

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

SAFETY DIVISION
UTILITIES SAFETY BRANCH

RESOLUTION SU-10
January .21, 1992

R E S O L U T I O N

RESOLUTION SU-10, ORDER AUTHORIZING RULE CHANGES
TO GENERAL ORDER NO.95 (G.O. 95),
RULES FOR OVERHEAD ELECTRIC LINE CONSTRUCTION

SUMMARY

1. The staff of the Safety Division's Utilities Safety Branch requests authorization for changes to G.O. 95 contained in the enclosed Appendix A.
2. The request follows submittal of proposed changes by the General Orders 95/128 Rules Committee, which is composed of representatives from operators of electric and communications lines in California. The committee has obtained a consensus of investor owned utilities, utility districts, municipalities, the California Cable Television Association, and the associated labor unions concerning the changes.
3. The changes authorized are to rules concerning strength of materials, grounding, bonding, conductor clearances, conductor spacing, guy clearances, guy sectionalizing insulators, trolley line clearances, and communication service drops.

BACKGROUND

1. The changes are the result of informal proposals by the General Orders 95/128 Rules Committee. The committee represents operators of overhead and underground lines and the associated labor unions in California. It was formed by the line operators to review electric and communication line construction and maintenance methods and materials. All operators- are invited to participate in ongoing workshops held in numerous locations each year to consider state-of-the-art methods and materials for the industry, along with changes in the General Orders.
2. Members of the Commission's utilities Safety Branch staff attend meetings of the rules committee and its subcommittees to participate in its discussions and assist in its work.
3. When a study group or subcommittee of the "Rules Committee" drafts a rule change proposal, the draft is sent to the whole committee for evaluation. The

proposal may be modified to obtain a consensus of the committee; if consensus is not reached, the proposal is dropped.

4. After a final draft of the proposed rule changes is approved in committee meetings the draft is mailed with a ballot to all members so that those who may have missed any discussion sessions may review and vote on each change. Any dissenting vote requires that meetings be held to resolve the issues.
5. Safety is of primary concern when a rule change is proposed. As noted in the rationale for changes in Appendix A, safety to workers and the general public is considered.

DISCUSSION

1. The proposed rule changes are presented in the enclosed " Appendix A. A list of the rules is contained in the Table of Contents of Appendix A.
2. The rule changes are divided generically into eighteen (18) items. Each is preceded with the rationale explaining the change, followed by the existing rule and the proposed rule changes (deletions struck out and additions underlined), and the final proposed rule marked by an asterisk (*).

The following sections of the General Orders are affected by the proposal:

General Order No. 95 Rules: 48, 49, Table 4, 52.7-F, 53.4, 54.4-A, 54.4-C4b, 54.4-D6b, 54.8, 54.10-D, 54.12 (new rule), 56.4-A1, 56.4-C2, 56.4-C3, 56.4-C4, 56.4-D, 56.4-F, 56.5, 56.6-A, 56.6-D, 56.7-A, 56.7-B, 56.7-C, 56.8-A, 56.8-C, 57.4-A, 57.4-B2, 57.4-F, 57.4-G, 57.5, 57.7, 59.3-A, 59.3-F, 74.4-E, 77.4-B, 84.8-A, 84.8-B1, 84.8-B2, 84.8-C, 84.8-C1, 84.S-C2, 84.8-C3, 84.S-D1, and 92.1-F4.

3. Except for the addition of Figures 54-9, 56-1, 56-2 and 92-1, where a pictorial representation is part of the rule, the pictorial representation has been taken from the appendix at the end of G.O. 95 and moved into the text of the rule. This should lend clarity and aid in the interpretation of the rules.
4. The staff believes the changes provide for increased safety to workers and the general public; the changes incorporate state-of-the-art methods and materials and should provide for economical construction and maintenance. The Safety Division staff recommends authorization of the changes.

FINDINGS

1. We find that the changes to G.O. 95 authorized in this Resolution are just and reasonable.

THEREFORE. IT IS ORDERED THAT:

1. The changes in text shown in Appendix A shall be made in G.O. 95.
2. All rules changed shall be marked Revised January 21, 1992, by Resolution SU-10.
3. This resolution is effective today.

I hereby certify that this Resolution was adopted by the Public Utilities Commission at its regular meeting o January 21, 1992. The following Commissioners approved it.

NEAL SHULMAN
Executive Director

DANIEL Wm. FESSLER
President
JOHN B. OHANIAN
PATRICIA M. ECKERT
NORMAN D. SHUMWAY
Commissioners

APPENDIX A
PROPOSED RULE CHANGES

RULES FOR OVERHEAD
LINE CONSTRUCTION, GENERAL ORDER NO.95
STATE OF CALIFORNIA PUBLIC UTILITIES COMMISSION

NOTE: (1) For each rule proposed to be changed, the appendix provides the following:

- (a) The rationale for the change.
- (b) The existing rule and the proposed rule changes, with deletions struck out and additions underlined.
- (c) The final proposed rule, marked by an asterisk (*).

(2) The changes are divided generically into 18 items.

APPENDIX A -TABLE OF CONTENTS

Item	Description
1.	Rules 48 and 49, Table 4, Strength Requirements, Safety Factors
2.	Rules 52.7-F and 53.4, Grounding and Bonding
3.	Rule 54. 4-A, Above Ground Conductor Clearances, Rural Districts, Agricultural Areas, and Along Roads
4.	Rules 54.4-C4b and 54.4-D6b, Conductor Clearances; Between Conductors and From Poles
5.	Rule 54.8, Service Drops, 0-750 Volts
6.	Rule 54.10-D, Conductor Spacing
7.	Rule 54.12 (New Rule), Extended Racks, 0- 750 Volts
8.	Rules 56.4-A1, C2, C3, C4, D, F, Guy Clearances
9.	Rule 56.5, Guy Fastenings
10.	Rules 56.6-A, D, Guy Sectionalizing
11.	Rules 56.7-A, B, C, Guy Insulator Location
12.	Rules 56.8-A, C, Guy Material and Insulators
13.	Rules 57.4-A, B2, F, G, 156 Messengers and Insulated Cables

14. Rules 57.5 and 57.7, Fastenings and Use of Guard Arms and Coverings
15. Rules 59.3-A and 59.3-F, Common Neutral; Material and Designation
16. Rules 74.4-E and 77.4-B, Trolley Line Clearances
17. Rules 84.8-A, E1, E2, C, C1, C2, C3, D1 Service Drops
18. Rule 92.1-F4, Clearances

ITEM 1

~~Rule~~ Rule 48

~~Rule~~ Rule 49

~~Table~~ Table 4

RATIONALE FOR PROPOSED RULE CRANGES

MATERIAL STRENGTH

-RULE 48-

ULTIMATE STRENGTH OF MATERIALS

-RULE 49-

DETAILED STRENGTH REQUIREMENTS

-TABLE 4 -

MINIMUM SAFETY FACTORS (RULE 44.1)

Present General Order 95 language restricts crossarm and structural materials, which limits the ability to apply new state-of-the-art technology. This proposal would allow the use of other materials.

EXISTING RULE
MATERIAL STRENGTH

48. ULTIMATE STRENGTH OF MATERIALS

Values used for the ultimate strength of materials, in connection with the safety specified in Rule 44 shall be not more than as follows:

48.1 Wood

Values used for moduli of rupture for wood in bending, in conjunction with the safety factors given in Rule 44, shall not exceed those shown in Table 5.

Table 5
Wood strengths

Species	Modulus of rupture in bending	
	Sawed rectangular poles, crossarm, etc. (a)	Round Poles
Cedar, western red	4,700 lbs. Per sq in	6,000 lbs. Per sq in
Douglas fir, sense	6,300 lbs. Per sq in	6,800 (b) lbs. Per sq in
Douglas fir, not dense	5,800 lbs. Per sq in	6,800 (b) lbs. Per sq in
Fir, white or red, local	4,700 lbs. Per sq in	5,600 lbs. Per sq in
Pine, southern yellow, dense	6,300 lbs. Per sq in	6,800 (b) lbs. Per sq in
Pine, southern yellow, not dense	5,800 lbs. Per sq in	6,800 (b) lbs. Per sq in
Redwood, virgin	5,300 lbs. Per sq in	6,200 lbs. Per sq in
Redwood, second growth	3,900 lbs. Per sq in	4,600 lbs. Per sq in

- (a) Figures given are for select structural grade of material under short time loading with the neutral plane parallel to a side. Multiply the values shown by 1.4 where the neutral plane is on the diagonal of a square. Multiply the given values by 0.55 where the loading being considered is a long time loading (continuous load for one year or more).
- (b) Where poles meet specifications of American Standards Association, 05.1-1963 for Douglas Fir Poles and for southern Pine Poles this value may be increased to not more than 8,000 lbs. Per square inch. Such poles shall be suitable preservative treatment.

Note Revised April 26, 1965 by Decision No. 68835.

48.2 Structural Material (other than wood)

Structural members and their connections, shall be designed and constructed so that the structures and parts thereof will not fail or be seriously distorted at any load less than the maximum working loads developed under the construction arrangement with loadings as specified in Rule 43) multiplied by the safety factors specified in Rule 44.

The safety factors specified in Rule 44 shall be applied as follows to structural steel:

Tensions and Bending: The yield point, 33,000 pounds per square inch, shall be divided by the safety factor to determine the maximum allowable working stress.

Compression: The maximum allowable working stress shall be calculated by the following formula:

$$S_{\max} = \frac{1}{f_s} \left[YP - \frac{YP - 12,000}{200} \frac{l}{r} \right]$$

where S_{\max} = maximum allowable working stress, lbs per sq in.

f_s = safety factor specified in Rule 44

YP = yield point of the steel, 33,000 lbs per sq in.

l = unsupported length of member, inches

r = radius of gyration of member, inches

Shear: The ultimate tensile strength, 60,000 pounds per square inch, shall be multiplied by 2/3 and divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Where the figures given are used, structural steel shall conform to Standards Specifications A7-39 of American Society for Testing Materials for carbon steel of structural quality. Other values may be used for steel of other strength provided the yield point and ultimate tensile strength are determined by test.

For other structural materials (other than concrete), the safety factor specified in Rule 44 shall be applied as follows:

Tension: The yield strength of the material used shall be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Compression: The ultimate compressive strength of the material used be divided by the safety factor specified in Rule 44 to obtain the allowable working stress. The ultimate compressive strength shall be determined by suitable formulas for material used, considering yield strength of the material, modulus of elasticity, slenderness ratio and eccentricity of connection. In no case shall the ultimate compressive stress be greater than the yield strength of the material.

Shear: The ultimate shear strength of the material used be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

48.3 Concrete

A Reinforced Concrete

Values used for ultimate strengths of reinforced concrete, in conjunction with safety factors given in Rule 44, shall not exceed the following:

Reinforcing steel, tensile or compressive strength, pounds per square inch- - - - -55,000

Concrete, 1:2:4 mixture	Age	Compressive Strength
	7 days-	900 lbs per sq in.
	30 days-	2,400 lbs per sq in.
	90 days-	3,100 lbs per sq in.
	6 mos-	4,400 lbs per sq in.

If reinforced concrete is designed for higher strength values which are proven by test, such values may be used in lieu of the figures given.

B Prestressed Concrete

Structural Members and their connections shall be designed and constructed so that the structures and parts thereof will not fail or be seriously distorted at any load less than their maximum working loads (developed under the current construction arrangements with loadings as Specified in Rule 43) multiplied by the safety factor specified in Rule 44."

