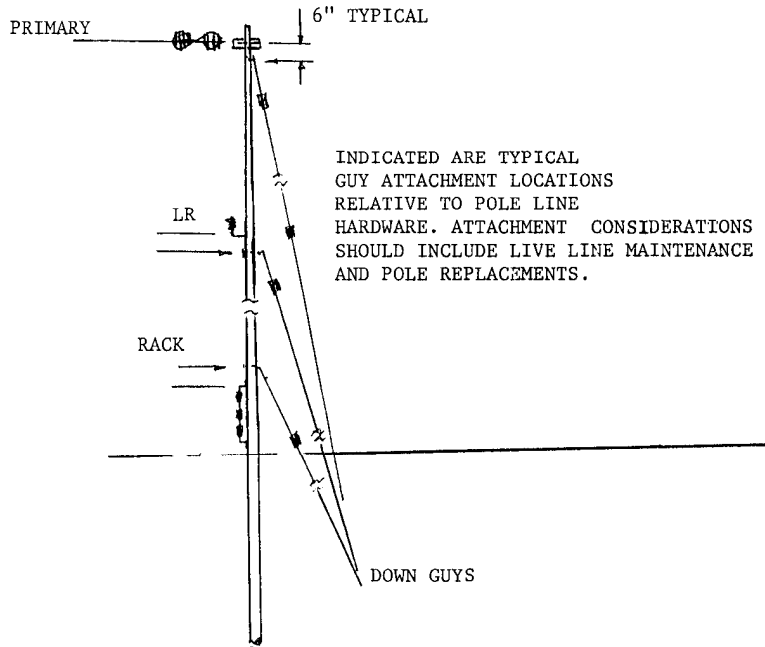
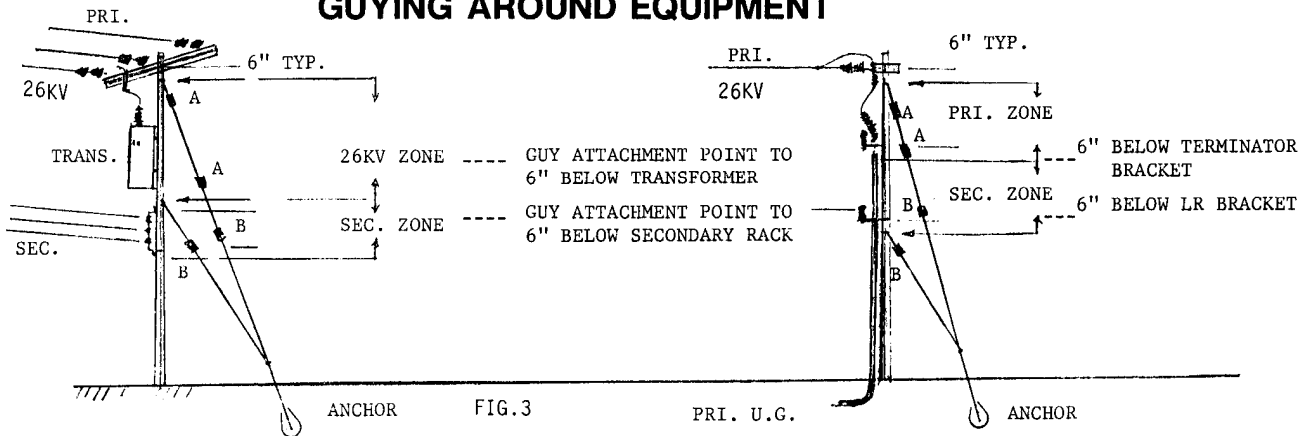
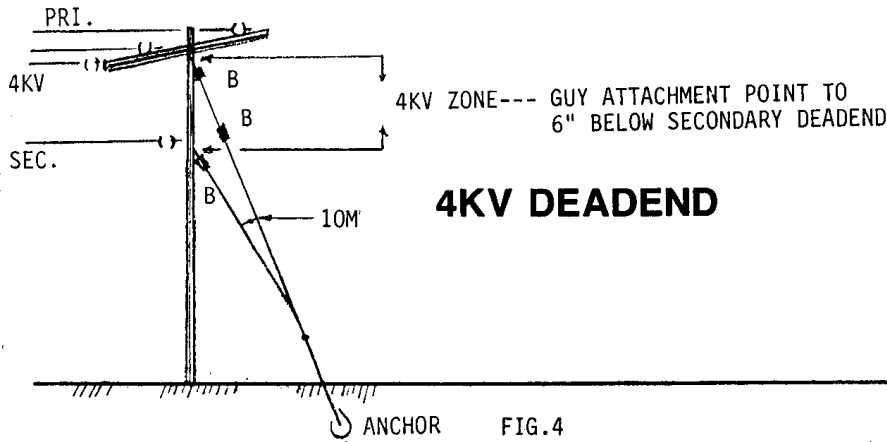