The minimum strength of the materials used in prestressed concrete structures used in conjunction with the safety factors given in Table 4 shall be as follows:

Reinforcing Steel - yield strength 40,000 lb.. per sq. inch
Prestressing Steel - yield strength 188,000 lbs. per sq. inch
Concrete - compressive strength 4,000 lbs. per sq. inch
at 28 days

Other strength Values may be used provided the strength values used for design are proven by tests.

NOTE Rule 48.3-5 added on February 13, 1974 by Decision No.82466.

48.4 Conductors, Span Wires, Guys and Messengers

Values used for ultimate strengths of wires and cable shall not exceed those given in Appendix B. The ultimate strengths given in Tables 17 to 24 of Appendix B, except for medium-hard-drawn copper, are based on the minimum ultimate

strengths given in the standards specifications of the American Society for Testing Materials. The ultimate strengths given in Appendix B for medium-hard-drawn copper based on the standard specifications of the ASTM and provide an allowance above the minimum values of one-quarter of the range between minimum and maximum values. For use of types of wires and cables of other materials not included in Appendix B, values for ultimate strengths similarly derived from specifications are nonexistent, maker's specifications may be used provided that tests have been made which shall justify the maker's rating for ultimate strength.

48.5 Tower or Pole Foundations and Footings

In calculating the resistance of foundations or footings of towers, poles and pole line structures to uplifts, the weight of concrete shall be taken as not more than 145 pounds per cubic foot and the weight of earth (calculated 30 degrees from the vertical) shall be taken as not more than 90 pounds per cubic foot. The resistance of soil to the depression of foundations or footings shall be calculated from the best available data on the soil in question. In lieu of calculation, the strength of foundations or footings against uplift or depression may be determined by tests under the soil conditions obtaining.

48.6 Metallic Service and Meter Poles

Metallic service and meter poles shall be designed and constructed so that the poles and parts thereof will not fail or be seriously distorted at any load less than the maximum working loads (see Rule 43 for loadings) multiplied by the safety factors specified in Table 4, Rule 44. The safety factors specified in Table 4, Rule 44 shall be applied as follows:

Tension: The yield strength of the metal used shall be divided by the safety factor specified in Table 4, Rule 44 to determine the maximum allowable working stress.

Compression: The critical buckling strength of the material used, as determined by applicable formulas employing the effective slenderness ratio and yield strength, shall be divided by the safety factors specified in Table 4, Rule 44, to determine the maximum allowable working stress.

NOTE: Added July 26, 1966 by Decision No. 71009.

49 DETAILED STRENGTH REQUIREMENTS

49.1 Poles Towers and Other Structures

A Strength

Wood poles shall be of sound timber, free from defects which would materially reduce their strength or durability and they shall have sufficient strength to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The modulus of rupture used in calculation of safety factors shall be not greater than the value given in Rule 48.1.

Metallic, prestressed concrete and reinforced concrete poles, together with their foundations, shall be of such material and dimensions as to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The fiber stress values used in calculation of safety factors shall be as specified in Rule 48.2, 48.3 and 48.6.

Certain poles subject to special stresses due to angles in the line, dead –ending of conductors or other attachments, which stresses must be included in computing the loading and safety factor. Poles subject to these special stresses sometimes require the use of guy attachment shall be considered merely as a strut, the guy taking all lateral stresses. In such cases the pole strength requirement shall apply at the point of guy attachment rather than at the ground line.

49.2 Crossarms

A. MATERIAL

- (1) Wood: Wood crossarms shall be of suitable grades of Douglas fir, Southern Yellow pine or other accepted species.
- (2) Metal: Metal crossarms shall be of structural steel cast steel, or malleable cast iron, properly galvanized or otherwise protected to resist corrosion, or may be of any corrosion-resisting metal or alloy.
- (3) Pre-stressed Concrete: Pre-stressed concrete crossarms may be used provided they are designed in accordance with Rule 48.3-B.

NOTE: Part (3) added February 13, 1974 by Decision No.82466.

B MINIMUM SIZE

- (1) Wood: Crossarms used to support or guard supply conductors shall have cross-sectional dimensions not less than the following:

One piece (homogeneous): 3 ¼ x 4 ¼ inches,
Fabricated: any single member. 1 ¾ x 4 ¼ inches, or
Laminated: 3 x 4 inches.

Crossarms supporting or guarding communication conductors shall provide the strength of Douglas fir having a cross section not less than 3 by 4 ¼ inches except that crossarms six and one-half feet or less in length which support sixteen wires or less shall provide the strength of Douglas fir having a cross section not less than 2 ¾ by 3 ¾ inches.

- (2) Metal: The physical properties as a result of dimensions, shape and cross-sectional area of metal crossarms shall be such as to result in sufficient strength to meet the requirements of Rules 46, 47 and 48.2, provided the thickness of any element shall be not less than 3/32 inch.
- (3) Pre-stressed Concrete: The minimum dimension of any pre-stressed concrete member shall be 3 inches.

NOTE: Part (3) added February 13, 1974 by Decision No.82466.

C. STRENGTH

Crossarms shall be securely supported by bracing, where necessary, to withstand unbalanced vertical loads and to prevent tipping of any arm sufficiently to decrease clearances below the values specified in Section III. Such bracing shall be securely attached to poles and crossarms. Supports in lieu of crossarms shall have means of resisting rotation in a vertical plane about their attachment to poles or shall be supported by braces as required for crossarms. Metal braces or attachments shall meet the requirements of Rules 48.2 and 49.8. In computing the strength requirements to meet vertical loads the effect of such bracing may be considered.

Table 4
Minimum Safety Factors

Element of Line	Grade of Construction			
	Grade "A"	Grade "B"	Grade "C"	Grade "F"
Conductors, splices and conductor fastenings (other than tie wires)	2	2	2	1
Pins	2	2	2	1
Pole line hardware	2	2	2	2
Line insulators (mechanical)	3	2	2	2
Guy Insulators (mechanical)				
Interlocking	2	2	2	2
Noninterlocking wood	3	3	3	-----
Noninterlocking glass fiber	3	2(a)	2(b)	-----
Guys, except in light loading districts	2	2	2	1 ½
Guys, in light loading rural districts	2	1 ½	1 ½	1 ½
Messengers and span wires	2	2	2	2
Wood poles	4	3	2	1
Metallic Service and Meter Poles	-	2	2	-
Structural or tubular metallic poles, towers, crossarms and steel members of foundations	1 ½	1 ½	1 ½	-----
Foundations against uplift	1 ½	1 ½	1 ½	-----
Foundations against depression	3	2	2	-----
Reinforced concrete poles	4	3	3	-----
Crossarms				
Wood	2	2	2	1
Steel	1.5	1.25	1.25	
Concrete	1.8	1.5	1.5	
Other Structures material	1.5	1.25	1.25	-----

- (a) Insulators are to be replaced before safety factors have been reduced (due to deterioration or changes in construction, arrangement or other conditions subsequent to installation) to less than 95 percent of the safety factor specified in Rule 44.1.
- (b) Insulator are to be replaced before safety factors have been reduced (due to deterioration or changes in construction, arrangement, or other conditions subsequent to installation) to less than 75 percent of the safety factor specified in Rule 44.1.
- (c) For aluminum members subject to tension caused by one or more estimated loads and where the critical load combination for the tension member would not endanger adjacent compression members, the factor of safety on ultimate tension shall be 2 for Grade "A" construction and 1.67 for Grades "B" and "C" construction

44.2 Replacement

Lines or parts thereof shall be replaced or reinforced before safety factors have been reduced (due to deterioration or changes in construction arrangement or other conditions subsequent to installation) in Grades "A" and "B" construction to less than two-thirds of the construction safety factors specified in Rule 44.1 and in Grades "C" and "F" construction to less than

PROPOSED RULE CHANGE
MATERIAL STRENGTH

48. ULTIMATE STRENGTH OF MATERIALS

Structural members and their connections shall be designed and constructed so that the structures and parts thereof will not fail or be seriously distorted at any load less than their maximum working loads (developed under the current construction arrangements with loadings as specified in Rule 43 multiplied by the safety factor specified in Rule 44.

Values used for the ultimate strength of materials shall comply with the safety factors specified in Rule 44.

~~Values used for the ultimate strength of materials, in connection with the safety specified in Rule 44 shall be not more than as follows:~~

48.1 Wood

Values used for moduli of rupture for wood in bending, in conjunction with the safety factors given in Rule 44, shall not exceed those shown in Table 5.

Table 5
Wood strengths

Species	Modulus of rupture in bending	
	Sawed rectangular poles, crossarm, etc. (a)	Round Poles
Cedar, western red	4,700 lbs. Per sq in	6,000 lbs. Per sq in
Douglas fir, sense	6,300 lbs. Per sq in	6,800 (b) lbs. Per sq in
Douglas fir, not dense	5,800 lbs. Per sq in	6,800 (b) lbs. Per sq in
Fir, white or red, local	4,700 lbs. Per sq in	5,600 lbs. Per sq in
Pine, southern yellow, dense	6,300 lbs. Per sq in	6,800 (b) lbs. Per sq in
Pine, southern yellow, not dense	5,800 lbs. Per sq in	6,800 (b) lbs. Per sq in
Redwood, virgin	5,300 lbs. Per sq in	6,200 lbs. Per sq in
Redwood, second growth	3,900 lbs. Per sq in	4,600 lbs. Per sq in

- (a) Figures given are for select structural grade of material under short time loading with the neutral plane parallel to a side. Multiply the values shown by 1.4 where the neutral plane is on the diagonal of a square. Multiply the given values by 0.55 where the loading being considered is a long time loading (continuous load for one year or more).
- (b) Where poles meet specifications of American Standards Association, 05.1-1963 for Douglas Fir Poles and for southern Pine Poles this value may be increased to not more than 8,000 lbs. Per square inch. Such poles shall be suitable preservative treatment.

Note Revised April 26, 1965 by Decision No. 68835.

48.2 Structural Material (other than wood) Steel

~~Structural members and their connections, shall be designed and constructed so that the structures and parts thereof will not fail or be seriously distorted at any load less than the maximum working loads developed under the construction arrangement with loadings as specified in Rule 43) multiplied by the safety factors specified in Rule 44.~~

The safety factors specified in Rule 44 shall be applied as follows to structural steel:

Tensions and Bending: The yield point, 33,000 pounds per square inch, shall be divided by the safety factor to determine the maximum allowable working stress.

Compression: The maximum allowable working stress shall be calculated by the following formula:

$$S_{\max} = \frac{1}{f_s} \left[YP + \frac{YP - 12,000}{200} \frac{l}{r} \right]$$

where S_{\max} = maximum allowable working stress, lbs per sq in.

f_s = safety factor specified in Rule 44

YP = yield point of the steel, 33,000 lbs per sq in.

l = unsupported length of member, inches

r = radius of gyration of member, inches

Shear: The ultimate tensile strength, 60,000 pounds per square inch, shall be multiplied by 2/3 and divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Where the figures given are used, structural steel shall conform to Standards Specifications A7-39 of American Society for Testing Materials for carbon steel of structural quality. Other values may be used for steel of other strength provided the yield point and ultimate tensile strength are determined by test.

~~For other structural materials (other than concrete), the safety factor specified in Rule 44 shall be applied as follows:~~

~~Tension: The yield strength of the material used shall be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.~~

~~Compression: The ultimate compressive strength of the material used be divided by the safety factor specified in Rule 44 to obtain the allowable working stress. The ultimate compressive strength shall be determined by suitable formulas for material used, considering yield strength of the material, modulus of elasticity, slenderness~~

~~ratio and eccentricity of connection. In no case shall the ultimate compressive stress be greater than the yield strength of the material.~~

~~Shear: The ultimate shear strength of the material used be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.~~

Note Revised March 30, 1968 by Decision No. 73813

48.3 Concrete

A Reinforced Concrete

Values used for ultimate strengths of reinforced concrete, in conjunction with safety factors given in Rule 44, shall not exceed the following:

Reinforcing steel, tensile or compressive strength, pounds per square inch- - - - -55,000

Concrete, 1:2:4 mixture	Age	Compressive Strength
	7 days- - - -	900 lbs per sq in.
	30 days- - - -	2,400 lbs per sq in.
	90 days- - - -	3,100 lbs per sq in.
	6 mos- - - -	4,400 lbs per sq in.