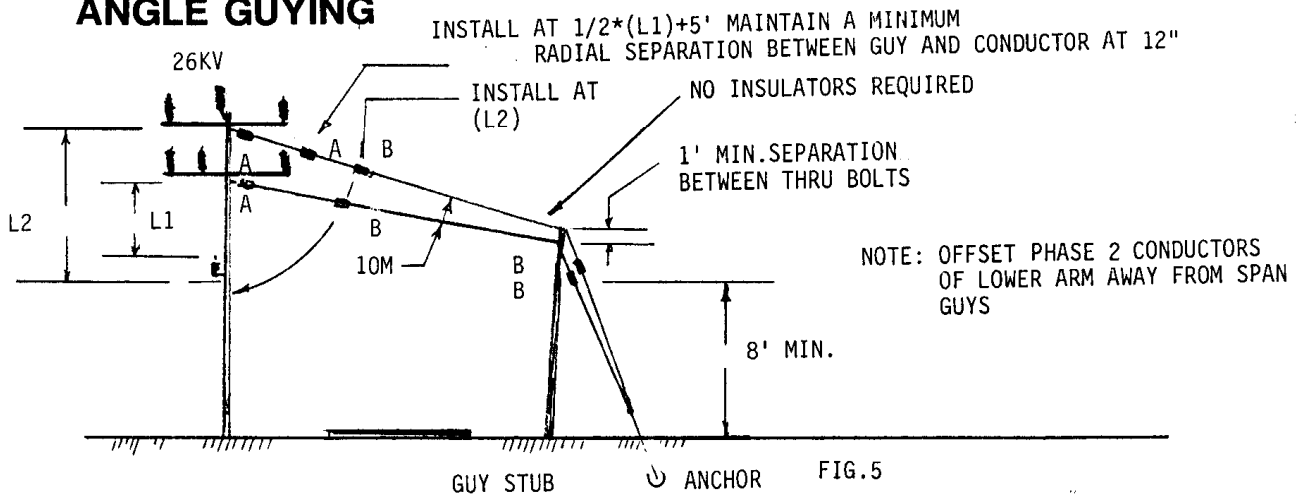
FIG. 2

**GUYING AROUND EQUIPMENT**

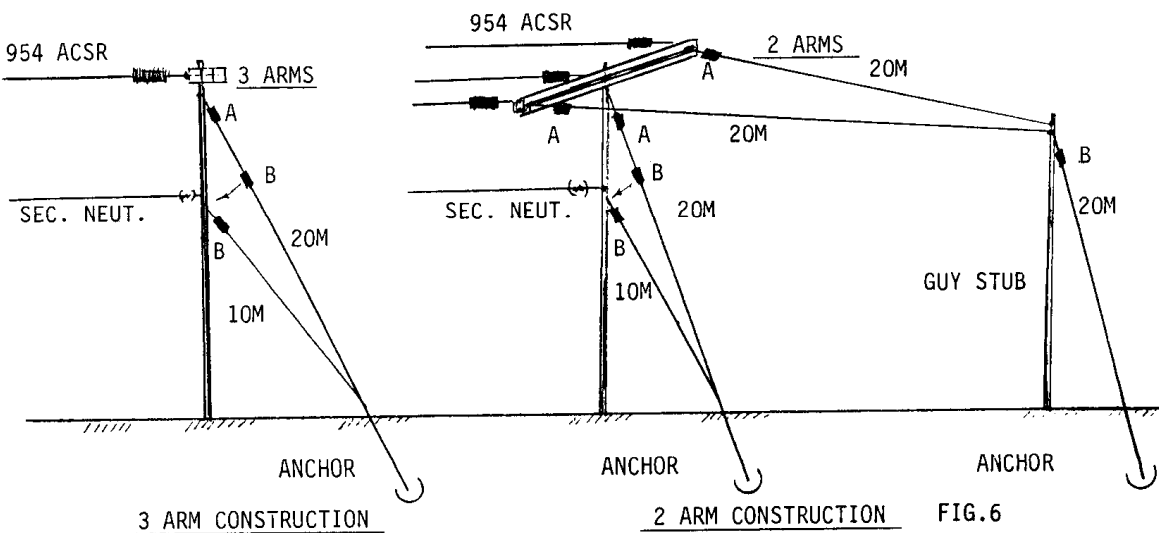