If reinforced concrete is designed for higher strength values which are proven by test, such values may be used in lieu of the figures given.

B Prestressed Concrete

~~Structural Members and their connections shall be designed and constructed so that the structures and parts thereof will not fail or be seriously distorted at any load less than their maximum working loads (developed under the current construction arrangements with loadings as Specified in Rule 43) multiplied by the safety factor specified in Rule 44.~~

The minimum strength of the materials used in prestressed concrete structures used in conjunction with the safety factors given in Table 4 shall be as follows:

Reinforcing Steel - yield strength 40,000 lb.. per sq. inch
Prestressing Steel - yield strength 188,000 lbs. per sq. inch
Concrete - compressive strength 4,000 lbs. per sq. inch
at 28 days

Other strength Values may be used provided the strength values used for design are proven by tests.

NOTE Rule 48.3-5 added on February 13, 1974 by Decision No.82466.

48.4 Other Structural Materials

For other structural materials (other than concrete), the safety factor specified in Rule 44 shall be applied as follows:

Tension: The yield strength of the material used shall be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Compression: The ultimate compressive strength of the material used be divided by the safety factor specified in Rule 44 to obtain the allowable working stress. The ultimate compressive strength shall be determined by suitable formulas for material used, considering yield strength of the material, modulus of elasticity, slenderness ratio and eccentricity of connection. In no case shall the ultimate compressive stress be greater than the yield strength of the material.

Shear: The ultimate shear strength of the material used be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

48.45 Conductors, Span Wires, Guys and Messengers

Values used for ultimate strengths of wires and cable shall not exceed those given in Appendix B. The ultimate strengths given in Tables 17 to 24 of Appendix B, except for medium-hard-drawn copper, are based on the minimum ultimate strengths given in the standards specifications of the American Society for Testing Materials. The ultimate strengths given in Appendix B for medium-hard-drawn copper based on the standard specifications of the ASTM and provide an allowance above the minimum values of one-quarter of the range between minimum and maximum values. For use of types of wires and cables of other materials not included in Appendix B, values for ultimate strengths similarly derived from specifications are nonexistent, maker's specifications may be used provided that tests have been made which shall justify the maker's rating for ultimate strength.

48.56 Tower or Pole Foundations and Footings

In calculating the resistance of foundations or footings of towers, poles and pole line structures to uplifts, the weight of concrete shall be taken as not more than 145 pounds per cubic foot and the weight of earth (calculated 30 degrees from the vertical) shall be taken as not more than 90 pounds per cubic foot. The resistance of soil to the depression of foundations or footings shall be calculated from the best

available data on the soil in question. In lieu of calculation, the strength of foundations or footings against uplift or depression may be determined by tests under the soil conditions obtaining.

48.67 Metallic Service and Meter Poles

Metallic service and meter poles shall be designed and constructed so that the poles and parts thereof will not fail or be seriously distorted at any load less than the maximum working loads (see Rule 43 for loadings) multiplied by the safety factors specified in Table 4, Rule 44. The safety factors specified in Table 4, Rule 44 shall be applied as follows:

Tension: The yield strength of the metal used shall be divided by the safety factor specified in Table 4, Rule 44 to determine the maximum allowable working stress.

Compression: The critical buckling strength of the material used, as determined by applicable formulas employing the effective slenderness ratio and yield strength, shall be divided by the safety factors specified in Table 4, Rule 44, to determine the maximum allowable working stress.

Note: Added July 26, 1968 by Decision No. 71009

49.1 Poles, Towers and Other Structures

A. STRENGTH

Wood poles shall be of sound timber, free from defects which would materially reduce their strength or durability and they shall have sufficient strength to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The modulus of rupture used in calculation of safety factors shall be not greater than the value given in Rule 48.1.

~~Metallic, pre-stressed concrete and reinforced concrete poles, together with their foundations, shall be of such material and dimensions as to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The fiber stress values used in calculation of safety factors shall be as specified in Rule 48.2, 48.3 and 48.6.~~

Materials, other than wood used for poles, towers and structures, together with their foundations shall be of such strength as to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading specified in Rule 43.

Certain poles subject to special stresses due to angles in the line, dead –ending of conductors or other attachments, which stresses must be included in computing the loading and safety factor. Poles subject to these special stresses sometimes require the use of guy attachment shall be considered merely as a strut, the guy taking all lateral stresses. In such cases the pole strength requirement shall apply at the point of guy attachment rather than at the ground line.

49.2 Crossarms

A. MATERIAL

- (1) Wood: Wood crossarms shall be of suitable grades of Douglas fir, Southern Yellow pine or other accepted species.
- (2) Metal: Metal crossarms shall be of structural steel cast steel, or malleable cast iron, properly galvanized or otherwise protected to resist corrosion, or may be of any corrosion-resisting metal or alloy.
- (3) Pre-stressed Concrete: Pre-stressed concrete crossarms may be used provided they are designed in accordance with Rule 48.3-B.
- (4) Other Material: Other materials may be used for crossarms provided they comply with Rule 48.4.

NOTE: Part (3) added February 13, 1974 by Decision No.82466.

B MINIMUM SIZE

The physical properties as a result of dimensions, shape and cross-sectional area crossarms shall be such as to result in sufficient strength to meet the requirements of these Rules.

- ~~(1) Wood: Crossarms used to support or guard supply conductors shall have cross-sectional dimensions not less than the following:~~

~~One piece (homogeneous): 3 1/4 x 4 1/4 inches,
Fabricated: any single member. 1 3/4 x 4 1/4 inches, or
Laminated: 3 x 4 inches.~~

~~Crossarms supporting or guarding communication conductors shall provide the strength of Douglas fir having a cross section not less than 3 by 4 1/4 inches except that crossarms six and one-half feet or less in length which support sixteen wires or less shall provide the strength of Douglas fir having a cross section not less than 2 3/4 by 3 3/4 inches.~~

- ~~(2) Metal: The physical properties as a result of dimensions, shape and cross-sectional area of metal crossarms shall be such as to result in sufficient strength to meet the requirements of Rules 46, 47 and 48.2, provided the thickness of any element shall be not less than 3/32 inch.~~
- ~~(3) Pre-stressed Concrete: The minimum dimension of any pre-stressed concrete member shall be 3 inches.~~

Table 4
Minimum Safety Factors

Element of Line	Grade of Construction			
	Grade "A"	Grade "B"	Grade "C"	Grade "F"
Conductors, splices and conductor fastenings (other than tie wires)	2	2	2	1
Pins	2	2	2	1
Pole line hardware	2	2	2	2
Line insulators (mechanical)	3	2	2	2
Guy Insulators (mechanical)				
Interlocking	2	2	2	2
Noninterlocking wood	3	3	3	-----
Noninterlocking glass fiber	3	2(a)	2(b)	-----
Guys, except in light loading districts	2	2	2	1 ½
Guys, in light loading rural districts	2	1 ½	1 ½	1 ½
Messengers and span wires	2	2	2	2
<u>Foundations against uplift</u>	<u>1 ½</u>	<u>1 ½</u>	<u>1 ½</u>	-----
<u>Foundations against depression</u>	<u>3</u>	<u>2</u>	<u>2</u>	-----
<u>Poles Towers and Structures</u>				
Wood poles	4	3	2	1
Metallic Service and Meter Poles	-	2	2	-
Structural or tubular metallic poles, towers, crossarms and steel members of foundations	1 ½	1 ½	1 ½	-----
<u>Foundations against uplift</u>	<u>1 ½</u>	<u>1 ½</u>	<u>1 ½</u>	-----
<u>Foundations against depression</u>	<u>3</u>	<u>2</u>	<u>2</u>	-----
Reinforced concrete poles	4	3	3	-----
Crossarms				
Wood	2	2	2	1
Steel	1.5	1.25	1.25	
Concrete	1.8	1.5	1.5	
Other Structures material	1.5	1.25	1.25	-----

- (a) Insulators are to be replaced before safety factors have been reduced (due to deterioration or changes in construction, arrangement or other conditions subsequent to installation) to less than 95 percent of the safety factor specified in Rule 44.1.
- (b) Insulator are to be replaced before safety factors have been reduced (due to deterioration or changes in construction, arrangement, or other conditions subsequent to installation) to less than 75 percent of the safety factor specified in Rule 44.1.
- (c) For aluminum members subject to tension caused by one or more estimated loads and where the critical load combination for the tension member would not endanger adjacent compression members, the factor of safety on ultimate tension shall be 2 for Grade "A" construction and 1.67 for Grades "B" and "C" construction

Note: Revised July 26, 1966 by Decision No. 71009; January 6, 1968 by 30, 1968 by Decision No. 73813; February 13, 1974 by Decision No. 73455; and March Decision No. 82466

Proposed Rule Change
(FINAL)*
MATERIAL STRENGTH

48. ULTIMATE STRENGTH OF MATERIALS

Structural members and their connections shall be designed and constructed so that the structures and parts thereof will not fail or be seriously distorted at any load less than their maximum working loads (developed under the current construction arrangements with loadings as specified in Rule 43 multiplied by the safety factor specified in Rule 44.

Values used for the ultimate strength of materials shall comply with the safety factors specified in Rule 44.

48.1 Wood

Values used for moduli of rupture for wood in bending, in conjunction with the safety factors given in Rule 44, shall not exceed those shown in Table 5.

Table 5
Wood strengths

Species	Modulus of rupture in bending	
	Sawed rectangular poles, crossarm, etc. (a)	Round Poles
Cedar, western red	4,700 lbs. Per sq in	6,000 lbs. Per sq in
Douglas fir, sense	6,300 lbs. Per sq in	6,800 (b) lbs. Per sq in
Douglas fir, not dense	5,800 lbs. Per sq in	6,800 (b) lbs. Per sq in
Fir, white or red, local	4,700 lbs. Per sq in	5,600 lbs. Per sq in
Pine, southern yellow, dense	6,300 lbs. Per sq in	6,800 (b) lbs. Per sq in
Pine, southern yellow, not dense	5,800 lbs. Per sq in	6,800 (b) lbs. Per sq in
Redwood, virgin	5,300 lbs. Per sq in	6,200 lbs. Per sq in
Redwood, second growth	3,900 lbs. Per sq in	4,600 lbs. Per sq in

- (a) Figures given are for select structural grade of material under short time loading with the neutral plane parallel to a side. Multiply the values shown by 1.4 where the neutral plane is on the diagonal of a square. Multiply the given values by 0.55 where the loading being considered is a long time loading (continuous load for one year or more).
- (b) Where poles meet specifications of American Standards Association, 05.1-1963 for Douglas Fir Poles and for southern Pine Poles this value may be increased to not more than 8,000 lbs. Per square inch. Such poles shall be suitable preservative treatment.

Note Revised April 26, 1965 by Decision No. 68835.

48.2 Steel

The safety factors specified in Rule 44 shall be applied as follows to structural steel:

Tensions and Bending: The yield point, 33,000 pounds per square inch, shall be divided by the safety factor to determine the maximum allowable working stress.