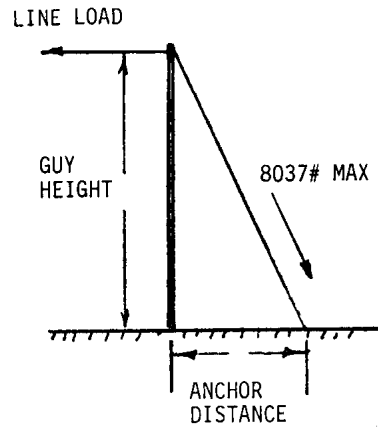
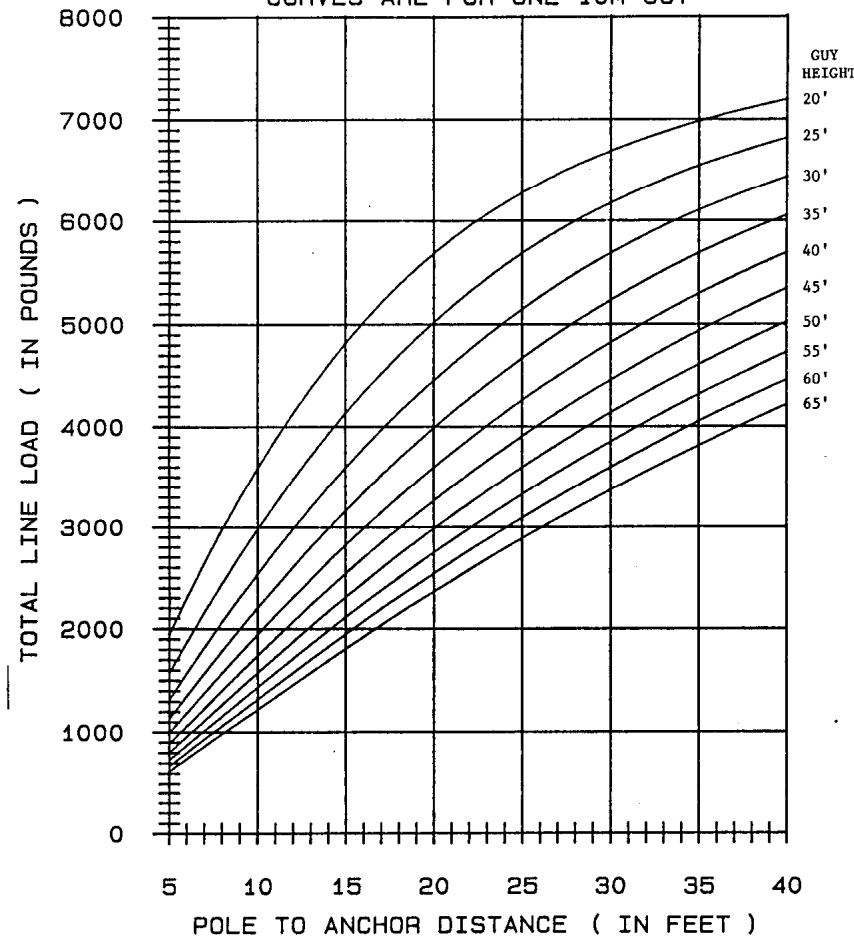
**ANGLE GUYING**



**954 GUYING OPTIONS**



DOWN GUY FOR DEADENDING  
AND ANGLE GUYING  
CURVES ARE FOR ONE 10M GUY

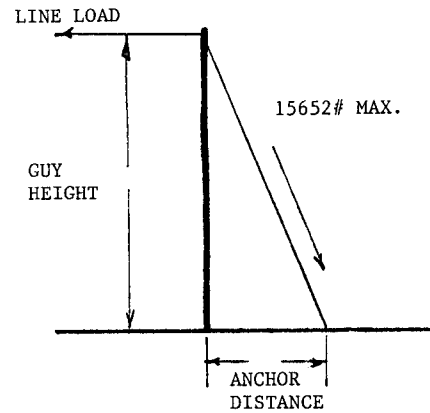
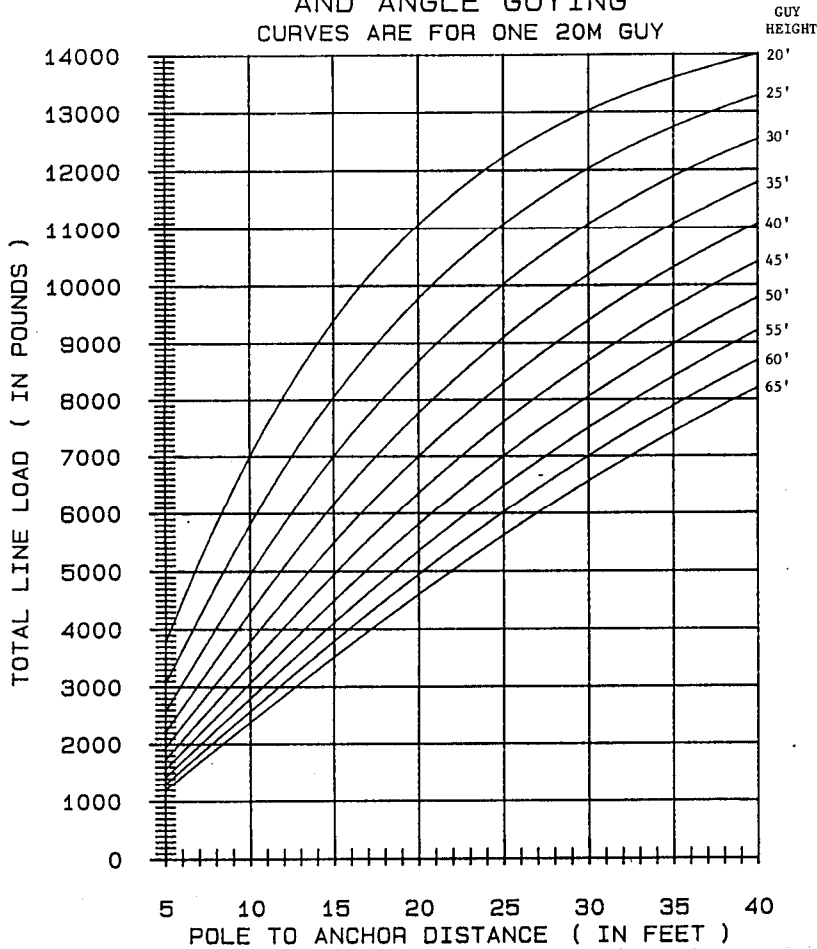


Maximum 10m Down Guy Tension is 8037 Pounds

GUY HEIGHT	POLE - ANCHOR DISTANCE (IN FEET)							
	5	10	15	20	25	30	35	40
20	1949	3594	4822	5683	6276	6688	6978	7189
25	1576	2985	4135	5021	5683	6174	6540	6816
30	1321	2542	3594	4458	5145	5683	6102	6430
35	1137	2208	3166	3988	4672	5231	5683	6049
40	997	1949	2822	3594	4260	4822	5293	5683
45	888	1744	2542	3264	3903	4458	4934	5340
50	800	1576	2310	2985	3594	4135	4609	5021
55	728	1438	2115	2747	3326	3849	4315	4727
60	667	1321	1949	2542	3091	3594	4050	4458

**CONSTRUCTION GUIDELINE**

DOWN GUY FOR DEADENDING  
AND ANGLE GUYING  
CURVES ARE FOR ONE 20M GUY

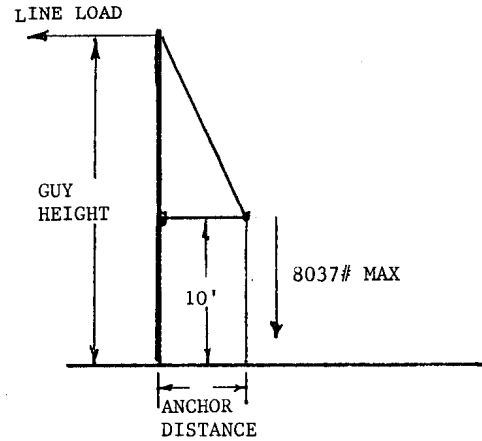
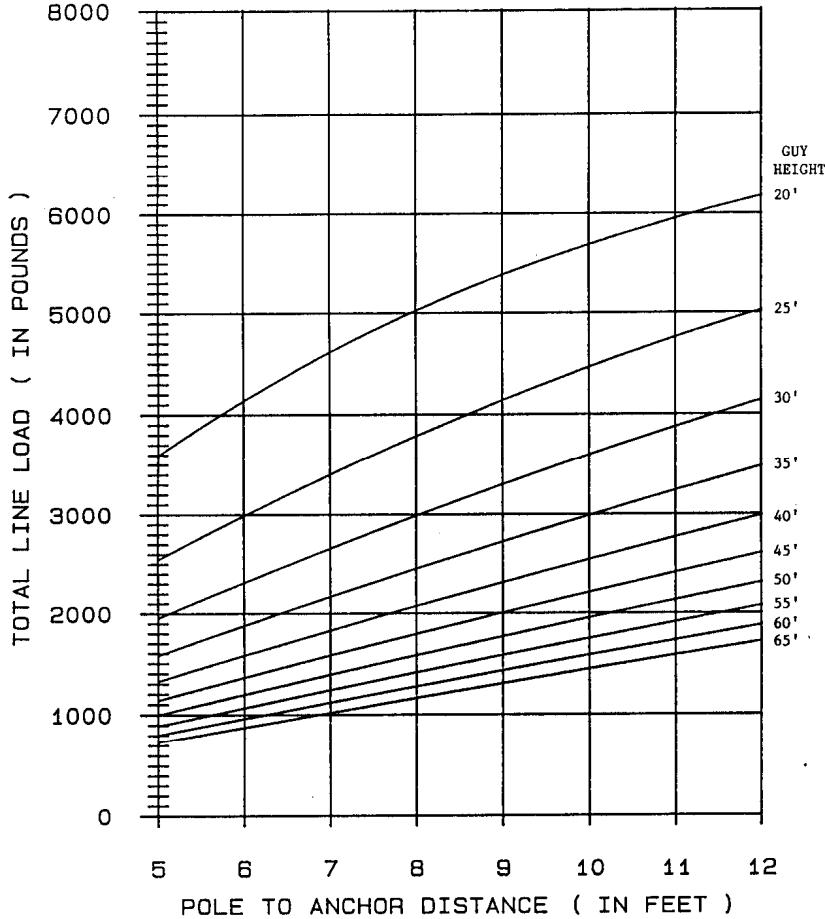