Compression: The maximum allowable working stress shall be calculated by the following formula:

$$S_{\max} = \frac{1}{f_s} \left(\frac{YP}{200} - \frac{l^2}{r^2} \right)$$

where S_{\max} = maximum allowable working stress, lbs per sq in.
 f_s = safety factor specified in Rule 44
 YP = yield point of the steel, 33,000 lbs per sq in.
 l = unsupported length of member, inches
 r = radius of gyration of member, inches

Shear: The ultimate tensile strength, 60,000 pounds per square inch, shall be multiplied by 2/3 and divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Where the figures given are used, structural steel shall conform to Standards Specifications A7-39 of American Society for Testing Materials for carbon steel of structural quality. Other values may be used for steel of other strength provided the yield point and ultimate tensile strength are determined by test.

Note Revised March 30, 1968 by Decision No. 73813

48.3 Concrete

A Reinforced Concrete

Values used for ultimate strengths of reinforced concrete, in conjunction with safety factors given in Rule 44, shall not exceed the following:

Reinforcing steel, tensile or compressive strength, pounds per square inch- - - - -55,000

Concrete, 1:2:4 mixture	Age	Compressive Strength
	7 days-	900 lbs per sq in.
	30 days-	2,400 lbs per sq in.
	90 days-	3,100 lbs per sq in.
	6 mos-	4,400 lbs per sq in.

If reinforced concrete is designed for higher strength values which are proven by test, such values may be used in lieu of the figures given.

B Prestressed Concrete

The minimum strength of the materials used in prestressed concrete structures used in conjunction with the safety factors given in Table 4 shall be as follows:

Reinforcing Steel - yield strength 40,000 lb. per sq. inch
Prestressing Steel - yield strength 188,000 lbs. per sq. inch
Concrete - compressive strength 4,000 lbs. per sq. inch at 28 days

Other strength Values may be used provided the strength values used for design are proven by tests.

NOTE Rule 48.3-5 added on February 13, 1974 by Decision No.82466.

48.4 Other Structural Materials

For other structural materials (other than concrete), the safety factor specified in Rule 44 shall be applied as follows:

Tension: The yield strength of the material used shall be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

Compression: The ultimate compressive strength of the material used be divided by the safety factor specified in Rule 44 to obtain the allowable working stress. The ultimate compressive strength shall be determined by suitable formulas for material used, considering yield strength of the material, modulus of elasticity, slenderness ratio and eccentricity of connection. In no case shall the ultimate compressive stress be greater than the yield strength of the material.

Shear: The ultimate shear strength of the material used be divided by the safety factor specified in Rule 44 to determine the maximum allowable working stress.

48.5 Conductors, Span Wires, Guys and Messengers

Values used for ultimate strengths of wires and cable shall not exceed those given in Appendix B. The ultimate strengths given in Tables 17 to 24 of Appendix B, except for medium-hard-drawn copper, are based on the minimum ultimate strengths given in the standards specifications of the American Society for Testing Materials. The ultimate strengths given in Appendix B for medium-hard-drawn copper based on the standard specifications of the ASTM and provide an allowance

above the minimum values of one-quarter of the range between minimum and maximum values. For use of types of wires and cables of other materials not included in Appendix B, values for ultimate strengths similarly derived from specifications are nonexistent, maker's specifications may be used provided that tests have been made which shall justify the maker's rating for ultimate strength.

48.6 Tower or Pole Foundations and Footings

In calculating the resistance of foundations or footings of towers, poles and pole line structures to uplifts, the weight of concrete shall be taken as not more than 145 pounds per cubic foot and the weight of earth (calculated 30 degrees from the vertical) shall be taken as not more than 90 pounds per cubic foot. The resistance of soil to the depression of foundations or footings shall be calculated from the best available data on the soil in question. In lieu of calculation, the strength of foundations or footings against uplift or depression may be determined by tests under the soil conditions obtaining.

48.7 Metallic Service and Meter Poles

Metallic service and meter poles shall be designed and constructed so that the poles and parts thereof will not fail or be seriously distorted at any load less than the maximum working loads (see Rule 43 for loadings) multiplied by the safety factors specified in Table 4, Rule 44. The safety factors specified in Table 4, Rule 44 shall be applied as follows:

Tension: The yield strength of the metal used shall be divided by the safety factor specified in Table 4, Rule 44 to determine the maximum allowable working stress.

Compression: The critical buckling strength of the material used, as determined by applicable formulas employing the effective slenderness ratio and yield strength, shall be divided by the safety factors specified in Table 4, Rule 44, to determine the maximum allowable working stress.

Note: Added July 26, 1968 by Decision No. 71009

49.1 Poles, Towers and Other Structures

A. STRENGTH

Wood poles shall be of sound timber, free from defects which would materially reduce their strength or durability and they shall have sufficient strength to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading conditions specified in Rule 43. The modulus of rupture used in calculation of safety factors shall be not greater than the value given in Rule 48.1.

Materials, other than wood used for poles, towers and structures, together with their foundations shall be of such strength as to withstand, with safety factors not less than those specified in Rule 44, the maximum stresses to which they are subjected under the loading specified in Rule 43.

Certain poles subject to special stresses due to angles in the line, dead –ending of conductors or other attachments, which stresses must be included in computing the loading and safety factor. Poles subject to these special stresses sometimes require the use of guy attachment shall be considered merely as a strut, the guy taking all lateral stresses. In such cases the pole strength requirement shall apply at the point of guy attachment rather than at the ground line.

49.2 Crossarms

A. MATERIAL

- (1) Wood: Wood crossarms shall be of suitable grades of Douglas fir, Southern Yellow pine or other accepted species.
- (2) Metal: Metal crossarms shall be of structural steel cast steel, or malleable cast iron, properly galvanized or otherwise protected to resist corrosion, or may be of any corrosion-resisting metal or alloy.
- (3) Pre-stressed Concrete: Pre-stressed concrete crossarms may be used provided they are designed in accordance with Rule 48.3-B.
- (4) Other Material: Other materials may be used for crossarms provided they comply with Rule 48.4.

NOTE: Part (3) added February 13, 1974 by Decision No.82466.

B MINIMUM SIZE

The physical properties as a result of dimensions, shape and cross-sectional area crossarms shall be such as to result in sufficient strength to meet the requirements of these Rules.

Table 4
Minimum Safety Factors

Element of Line	Grade of Construction			
	Grade "A"	Grade "B"	Grade "C"	Grade "F"
Conductors, splices and conductor fastenings (other than tie wires)	2	2	2	1
Pins	2	2	2	1
Pole line hardware	2	2	2	2
Line insulators (mechanical)	3	2	2	2
Guy Insulators (mechanical)				
Interlocking	2	2	2	2
Noninterlocking wood	3	3	3	-----
Noninterlocking glass fiber	3	2(a)	2(b)	-----
Guys, except in light loading districts	2	2	2	1 ½
Guys, in light loading rural districts	2	1 ½	1 ½	1 ½
Messengers and span wires	2	2	2	2
Foundations against uplift	1 ½	1 ½	1 ½	-----
Foundations against depression	3	2	2	-----
Poles Towers and Structures				
Wood poles	4	3	2	1
Metallic Service and Meter Poles	-	2	2	-
Structural or tubular metallic poles, towers, crossarms and steel members of foundations	1 ½	1 ½	1 ½	-----
Reinforced concrete poles	4	3	3	-----
Crossarms				
Wood	2	2	2	1
Steel	1.5	1.25	1.25	
Concrete	1.8	1.5	1.5	
Other Structures material	1.5	1.25	1.25	-----

- (a) Insulators are to be replaced before safety factors have been reduced (due to deterioration or changes in construction, arrangement or other conditions subsequent to installation) to less than 95 percent of the safety factor specified in Rule 44.1.
- (b) Insulator are to be replaced before safety factors have been reduced (due to deterioration or changes in construction, arrangement, or other conditions subsequent to installation) to less than 75 percent of the safety factor specified in Rule 44.1.
- (c) For aluminum members subject to tension caused by one or more estimated loads and where the critical load combination for the tension member would not endanger adjacent compression members, the factor of safety on ultimate tension shall be 2 for Grade "A" construction and 1.67 for Grades "B" and "C" construction

Note: Revised July 26, 1966 by Decision No. 71009; January 6, 1968 by 30, 1968 by Decision No. 73813; February 13, 1974 by Decision No. 73455; and March Decision No. 82466

ITEM 2

~~Rule~~ Rule 52.7-F

~~Rule~~ Rule 53.4

RATIONALE FOR PROPOSED RULE CHANGE
RULE 52.7-.F
HARDWARE -GROUNDING

Remove work rules covered in CAL/OSHA Title 8

EXISTING RULE
RULE 52.7F

F Grounding

1 Circuits of 0-7500 Volts: On Wood crossarms, wood poles, or wood structures, hardware which is less than 3 feet above or 6 feet below unprotected conductors of 0-7500 volts shall be nongrounded. Excepted from the requirements of this rule are the following:

Hardware of riser terminals treated as specified in Rule 54.6-F;

Hardware associated with grounded cables and messengers supported on crossarms with vertical clearances and pole clearances as specified in Tables 1 and 2 for such cables and messengers; and

Hardware associated with guarded cables and messengers which are treated as specified in Rule 57.4-F.

2 Circuits of More Than 7500 Volts: Hardware of circuits of more than 7500 volts shall be securely and permanently grounded where such hardware can act as a bond between metal parts of the insulating supports of an energized conductor and of a de-energized portion of the same conductor or of the de-energized portion of another conductor where work is to be performed on the de-energized conductor. Such hardware includes the bases of air-break switches and the tanks of oil switches. Bond wires are excepted from this requirement, and are not required to be grounded.

The permanent grounding specified in this rule will not be required provided the regular written operating (safety) rules of the utility concerned require that:

Conductors of Circuits exceeding 7500 volts which are de-energized for work thereon shall be securely grounded during all periods of such work, and

When work is to be performed at the location of hardware described in this rule, such hardware shall be temporarily and securely grounded and securely connected to any de-energized conductors involved during all work at the location, or in lieu of temporary grounding such hardware

shall be proven by test to nonenergized immediately preceding each period of work at that location.

- 3 Transformer Cases and Hardware: See Rule 58.3-C3.

PROPOSED RULE CHANGE
RULE 52.7F

F Grounding

1 Circuits of 0-7500 Volts: On Wood crossarms, wood poles, or wood structures, hardware which is less than 3 feet above or 6 feet below unprotected conductors of 0-7500 volts shall be nongrounded. Excepted from the requirements of this rule are the following:

Hardware of riser terminals treated as specified in Rule 54.6-F;

Hardware associated with grounded cables and messengers supported on crossarms with vertical clearances and pole clearances as specified in Tables 1 and 2 for such cables and messengers; and

Hardware associated with guarded cables and messengers which are treated as specified in Rule 57.4-F.

2 Circuits of More Than 7500 Volts: Hardware of circuits of more than 7500 volts shall be securely and permanently grounded where such hardware can act as a bond between metal parts of the insulating supports of an energized conductor and of a de-energized portion of the same conductor or of the de-energized portion of another conductor where work is to be performed on the de-energized conductor. Such hardware includes the bases of air-break switches and the tanks of oil switches. Bond wires are excepted from this requirement, and are not required to be permanently grounded.

The permanent grounding specified in this rule will not be required provided the regular written operating (safety) rules of the utility concerned require that:

Conductors of Circuits exceeding 7500 volts which are de-energized for work thereon shall be securely grounded during all periods of such work, and

When work is to be performed at the location of hardware described in this rule, such hardware shall be temporarily and securely grounded and securely connected to any de-energized conductors involved during all work at the location, ~~or in lieu of temporary grounding such hardware~~

~~shall be proven by test to nonenergized immediately preceding each period of work at that location.~~

- 3 Transformer Cases and Hardware: See Rule 58.3-C3.