Maximum 20m Down Guy Tension is 15652 Pounds

GUY HEIGHT	POLE - ANCHOR DISTANCE (IN FEET)							
	5	10	15	20	25	30	35	40
20	3796	7000	9391	11068	12222	13023	13590	14000
25	3070	5813	8053	9778	11068	12024	12737	13273
30	2573	4950	7000	8682	10020	11068	11884	12522
35	2214	4300	6166	7766	9098	10186	11068	11779
40	1941	3796	5496	7000	8296	9391	10307	11068
45	1728	3395	4950	6357	7601	8682	9610	10399
50	1557	3070	4498	5813	7000	8053	8976	9778
55	1417	2800	4118	5349	6477	7495	8403	9206
60	1300	2573	3796	4950	6020	7000	7887	8682

PIPE BRACE GUYS

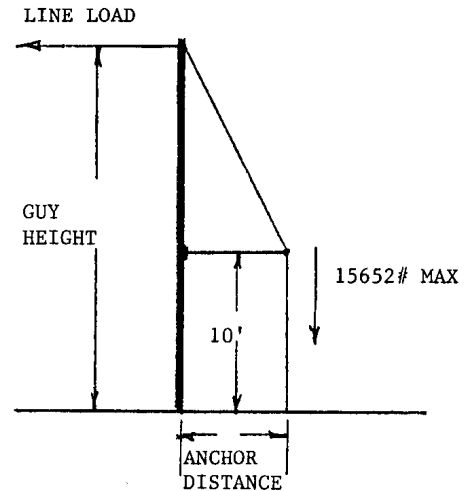
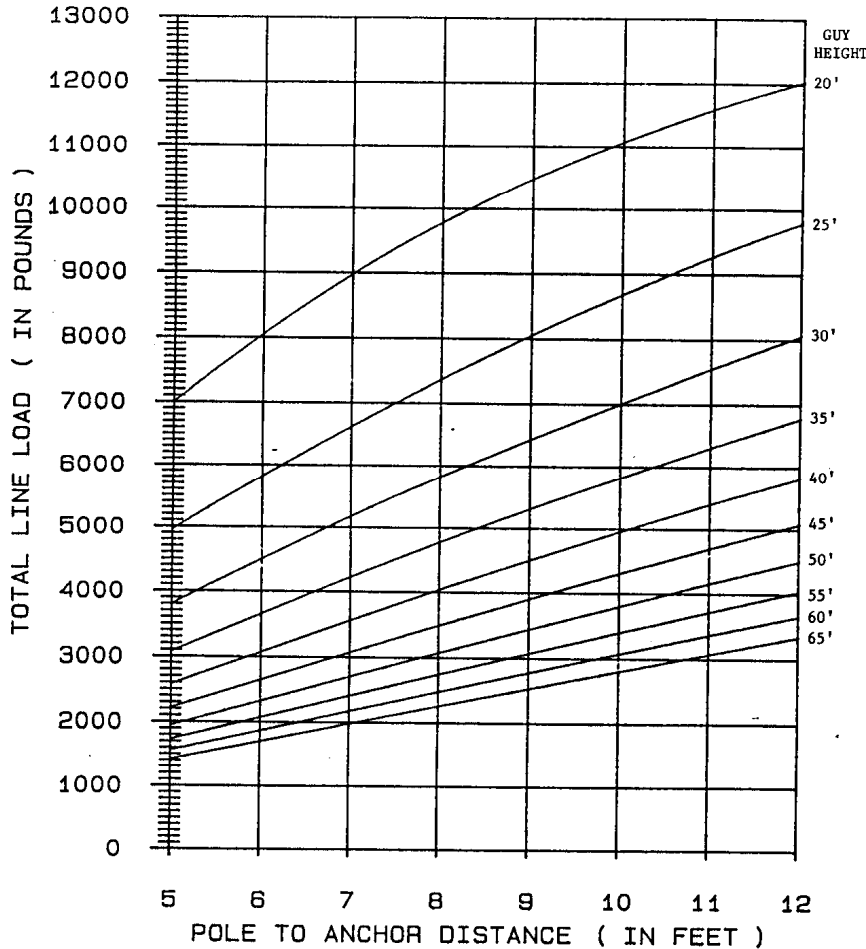
CURVES ARE FOR ONE 10M GUY



Maximum 10m Pipe Brace Tension is 8037 Pounds

GUY HEIGHT	POLE - ANCHOR DISTANCE (IN FEET)							
	5	6	7	8	9	10	11	12
20	3594	4135	4609	5021	5377	5683	5947	6174
25	2542	2985	3399	3782	4135	4458	4753	5021
30	1949	2310	2655	2985	3298	3594	3873	4135
35	1576	1876	2167	2450	2722	2985	3237	3478
40	1321	1576	1826	2071	2310	2542	2767	2985
45	1137	1358	1576	1791	2002	2208	2410	2607
50	997	1192	1385	1576	1764	1949	2131	2310
55	888	1062	1235	1407	1576	1744	1909	2071
60	800	958	1114	1270	1424	1576	1727	1876

**PIPE BRACE GUYS**  
CURVES ARE FOR ONE 20M GUY



Maximum 20m Pipe Brace Tension is 15652 Pounds

GUY HEIGHT	POLE - ANCHOR DISTANCE (IN FEET)							
	5	6	7	8	9	10	11	12
20	7000	8053	8976	9778	10471	11068	11582	12024
25	4950	5813	6619	7366	8053	8682	9256	9778
30	3796	4498	5171	5813	6423	7000	7543	8053
35	3070	3653	4220	4770	5302	5813	6304	6773
40	2573	3070	3557	4033	4498	4950	5388	5813
45	2214	2645	3070	3488	3898	4300	4693	5076
50	1941	2322	2698	3070	3436	3796	4150	4498
55	1728	2069	2406	2740	3070	3395	3717	4033
60	1557	1865	2170	2473	2773	3070	3363	3653

**COMMONLY USED GUYING HARDWARE**



**CONSTRUCTION GUIDELINE**

Material	Description	Matl. Std.	Stock No.
GUY WIRE	Aluminum Covered Steel, 5/16" – 9/16"	5664.1	566406 - 566425
DEAD END	Automatic, Feed Through	5650.3	565048E - 565052
GRIPS, Guy Wire	Preformed Deadend	5651.4	565122E - 565126
GUY HOOK	Spur Type	5651.15	565195E
POLE EYE PLATE	3/4" Bolt & Pin, 20,000 lbs @ 45° & 90°	5651.15	565198
	1" bolt, 36,000 lbs @ 45° 7/8" pin, 30,000 lbs @ 90°	5651.15	565199
GUY MARKER	Plastic, 8' Lengths	5651.8	565168E
INSULATOR	Porcelain, Guy Strain	6901.1	690104E& 690106E
INSULATOR	Fiberglass, Guy Strain, 12" – 108"	6900.5	690090- 690096
SPLICE	Automatic, Full Tension	5653.4	565337 & 565338
SHACKLE	3/4" & 7/8" pin, can be used to compensate for misalignment.	6966.1	696604 - 696618
GUY CLAMP	Sidewalk Guy Fitting	5650.1	565054
POLE PLATE	Sidewalk Guy Fitting	5650.1	565105
EYE NUT	Oval, 5/8" & 3/4"	5652.1	565252E& 565254E
	Strand, 5/8" & 3/4"	5652.1	565258E& 565260E
	Twin strand, 3/4"	5652.1	565266E
	Triple eye for 1" anchor rod.	-	565274
CLEVIS, Anchor Rod Extension	Links to existing anchor rod eye. Use with Stock No. 562290 3/4" x 8' rod.	-	562070
ANCHOR, Cross Plate	20", use Stock No. 562290 - rod.	5620.7	562058
ANCHOR, Plate	"Manta Ray"	-	562050
ROD, Triple Eye	3/4" x 8' For plate anchors.	5622.5	562290
ANCHORS, Single Helix, Screw	6", 10,000 ft. lb.	-	562030
	10", 15,000 ft. lb.	-	562028
ROD, Single Helix	1" x 1-1/2' Round	-	562090
	1" x 3-1/2' Round	-	562096
ANCHORS, Triple Helix, Screw	Diameters 10", 11-5/16", and 13-1/2".	-	562043
ROD, Triple Helix	1-1/2" x 5' square.	-	562102
COUPLING, Extension Rod	For 3/4" or 1" rod.	-	562110