FINAL RULE CHANGE *
RULE 52.7F

F Grounding

1 Circuits of 0-7500 Volts: On Wood crossarms, wood poles, or wood structures, hardware which is less than 3 feet above or 6 feet below unprotected conductors of 0-7500 volts shall be nongrounded. Excepted from the requirements of this rule are the following:

Hardware of riser terminals treated as specified in Rule 54.6-F;

Hardware associated with grounded cables and messengers supported on crossarms with vertical clearances and pole clearances as specified in Tables 1 and 2 for such cables and messengers; and

Hardware associated with guarded cables and messengers which are treated as specified in Rule 57.4-F.

2 Circuits of More Than 7500 Volts: Hardware of circuits of more than 7500 volts shall be securely and permanently grounded where such hardware can act as a bond between metal parts of the insulating supports of an energized conductor and of a de-energized portion of the same conductor or of the de-energized portion of another conductor where work is to be performed on the de-energized conductor. Such hardware includes the bases of air-break switches and the tanks of oil switches. Bond wires are excepted from this requirement, and are not required to be permanently grounded.

The permanent grounding specified in this rule will not be required provided the regular written operating (safety) rules of the utility concerned require that:

Conductors of Circuits exceeding 7500 volts which are de-energized for work thereon shall be securely grounded during all periods of such work, and

When work is to be performed at the location of hardware described in this rule, such hardware shall be temporarily and securely grounded and securely connected to any de-energized conductors involved during all work at the location.

3 Transformer Cases and Hardware: See Rule 58.3-C3.

RATIONALE FOR PROPOSED RULE CHANGE

RULE 53.4

PINS, DEAD ENDS, CONDUCTOR SUSPENSIONS AND FASTENINGS BONDING

Remove work rules covered in CAL/OSHA Title 8 .

EXISTING RULE
RULE 53.4

53.4 Bonding

A Circuits of More Than 7500 Volts

1 At Top of Pole:

a) Single Circuit: The bond wire of a single circuit in horizontal, triangular or vertical configuration at the top circuit position of the pole may be installed on the face, back or under side of wood crossarms and on the surface of pole without a protective covering. Such bond wire on the surface of a wood pole shall be covered by a suitable protective covering (see Rule 22.2) where within 3 feet vertically of the next conductor level below the top circuit. Crossarm braces may be connected to such bond wire only where positive electrical contact is made and the brace is not less than 3 feet vertically above the next conductor level below the top circuit.

b) More than one Circuit: The bonding of any circuit where more than one circuit is installed at the top position of pole shall be in accordance with the provision of Rule 53.4-A3 below.

2 Below Top of Pole: Bond wires of any circuit below the top circuit position of the pole shall be covered by a suitable protective covering (see Rule 22.2) except where such bond wires are installed on the under side of crossarms or where bonds (wires or straps) are installed vertically between crossarms at a different levels or between and approximately perpendicular to the individual arms of a double crossarm at a distance of not less than 30 inches from center line of pole.

3 Where Conductors of More Than One Circuit at Same Level: Where conductors of more than one circuit are at the same level, bond wires shall be covered by a suitable protective covering (see Rule 22.2) except where such bond wires are installed on the under side

of crossarms or where bonds (wires or straps) are installed vertically between crossarms or between and approximately perpendicular to the individual arms of a double crossarm at a distance of not less than 30 inches from center line of pole.

a) Separately Bonded Circuits: Where conductors of more than one circuit are at the same level and separately bonded, such bond wires shall be separated on crossarm and on surface of pole by not less than 6 inches. Neither circuit shall be worked on while de-energized unless the de-energized conductors are shorted and securely grounded and the bond wire of the de-energized circuit is connected to the de-energized and grounded conductors on the pole where work is done.

Where both circuits are de-energized, shorted and all conductors securely grounded, then bond wires of either circuit need not be connected to the de-energized and grounded conductors, provided that before work commences the bond wires are tested for and drained of any potential differences between themselves and the de-energized and securely grounded conductors.

b) Commonly Bonded Circuits: Where conductors of more than one circuit are at the same level and a common bonding system is used, neither circuit shall be worked on de-energized unless the de-energized conductors are shorted and securely grounded and connected to the bonding system on the poles where work is done.

B Circuits of 7500 Volts or Less

The bonding of circuits of 7500 volts or less shall comply with the following:

Bond wires on wood poles and wood crossarms shall be fully covered by a suitable protective covering;

Bond wires shall be not less than 1 ½ inches from metal braces and all other hardware except the metal pins and dead ends which are bonded; and

Bond wires of separate circuits shall be separated on crossarm and poles by not less than 3 inches.

PROPOSED RULE CHANGE

Rule 53.4

53.4 Bonding

A Circuits of More Than 7500 Volts

1 At Top of Pole:

a) Single Circuit: The bond wire of a single circuit in horizontal, triangular or vertical configuration at the top circuit position of the pole may be installed on the face, back or under side of wood crossarms and on the surface of pole without a protective covering. Such bond wire on the surface of a wood pole shall be covered by a suitable protective covering (see Rule 22.2) where within 3 feet vertically of the next conductor level below the top circuit. Crossarm braces may be connected to such bond wire only where positive electrical contact is made and the brace is not less than 3 feet vertically above the next conductor level below the top circuit.

b) More than one Circuit: The bonding of any circuit where more than one circuit is installed at the top position of pole shall be in accordance with the provision of Rule 53.4-A3 below.

2 Below Top of Pole: Bond wires of any circuit below the top circuit position of the pole shall be covered by a suitable protective covering (see Rule 22.2) except where such bond wires are installed on the under side of crossarms or where bonds (wires or straps) are installed vertically between crossarms at a different levels or between and approximately perpendicular to the individual arms of a double crossarm at a distance of not less than 30 inches from center line of pole.

3 Where Conductors of More Than One Circuit at Same Level: Where conductors of more than one circuit are at the same level, bond wires shall be covered by a suitable protective covering (see Rule 22.2) except where such bond wires are installed on the under side

of crossarms or where bonds (wires or straps) are installed vertically between crossarms or between and approximately perpendicular to the individual arms of a double crossarm at a distance of not less than 30 inches from center line of pole.

a) Separately Bonded Circuits: Where conductors of more than one circuit are at the same level and separately bonded, such bond wires shall be separated on crossarm and on surface of pole by not less than 6 inches. ~~Neither circuit shall be worked on while de-energized unless the de-energized conductors are shorted and securely grounded and the bond wire of the de-energized circuit is connected to the de-energized and grounded conductors on the pole where work is done.~~

~~Where both circuits are de-energized, shorted and all conductors securely grounded, then bond wires of either circuit need not be connected to the de-energized and grounded conductors, provided that before work commences the bond wires are tested for and drained of any potential differences between themselves and the de-energized and securely grounded conductors.~~

b) Hardware Bond Wires: Where work is to be performed at such locations, the grounding of hardware bond wires shall be in accordance with Rule 52.7-F(2).

~~b) Commonly Bonded Circuits: Where conductors of more than one circuit are at the same level and a common bonding system is used, neither circuit shall be worked on de-energized unless the de-energized conductors are shorted and securely grounded and connected to the bonding system on the poles where work is done.~~

B Circuits of 7500 Volts or Less

The bonding of circuits of 7500 volts or less shall comply with the following:

Bond wires on wood poles and wood crossarms shall be fully covered where practicable by a suitable protective covering;

Bond wires shall be not be less than 1 ½ inches from metal braces and all other hardware except the metal pins and dead ends which are bonded; and

Bond wires of separate circuits shall be separated on crossarm and poles by not less than 3 inches.

FINAL *
PROPOSED RULE

Rule 53.4

53.4 Bonding

A Circuits of More Than 7500 Volts

1 At Top of Pole:

a) Single Circuit: The bond wire of a single circuit in horizontal, triangular or vertical configuration at the top circuit position of the pole may be installed on the face, back or under side of wood crossarms and on the surface of pole without a protective covering. Such bond wire on the surface of a wood pole shall be covered by a suitable protective covering (see Rule 22.2) where within 3 feet vertically of the next conductor level below the top circuit. Crossarm braces may be connected to such bond wire only where positive electrical contact is made and the brace is not less than 3 feet vertically above the next conductor level below the top circuit.

b) More than one Circuit: The bonding of any circuit where more than one circuit is installed at the top position of pole shall be in accordance with the provision of Rule 53.4-A3 below.

2 Below Top of Pole: Bond wires of any circuit below the top circuit position of the pole shall be covered by a suitable protective covering (see Rule 22.2) except where such bond wires are installed on the under side of crossarms or where bonds (wires or straps) are installed vertically between crossarms at a different levels or between and approximately perpendicular to the individual arms of a double crossarm at a distance of not less than 30 inches from center line of pole.

3 Where Conductors of More Than One Circuit at Same Level: Where conductors of more than one circuit are at the same level, bond wires shall be covered by a suitable protective covering (see Rule

22.2) except where such bond wires are installed on the under side of crossarms or where bonds (wires or straps) are installed vertically between crossarms or between and approximately perpendicular to the individual arms of a double crossarm at a distance of not less than 30 inches from center line of pole.

- a) Separately Bonded Circuits: Where conductors of more than one circuit are at the same level and separately bonded, such bond wires shall be separated on crossarm and on surface of pole by not less than 6 inches.
- b) Hardware Bond Wires: Where work is to be performed at such locations, the grounding of hardware bond wires shall be in accordance with Rule 52.7-F(2).

B Circuits of 7500 Volts or Less

The bonding of circuits of 7500 volts or less shall comply with the following:

Bond wires on wood poles and wood crossarms shall be fully covered where practicable by a suitable protective covering;

Bond wires shall not be less than 1 ½ inches from metal braces and all other hardware except the metal pins and dead ends which are bonded; and

Bond wires of separate circuits shall be separated on crossarm and poles by not less than 3 inches.

ITEM 3



Rule 54.4-A

RATIONALE FOR PROPOSED RULE CHANGE
RULE 54.4-A
CONDUCTOR -CLEARANCES ABOVE GROUND

Corresponding Rule to Change
Rule 37- Table 1

Due to increased height changes in agricultural equipment and increased electrical contacts with supply lines, minimum conductor to ground clearance requirements should be increased in rural agricultural areas for public safety.

EXISTING G.O. 95

54.4 Clearances

Allowable variations in clearances due to side swing of suspension insulators, temperature, loading, etc. are given in Rules 37 and 38.

A. ABOVE GROUND

- 1) Across Arid or Mountainous Areas: Across arid or mountainous areas supply circuits carrying 22,500-30,000 volts, inclusive, may have a clearance of less than 30 feet (Table 1, Case 4, Column F) but not less than 25 feet above ground subject to a reduction of not more than 10 per cent because of temperature and loading as specified in Rule 43. Upon special permission from the Rail Road Commission, a minimum clearance of 25 feet above ground may be applied in similar areas to circuits in excess of 30,000 volts, not including Class E circuits. For circuits in excess of 30,000 volts, in which case no reduction of the 25 feet will be permitted for conditions less than maximum loadings or temperature specified in Rules 43.1 and 43.2.
- 2 In Rural Districts, Conductors of 750-20,000 Volts:
 - a Crossing Roads or Driveways: In rural districts the minimum clearance of 25 feet specified in Table 1, Case 3 Column E may be reduced to 22 feet above ground for conductors not exceeding 20,000 volts crossing or overhanging traversable portions of public or private roads or driveways. This modified minimum clearance of 22 feet shall in no case be reduced because of temperature or loading at conditions less than the maximum loading or temperature specified in Rules 43.1 and 43.2.
 - b Above Agricultural Areas Along Roads: In rural districts the minimum clearance of 25 feet specified in Table 1, Case 4 Column E may be reduced to 18 feet above ground for lines not exceeding 20,000 volts across areas capable of being traversed by agricultural equipment and along roads where no part of the line overhangs any traversable portion of a public or private roadway. This modified minimum clearance of 18 feet shall in no case be reduced because of temperature or loading at conditions less than maximum loadings or temperature specified in Rules 43.1 and 43.2. Care should be exercised in using this minimum clearance

along roads, above or along ditches where mechanical devices are used for maintenance, near trees in orchards, near trees or structures which can be climbed and in other similar situations.