GUY WIRE



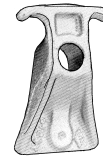
DEAD END



GRIPS



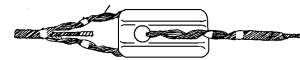
FULL TENSION SPLICE



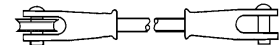
GUY HOOK



POLE EYE PLATES



Porcelain

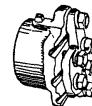


Fiberglass

INSULATORS



GUY MARKER



GUY CLAMP



POLE PLATE



SHACKLE



Oval



Strand



Twin Strand

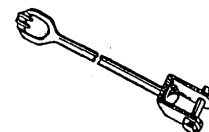


Triple

EYE NUTS



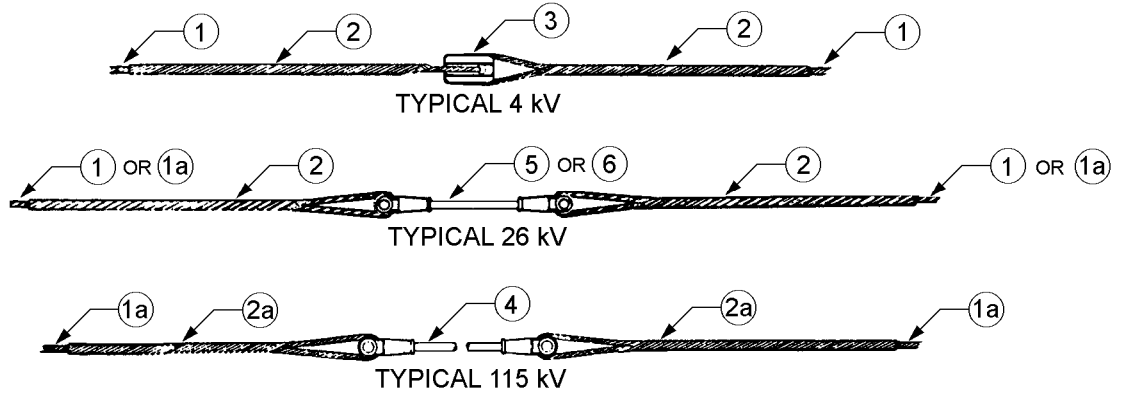
Coupling



Clevis

ANCHOR ROD EXTENSIONS

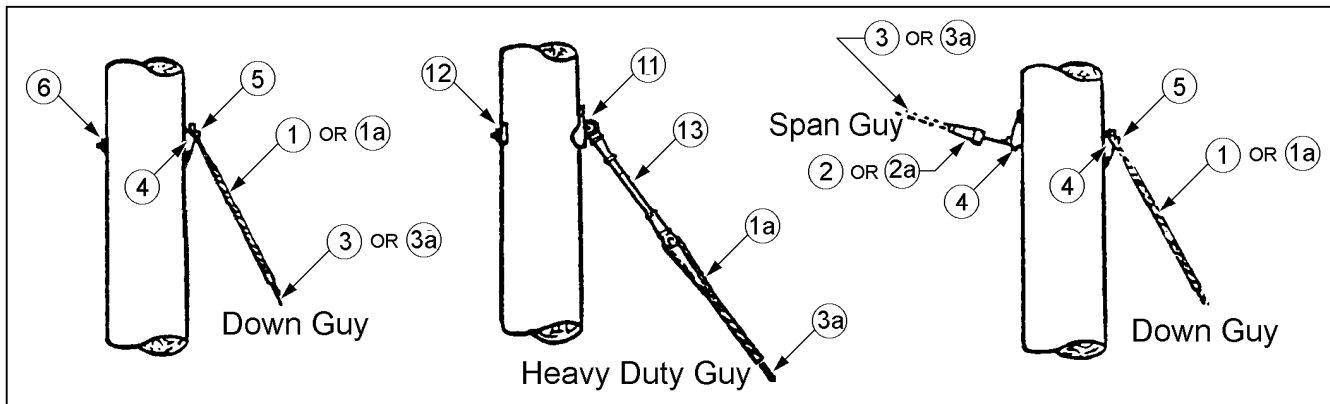
**STRAIN INSULATOR INSTALLATIONS**



Material List			
Item	Material, As Required	Stock No.	Rated Strength
<b>WIRE</b>			
1	5/16" Aluminum Covered Guy	566406	10,270 LB
1a	7/16" Aluminum Covered Guy	566408	20,000 LB
<b>GRIPS, GUY</b>			
2	5/16" Aluminum Covered	565122E	10,270 LB
2a	7/16" Aluminum Covered	565124E	20,000 LB
3	Insulator, 506 Guy Strain	690106E	20,000 LB
4	108" Insulator, Fiberglass Strain	690094	21,000 LB
*5	12" Insulator, Fiberglass Strain	690092E	11,000 LB
6	35" Insulator, Fiberglass Strain	690090	21,000 LB