3 Lead Wires for Transformers: Transformer lead wires shall have clearances above ground as specified in Table 1 except as modified by the provisions of Rule 58.3-B1a.

4 Over swimming Pools: (see Fig. 54-8) Installations of conductors, service drops and guys over swimming pools shall be avoided where practicable. Where line conductors, service drop conductors or guys are installed over swimming pools the following rules apply:

(a) Line Conductors: Where unprotected line conductors are installed over a swimming pool they shall have radial clearances from the top edge of the swimming pool walls and vertical clearances above the highest water level of the pool surface not less than the following:

- 1) 0 - 750 Volts 20 feet
- 2) 750 - 22,500 Volts 25 feet
- 3) 22.5 - 300 kV 30 feet

(See Table 1, Case 3, Columns D, E and F)

(b) Service Drops 0 - 750 Volts: Where service drop conductors are installed over a swimming pool:

- 1) Phase conductors shall be suitably insulated (see Rule 20.8-G).
- 2) Vertical clearances above the highest water level of the pool surface and radial clearances from the top edge of the pool wall shall be:
 - a) 16 feet for public and commercially operated pools.
 - b) 12 feet for residential pools.
- 3) No service drop may be installed less than 16 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 8 feet radially of

the diving board or platform that is over the water surface of the pool.

- 4) No service drop may be installed less than 12 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 3 feet radially of the diving board or platform that is not over the water surface of the pool.

(c) Ungrounded Portions of Guys:

- 1) Shall have radial clearances from the top edge of the swimming pool wall of not less than 18 feet.
- 2) Shall have vertical clearances above the highest water level of the pool surface of not less than 18 feet.
- 3) Shall not be installed less than 18 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 8 feet radially of the diving board or platform that is over the water surface of the pool.
- 4) Shall not be installed less than 12 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 6 feet radially of the diving board or platform that is not over the water surface of the pool.

(d) Grounded Portions of Guys:

- 1) Shall have vertical clearances above the highest water level of the pool surface of not less than 16 feet.
- 2) Shall not be installed less than 16 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 8 feet radially of the diving board or platform that is over the water surface of the pool.
- 3) Shall not be installed less than 8 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 3 feet radially of the diving

board or platform that is not over the water surface of the pool.

Minimum Vertical and Radial Clearances over Swimming Pools	A Minimum Vertical	B Minimum Radial
Unprotected Line Conductors (Vertical Over Highest Water Level and Radial from Top Edge of Pool Walls)		
1. 0 - 750 Volts	20 Feet	20 Feet
2. 750 - 22,500 Volts	25 Feet	25 Feet
3. 22.5 - 300 kV	30 Feet	30 Feet
Service Drops (Vertical Over Highest Water Level and Radial from Top Edge of Pool Walls)		
4. Pools Public and Commercial	16 Feet	16 Feet
5. Pools Residential	12 Feet	12 Feet
Service Drops (Over Diving Boards or Platforms)		
6. Portion of Board or Platform That is Over Water Surface	16 Feet	8 Feet
7. Portion of Board or Platform That is not Over Water Surface	12 Feet	3 Feet
Guys (Ungrounded Portions)		
8. Over Highest Water Level and from Top Edge of Pool Walls	18 Feet	18 Feet
9. Over Diving Board or Platform (The Portion that is Over the Water Surface)	18 Feet	8 Feet
10. Over Diving Board or Platform (The Portion that is not Over the Water Surface)	12 Feet	6 Feet
Guys (Grounded Portions)		
11. Over the Highest Water Level	16 Feet	—
12. Over Diving Board or Platform (The Portion that is Over the Water Surface)	16 Feet	8 Feet
13. Over Diving Board or Platform (The Portion that is not Over the Water Surface)	8 Feet	3 Feet

Clearance Over Swimming Pools

Figure 54-8

Table 1

Basic Minimum Allowable Vertical Clearance of Wire Above Railroads, Thoroughfares , Ground or Water Surface; Also clearances from Poles, Buildings, Structures or Other Objects(nn)
 (Letter References Denote Modifications of Minimum Clearances as Referred to in Note Following this Table)

	Nature of Clearance	Wire or Conductor Concerned						
		A Span wires other than trolley span wires), overhead guys and messengers	B Communication conductors (including open wire, cables and service drops), supply service drops of 0-750 volts	C Trolley Contact, feeder and span wires 0-5000 volts	D Supply conductors of 0- 750 volts and supply cables treated as in Rule 57.8	E Supply Conductors and supply cables, 750-22,500 volts	F Supply Conductors and supply cables 22.5 – 300 kV	G (mm) Supply Conductors and supply cables more 300 - 550 kV
1	Crossing above tracks of railroads which transport or propose to transport freight cars (max height 15 ft 1in) where not operated by overhead contact wires (a) (b) (c) (d)	25 ft	25 ft	22 ft	25 ft	28 ft	34 ft	34 ft
2	Crossing or paralleling above tracks of railroads operated by overhead trolleys (b) (c) (d)	26 ft (e)	26 ft (e) (f) (g)	19 ft (h) (i)	27 ft (e) (g)	30 ft (g)	34 ft (g)	34 ft (g) (kk)
3	Crossing or along thoroughfares in Urban districts or crossings thoroughfares in rural districts (c) (d)	18 ft (j) (k) (ii)	18 ft (j) (l) (m) (ii) (aa)	19 ft (hh)	20 ft (ii)	25 ft (n) (o) (ii)	30 ft (o) (ii)	30 ft (o) (ii) (kk)
4	Above ground along thoroughfares in rural districts or across other areas capable of being transversed by vehicles or agricultural equipment.	15 ft (k)	15 ft (m) (n) (p)	19 ft	16 ft	25 ft (n) (o)	30 ft (o) (p)	30 ft. (o) (kk)
5	Vertical ground in areas accessible to pedestrians only.	7 ft	10 ft (m) (q)	19 ft	12 ft	17 ft	25 ft (o)	25 ft. (o) (kk)
6	Vertical clearance above buildings and bridges (or other structures which do not ordinarily support conductors and on which men can walk) whether attached or unattached.	8 ft (r)	8 ft (r)	8 ft	8 ft	12 ft	12 ft	20 ft (ll)
7	Horizontal clearance of conductor from buildings (except generating and substations), bridges or other structures (upon which men may work) where such conductor is not	-----	3 ft (u)	3 ft	3 ft (u) (v)	6 ft (v)	6 ft (v)	15 ft (v)

	attached thereto. (a) (t)							
8	Distance of conductor from center line of pole, wheter attached or unattached (w) (x) (y)	-----	15 in (a) (aa)	15 in (aa) (bb) (cc)	15 in (o) (aa) (dd)	15 or 18 in (o) (dd) (ee) (jj)	18 in (dd) (ee) (jj)	Not Applicable
9	Distance of conductor from surface of pole, crossarm or other overhead line structure upon which it is supported, providing it complies with Case 8 above (x) (ee)	-----	3 in (aa) (ff)	3 in (aa) (cc) (gg)	3 in (aa) (dd) (gg)	3 in (dd) (gg)	¼ pin spacing shown in Table 2 Case 15 (dd)	½ pin spacing shown in Table 2 Case 15 (dd)
10	Radial centerline clearance of conductor or cable (unattached) from non-climbable street lighting or traffic signal poles or standards, including mastarms, brackets and lighting fixtures.	-----	1 ft (oo) (u) (rr) (ss)	15 in. (bb) (cc)	3 ft (oo)	6 ft (pp)	10 ft (qq)	10 ft (ll)
11	Water areas not suitable for sailboating (tt) (uu) (ww) (xx)	15'	15'	---	15'	17'	25'	25' (kk)
12	Water areas suitable for sailboating, surface area of: (tt) (vv) (ww) (xx)							
	(a) Less Than 20 acrea	18'	18'	---	18'	20'	27'	27' (kk)
	(b) 20 to 200 acres	26'	26'	---	26'	28'	35'	35' (kk)
	(c) Over 200 to 2,000 acres	32'	32'	---	32'	34'	41'	41' (kk)
	(d) Over 2,000 acres	38'	38'	---	38'	40'	47'	47' (kk)

a) Shall not be reduced more than 5% because of temperature or loading 37

1. Supply Lines 54.4-B1
2. Communication Lines 84.4-B1

(b) Shall be increased for supply conductors on Suspension insulators, under certain conditions 37

(c) Special clearances are provided for traffic signal equipment 58.1-C

(d) Special clearances are provided for street lighting equipment 58.2-B

(e) Based on trolley pole throw of 26 feet. May be reduced where suitably protected.

1. Supply Guys 56.4-B2
 2. Supply cables and messengers 57.4-B2
 3. Communication Guys 86.4-B2
 4. Communication cables and messengers 87.4-B2
- (f) May be reduced depending on height of trolley contact conductors.
1. Supply Service Drop 54.8-C5
 2. Communication service drops 84.8-D5
- (g) May be reduced and shall be increased depending on trolley throw
1. Supply conductors (except service drops) 54.4-B2
 2. Communication conductors (except service drops) 84.4-B2
- (h) Shall be increase where freight cars are transported.
1. Trolley contact and feeder conductors 74.4-B1
 2. Trolley span wires 77.4-A
- (i) May be reduced for trolley contact and span wires in subways, tunnels and under bridges
1. Trolley contact conductors 74.4-E
 2. Trolley span wires 77.4-A
- (j) May be reduced at crossings over private thoroughfares and entrances to private property and over private property.
1. Supply Service drops 54.8-B2
 2. Supply Guys 56.4-A
 3. Communication service drops 84.8-C2
 4. Communication guys 86.4-A
- (k) May be reduced along thoroughfares where not normally accessible to vehicles.

1. Supply Guys 56.4-A1
 2. Communication Guys 86.4-A1
- (l) May be reduced where within 12 feet of curb line of public thoroughfares
1. Supply Service drops 54.8-B1
 2. Communication service drops 84.8-C1
- (m) May be reduced for railways signal cables under special conditions 84.4-A4
- (n) May be reduced in rural districts
1. Supply conductors, 750-22,500 volts, crossing roads or driveways 54.4-A2a
 2. Supply conductors, 750-2000 volts, above agricultural areas and along roads 54.4-A2b
 3. Communication conductors along roads 84.4-A2
- (o) May be reduced for transformer, regulator or capacitor leads.
1. Transformer Leads 58.3-B
 2. Regulator or Capacitor Leads 58.4-B
- (p) May be reduced across arid or mountainous areas
1. Supply Conductors of more than 22,500 Volts 54.4-A1
 2. Communication conductors 84.4-A1
- (q) Shall be increased or may be reduced under special conditions.
1. Increased for supply service drops on industrial or commercial premises 54.8-B3a
 2. Supply service drops on residential premises 54.8-B3b
 3. Communication conductors 84.4-A3
 4. Increased for Communication service drops on industrial or commercial premises 84.8-C3a
 5. Communication service drops on residential premises 84.8-C3b
- (r) May be reduced above roofs of buildings under special conditions

1. Supply overhead guys 56.4-G
2. Supply service drops 54.8-B4
3. Communication overhead guys 86.4-F
4. Communication conductors and cables 84.4-E
5. Communication service drops 84.8-C4

(s) Also applies at fire escapes, etc.

1. Supply Conductors 54.4-H1
2. Supply service drops on industrial or commercial premises 54.8-B4a
3. Supply service drops on residential premises 54.8-B4b
4. Communication Conductor 84.4-E

(t) Special Clearances where attached to buildings, bridges or other structures

1. Supply conductors of 750-22,500 volts 54.4-H2
2. Trolley Contact Conductors 74.4-E
3. Communication Conductors 84.4- F

(u) Reduced clearances permitted under special conditions

1. Supply service drops on industrial or commercial premises 54.8-B4a
2. Supply cables, grounded 57.4-G
3. Communication cables beside buildings, etc. 84.4-E
4. Communication conductors under bridges, etc. 84.4-F
5. Communication service drops. 84.8-C4
6. Communication cables passing on non-climbable streetlight poles, etc. 84.4-D4a

(v) May be reduced under special conditions.

1. Supply conductors of 750-7500 volts 54.4-H1
2. Supply transformer lead and bus wires where guarded 58.3-B2

- (w) May be reduced at angles in lines and transportation points
 - 1. Supply conductors 54.4-D1
 - 2. Communication Conductors 84.4-D5

- (x) May be reduced for suitably protected lateral or vertical runs.
 - 1. Supply bond wires 53.4
 - 2. Supply ground wires 54.6-B
 - 3. Supply lateral conductors 54.6-C
 - 4. Supply vertical pins 54.6-D
 - 5. Supply risers 54.6-E
 - 6. Communication Ground Wires 84.6-B
 - 7. Communication lateral conductors 84.6-C
 - 8. Communication vertical runs 84.6-D
 - 9. Communication risers 84.6-E

- (y) Increased clearances for certain conductors
 - 1. Unattached conductors on colinear lines and crossing lines 32.3
 - 2. Unattached supply conductors 54.4D3
 - 3. Supply Service drops on clearance crossarms 54.8-C2
 - 4. Supply Service drops on pole top extensions 54.8-C3
 - 5. Unattached Supply service drops 54.8-D
 - 6. Communication lines, collinear, conflicting or crossing 84.4-D3
 - 7. Communication conductors passing supply poles and unattached thereto 84.4-D4
 - 8. Communication service drops on clearance crossarms 84.8-D2
 - 9. Communication service drops on pole top extensions 84.8-D3
 - 10. Unattached Communication service drops 84.8-E

- (z) Special provisions for police and fire alarm conductors require increased clearances 92.2
- (aa) May be reduced under special provisions.
 - 1. Supply conductors of 0-750 volts in rack configuration 54.4-D5
 - 2. Supply service drops from racks 54.8-F
 - 3. Supply cables and messengers attached to poles 57.4-F
 - 4. Communication conductors on communication poles 84.4-D
 - 5. Communication conductors on crossarms 84.4-D1
 - 6. Communication conductors attached to poles 84.4-D2
 - 7. Communication service drops attached to poles 84.8-B
 - 8. Communication cables and messengers 87.4-D
 - 9. Supply or communication cables and messengers on jointly used poles 92.1-B
 - 10. Communication service drops on pole top extensions 92.1-C
 - 11. Multiconductor cables with bare neutral 54.10-B1
 - 12. Communication Conductors Across and Along Public Thoroughfares 84.4A6
- (bb) May be reduced for Class T conductors of not more than 750 volts and of the same potential and polarity 74.4-D
- (cc) Not applicable to trolley span wires 77.4-E
- (dd) Special clearances for pole-top and dead-end construction
 - 1. Conductors dead-ended in vertical configuration on poles 54.4-C4
 - 2. Conductors dead-ended in horizontal configuration 54.4-D7
 - 3. Conductors in pole-top construction 54.4-D8
- (ee) Clearance requirements for certain voltage classifications 54.4-D2
- (ff) Not applicable to communication conductors 84.4-D

- (gg) Clearance from crossarms may be reduced for certain conductors
 - 1. Suitably insulated leads to protected runs 54.4-E
 - 2. Leads of 0-5000 volts to equipment 54.4-E
 - 3. Leads of 0-5000 volts to cutouts or switches 58.5-C
- (hh) Reduced clearance permitted from temporary fixtures and lighting circuits 0-300 volts 78.3A(1)
- (ii) Special Clearances Required Above Public and Private Swimming Pools:
 - 1. Supply line conductors 54.4-A4
 - 2. Supply service drops 54.8-B5
 - 3. Communication line conductors 84.4-A5
 - 4. Communication service drops 84.8-C5
 - 5. Supply guys, span wires 56.4-A3
 - 6. Communication guys 86.4-A3
- (jj) May be decreased in partial underground distribution 54.4-D2
- (kk) Shall be increased by 0.025 ft. per kV in excess of 300 kV.
- (ll) Shall be increased by 0.04 ft per kV in excess of 300 kV.
- (mm) proposed clearances to be submitted tot the CPUC prior to construction for circuits in excess of 550 kV.
- (nn) Voltage shown in the table shall mean line – to – ground voltage for direct current (DC) systems.
- (oo) May be reduced for grounded or multi-conductor cables.
 - 1. Grounded cables 57.4-H
 - 2. Multi-Conductor cables 54.10-B6

- (pp) May be reduced to 4 feet for voltages below 7,500 volts 54.4-D3
- (qq) May be reduced to 6 feet for voltages below 75 kV
- (rr) May be reduced for supply service drops 54.8-D1
- (ss) May be reduced to communication service drops 84.4-E1
- (tt))Where a federal agency or surrogate thereof has issued a crossing permit, clearances of that permit shall govern.
- (uu) Or Where sailboating is prohibited and where other boating activities are allowed
- (vv) Clearance above contiguous ground shall be 5 feet greater than in cases 11 or 12 for the type of water area served for boat launch facilities and for area contiguous thereto, that are posted, designated or specifically prepared for rigging of sailboats or other watercraft.
- (ww) For controlled impoundments, the surface areas and corresponding clearances shall be based upon the high water level. for other waters, the surface area shall be that enclosed by its annual flood level. the clearance over rivers, streams and canals shall be based upon the largest surface areas of any one-mile long segment which includes the crossing. the clearance over a canal, river or stream normally used to provide access for sailboats to a larger body of water shall be the same as that required for the larger body of water
- (xx) Water areas are lakes, ponds, reservoirs, tidal waters, rivers, streams and canals without surface obstructions

PROPOSED G.O. 95

54.4 Clearances

Allowable variations in clearances due to side swing of suspension insulators, temperature, loading, etc. are given in Rules 37 and 38.

A. ABOVE GROUND

- 1) Across Arid or Mountainous Areas: Across arid or mountainous areas supply circuits carrying 22,500-30,000 volts, inclusive, may have a clearance of less than 30 feet (Table 1, Case 4, Column F) but not less than 25 feet above ground subject to a reduction of not more than 10 per cent because of temperature and loading as specified in Rule 43. Upon special permission from the Rail Road Commission, a minimum clearance of 25 feet above ground may be applied in similar areas to circuits in excess of 30,000 volts, not including Class E circuits. For circuits in excess of 30,000 volts, in which case no reduction of the 25 feet will be permitted for conditions less than maximum loadings or temperature specified in Rules 43.1 and 43.2.

~~2 In Rural Districts, Conductors of 750-20,000 Volts:~~

- ~~a Crossing Roads or Driveways: In rural districts the minimum clearance of 25 feet specified in Table 1, Case 3 Column E may be reduced to 22 feet above ground for conductors not exceeding 20,000 volts crossing or overhanging traversable portions of public or private roads or driveways. This modified minimum clearance of 22 feet shall in no case be reduced because of temperature or loading at conditions less than the maximum loading or temperature specified in Rules 43.1 and 43.2.~~
- ~~b Above Agricultural Areas Along Roads: In rural districts the minimum clearance of 25 feet specified in Table 1, Case 4 Column E may be reduced to 18 feet above ground for lines not exceeding 20,000 volts across areas capable of being traversed by agricultural equipment and along roads where no part of the line overhangs any traversable portion of a public or private roadway. This modified minimum clearance of 18 feet shall in no case be reduced because of temperature or loading at conditions less than maximum loadings or temperature specified in Rules 43.1 and 43.2. Care should be exercised in using this minimum clearance~~

~~along roads, above or along ditches where mechanical devices are used for maintenance, near trees in orchards, near trees or structures which can be climbed and in other similar situations.~~

32 Lead Wires for Transformers: Transformer lead wires shall have clearances above ground as specified in Table 1 except as modified by the provisions of Rule 58.3-B1a.

43 Over swimming Pools: (see Fig. 54-8) Installations of conductors, service drops and guys over swimming pools shall be avoided where practicable. Where line conductors, service drop conductors or guys are installed over swimming pools the following rules apply:

(a) Line Conductors: Where unprotected line conductors are installed over a swimming pool they shall have radial clearances from the top edge of the swimming pool walls and vertical clearances above the highest water level of the pool surface not less than the following:

- 1) 0 - 750 Volts 20 feet
- 2) 750 - 22,500 Volts 25 feet
- 3) 22.5 - 300 kV 30 feet

(See Table 1, Case 3, Columns D, E and F)

(b) Service Drops 0 - 750 Volts: Where service drop conductors are installed over a swimming pool:

- 1) Phase conductors shall be suitably insulated (see Rule 20.8-G).
- 2) Vertical clearances above the highest water level of the pool surface and radial clearances from the top edge of the pool wall shall be:
 - a) 16 feet for public and commercially operated pools.
 - b) 12 feet for residential pools.
- 3) No service drop may be installed less than 16 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 8 feet radially of

the diving board or platform that is over the water surface of the pool.

- 4) No service drop may be installed less than 12 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 3 feet radially of the diving board or platform that is not over the water surface of the pool.

(c) Ungrounded Portions of Guys:

- 1) Shall have radial clearances from the top edge of the swimming pool wall of not less than 18 feet.
- 2) Shall have vertical clearances above the highest water level of the pool surface of not less than 18 feet.
- 3) Shall not be installed less than 18 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 8 feet radially of the diving board or platform that is over the water surface of the pool.
- 4) Shall not be installed less than 12 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 6 feet radially of the diving board or platform that is not over the water surface of the pool.

(d) Grounded Portions of Guys:

- 1) Shall have vertical clearances above the highest water level of the pool surface of not less than 16 feet.
- 2) Shall not be installed less than 16 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 8 feet radially of the diving board or platform that is over the water surface of the pool.
- 3) Shall not be installed less than 8 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 3 feet radially of the diving

board or platform that is not over the water surface of the pool.