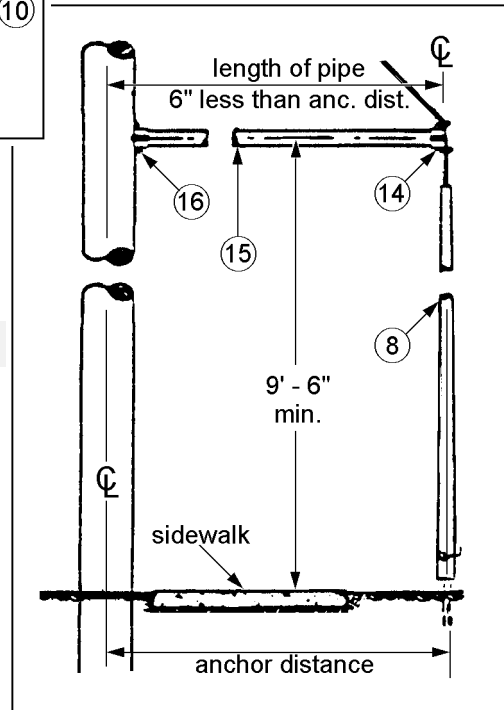
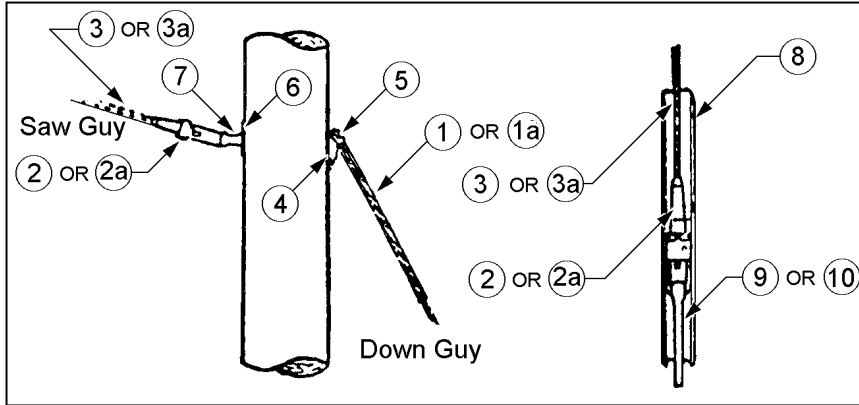
\*Do not use with 7/16" aluminum covered guy.

**POLE AND ANCHOR ATTACHMENTS**



Material List on the following page.

**POLE AND ANCHOR ATTACHMENTS - CONTINUED**



Material List		
Item	Description	Stock No.
1	Guy Grip, 5/16" Aluminum Covered	565122E
1a	Guy Grip, 7/16" Aluminum Covered	565124E
2	Deadend, Automatic, for 10M Guy	565048E
2a	Deadend, Automatic, for 20M Guy	565051
3	Wire, 5/16", Aluminum Covered Guy (10M)	566406
3a	Wire, 7/16", Aluminum Covered Guy (20M)	566408
4	Hook, Guy, 10M	565195E
5	Bolt, 3/4" x Length	780875E-780878E
6	Washer, 2-1/4"x 2-1/4" Flat	585135E
7	Nut, 3/4" Strand Eye	565254E
8	Marker, Plastic Guy	565168E
9	Rod, 3/4"x 8'-0" Galvanized Anchor	562290
10	Nut, Triple Eye, Galvanized	565274
11	Plate, Pole Eye	565198
12	Washer, Curved, 4x4	584775E
13	Insulator, Fiberglass, Strain 20M	690090
14	Clamp, Galvanized Guy Pipe, 2-1/2"	565054
15	Pipe, Galvanized Water, 2-1/2"x (As Req'd)	710370
16	Plate, Galvanized Guy Pole, 2-1/2"	565105