Minimum Vertical and Radial Clearances over Swimming Pools	A Minimum Vertical	B Minimum Radial
Unprotected Line Conductors (Vertical Over Highest Water Level and Radial from Top Edge of Pool Walls)		
1. 0 - 750 Volts	20 Feet	20 Feet
2. 750 - 22,500 Volts	25 Feet	25 Feet
3. 22.5 - 300 kV	30 Feet	30 Feet
Service Drops (Vertical Over Highest Water Level and Radial from Top Edge of Pool Walls)		
4. Pools Public and Commercial	16 Feet	16 Feet
5. Pools Residential	12 Feet	12 Feet
Service Drops (Over Diving Boards or Platforms)		
6. Portion of Board or Platform That is Over Water Surface	16 Feet	8 Feet
7. Portion of Board or Platform That is not Over Water Surface	12 Feet	3 Feet
Guys (Ungrounded Portions)		
8. Over Highest Water Level and from Top Edge of Pool Walls	18 Feet	18 Feet
9. Over Diving Board or Platform (The Portion that is Over the Water Surface)	18 Feet	8 Feet
10. Over Diving Board or Platform (The Portion that is not Over the Water Surface)	12 Feet	6 Feet
Guys (Grounded Portions)		
11. Over the Highest Water Level	16 Feet	—
12. Over Diving Board or Platform (The Portion that is Over the Water Surface)	16 Feet	8 Feet
13. Over Diving Board or Platform (The Portion that is not Over the Water Surface)	8 Feet	3 Feet

Clearance Over Swimming Pools

Figure 54-8

Table 1

Basic Minimum Allowable Vertical Clearance of Wire Above Railroads, Thoroughfares, Ground or Water Surface; Also clearances from Poles, Buildings, Structures or Other Objects(nn)

(Letter References Denote Modifications of Minimum Clearances as Referred to in Note Following this Table)

	Nature of Clearance	Wire or Conductor Concerned						
		A Span wires other than trolley span wires), overhead guys and messengers	B Communication conductors (including open wire, cables and service drops), supply service drops of 0-750 volts	C Trolley Contact, feeder and span wires 0-5000 volts	D Supply conductors of 0-750 volts and supply cables treated as in Rule 57.8	E Supply Conductors and supply cables, 750-22,500 volts	F Supply Conductors and supply cables 22.5 – 300 kV	G (mm) Supply Conductors and supply cables more 300 - 550 kV
1	Crossing above tracks of railroads which transport or propose to transport freight cars (max height 15 ft 1in) where not operated by overhead contact wires (a) (b) (c) (d)	25 ft	25 ft	22 ft	25 ft	28 ft	34 ft	34 ft
2	Crossing or paralleling above tracks of railroads operated by overhead trolleys (b) (c) (d)	26 ft (e)	26 ft (e) (f) (g)	19 ft (h) (i)	27 ft (e) (g)	30 ft (g)	34 ft (g)	34 ft (g) (kk)
3	Crossing or along thoroughfares in Urban districts or crossings thoroughfares in rural districts (c) (d)	18 ft (j) (k) (ii)	18 ft (j) (l) (m) (ii) (aa)	19 ft (hh)	20 ft (ii)	25 ft (n) (o) (ii)	30 ft (o) (ii)	30 ft (o) (ii) (kk)
4	Above ground along thoroughfares in rural districts or across other areas capable of being transversed by vehicles or agricultural equipment.	15 ft (k)	15 ft (m) (n) (p)	19 ft	19 16 ft	25 ft (n) (o)	30 ft (o) (p)	30 ft. (o) (kk)
5	Vertical ground in areas accessible to pedestrians only.	7 ft	10 ft (m) (q)	19 ft	12 ft	17 ft	25 ft (o)	25 ft. (o) (kk)
6	Vertical clearance above buildings and bridges (or other structures which do not ordinarily support conductors and on which men can walk) whether attached or unattached.	8 ft (r)	8 ft (r)	8 ft	8 ft	12 ft	12 ft	20 ft (ll)
7	Horizontal clearance of conductor from buildings (except generating and substations), bridges or other structures (upon which men may	-----	3 ft (u)	3 ft	3 ft (u) (v)	6 ft (v)	6 ft (v)	15 ft (v)

	work) where such conductor is not attached thereto. (a) (t)							
8	Distance of conductor from center line of pole, wheter attached or unattached (w) (x) (y)	-----	15 in (a) (aa)	15 in (aa) (bb) (cc)	15 in (o) (aa) (dd)	15 or 18 in (o) (dd) (ee) (jj)	18 in (dd) (ee) (jj)	Not Applicable
9	Distance of conductor from surface of pole, crossarm or other overhead line structure upon which it is supported, providing it complies with Case 8 above (x) (ee)	-----	3 in (aa) (ff)	3 in (aa) (cc) (gg)	3 in (aa) (dd) (gg)	3 in (dd) (gg)	¼ pin spacing shown in Table 2 Case 15 (dd)	½ pin spacing shown in Table 2 Case 15 (dd)
10	Radial centerline clearance of conductor or cable (unattached) from non-climbable street lighting or traffic signal poles or standards, including mastarms, brackets and lighting fixtures.	-----	1 ft (oo) (u) (rr) (ss)	15 in. (bb) (cc)	3 ft (oo)	6 ft (pp)	10 ft (qq)	10 ft (ll)
11	Water areas not suitable for sailboating (tt) (uu) (ww) (xx)	15'	15'	---	15'	17'	25'	25' (kk)
12	Water areas suitable for sailboating, surface area of: (tt) (vv) (ww) (xx)							
	(a) Less Than 20 acrea	18'	18'	---	18'	20'	27'	27' (kk)
	(b) 20 to 200 acres	26'	26'	---	26'	28'	35'	35' (kk)
	(c) Over 200 to 2,000 acres	32'	32'	---	32'	34'	41'	41' (kk)
	(d) Over 2,000 acres	38'	38'	---	38'	40'	47'	47' (kk)

- a) Shall not be reduced more than 5% because of temperature or loading 37
 - 1. Supply Lines 54.4-B1
 - 2. Communication Lines 84.4-B1
- (b) Shall be increased for supply conductors on Suspension insulators, under certain conditions 37
- (c) Special clearances are provided for traffic signal equipment 58.1-C
- (d) Special clearances are provided for street lighting equipment 58.2-B
- (e) Based on trolley pole throw of 26 feet. May be reduced where suitably protected.

1. Supply Guys 56.4-B2
 2. Supply cables and messengers 57.4-B2
 3. Communication Guys 86.4-B2
 4. Communication cables and messengers 87.4-B2
- (f) May be reduced depending on height of trolley contact conductors.
1. Supply Service Drop 54.8-C5
 2. Communication service drops 84.8-D5
- (g) May be reduced and shall be increased depending on trolley throw
1. Supply conductors (except service drops) 54.4-B2
 2. Communication conductors (except service drops) 84.4-B2
- (h) Shall be increase where freight cars are transported.
1. Trolley contact and feeder conductors 74.4-B1
 2. Trolley span wires 77.4-A
- (i) May be reduced for trolley contact and span wires in subways, tunnels and under bridges and in fenced areas.
1. Trolley contact conductors 74.4-E
 2. Trolley span wires 77.4-A
- (j) May be reduced at crossings over private thoroughfares and entrances to private property and over private property.
1. Supply Service drops 54.8-B2
 2. Supply Guys 56.4-A
 3. Communication service drops 84.8-C2
 4. Communication guys 86.4-A
- (k) May be reduced along thoroughfares where not normally accessible to vehicles.

1. Supply Guys 56.4-A1
 2. Communication Guys 86.4-A1
- (l) May be reduced where within 12 feet of curb line of public thoroughfares
1. Supply Service drops 54.8-B1
 2. Communication service drops 84.8-C1
- (m) May be reduced for railways signal cables under special conditions 84.4-A4
- (n) May be reduced in rural districts
1. ~~Supply conductors, 750-22,500 volts, crossing roads or driveways~~ 54.4-A2a Intentionally Left Blank
 2. ~~Supply conductors, 750-2000 volts, above agricultural areas and along roads~~ 54.4-A2b Intentionally Left Blank
 3. Communication conductors along roads 84.4-A2
- (o) May be reduced for transformer, regulator or capacitor leads.
1. Transformer Leads 58.3-B
 2. Regulator or Capacitor Leads 58.4-B
- (p) May be reduced across arid or mountainous areas
1. Supply Conductors of more than 22, 500 Volts 54.4-A1
 2. Communication conductors 84.4-A1
- (q) Shall be increased or may be reduced under special conditions.
1. Increased for supply service drops on industrial or commercial premises 54.8-B3a
 2. Supply service drops on residential premises 54.8-B3b
 3. Communication conductors 84.4-A3
 4. Increased for Communication service drops on industrial or commercial premises 84.8-C3a
 5. Communication service drops on residential premises 84.8-C3b

- (r) May be reduced above roofs of buildings under special conditions
 - 1. Supply overhead guys 56.4-G
 - 2. Supply service drops 54.8-B4
 - 3. Communication overhead guys 86.4-F
 - 4. Communication conductors and cables 84.4-E
 - 5. Communication service drops 84.8-C4

- (s) Also applies at fire escapes, etc.
 - 1. Supply Conductors 54.4-H1
 - 2. Supply service drops on industrial or commercial premises 54.8-B4a
 - 3. Supply service drops on residential premises 54.8-B4b
 - 4. Communication Conductor 84.4-E

- (t) Special Clearances where attached to buildings, bridges or other structures
 - 1. Supply conductors of 750-22,500 volts 54.4-H2
 - 2. Trolley Contact Conductors 74.4-E
 - 3. Communication Conductors 84.4- F

- (u) Reduced clearances permitted under special conditions
 - 1. Supply service drops on industrial or commercial premises 54.8-B4a
 - 2. Supply cables, grounded 57.4-G
 - 3. Communication cables beside buildings, etc. 84.4-E
 - 4. Communication conductors under bridges, etc. 84.4-F
 - 5. Communication service drops. 84.8-C4
 - 6. Communication cables passing on non-climbable streetlight poles, etc. 84.4-D4a

- (v) May be reduced under special conditions.

1. Supply conductors of 750-7500 volts 54.4-H1
2. Supply transformer lead and bus wires where guarded 58.3-B2

(w) May be reduced at angles in lines and transportation points

1. Supply conductors 54.4-D1
2. Communication Conductors 84.4-D5

(x) May be reduced for suitably protected lateral or vertical runs.

1. Supply bond wires 53.4
2. Supply ground wires 54.6-B
3. Supply lateral conductors 54.6-C
4. Supply vertical pins 54.6-D
5. Supply risers 54.6-E
6. Communication Ground Wires 84.6-B
7. Communication lateral conductors 84.6-C
8. Communication vertical runs 84.6-D
9. Communication risers 84.6-E

(y) Increased clearances for certain conductors

1. Unattached conductors on colinear lines and crossing lines 32.3
2. Unattached supply conductors 54.4D3
3. Supply Service drops on clearance crossarms 54.8-C2
4. Supply Service drops on pole top extensions 54.8-C3
5. Unattached Supply service drops 54.8-D
6. Communication lines, collinear, conflicting or crossing 84.4-D3
7. Communication conductors passing supply poles and unattached thereto 84.4-D4
8. Communication service drops on clearance crossarms 84.8-D2
9. Communication service drops on pole top extensions 84.8-D3
10. Unattached Communication service drops 84.8-E

- (z) Special provisions for police and fire alarm conductors require increased clearances 92.2

- (aa) May be reduced under special provisions.
 - 1. Supply conductors of 0-750 volts in rack configuration 54.4-D5
 - 2. Supply service drops from racks 54.8-F
 - 3. Supply cables and messengers attached to poles 57.4-F
 - 4. Communication conductors on communication poles 84.4-D
 - 5. Communication conductors on crossarms 84.4-D1
 - 6. Communication conductors attached to poles 84.4-D2
 - 7. Communication service drops attached to poles 84.8-B
 - 8. Communication cables and messengers 87.4-D
 - 9. Supply or communication cables and messengers on jointly used poles 92.1-B
 - 10. Communication service drops on pole top extensions 92.1-C
 - 11. Multiconductor cables with bare neutral 54.10-B1
 - 12. Communication Conductors Across and Along Public Thoroughfares 84.4A6

- (bb) May be reduced for Class T conductors of not more than 750 volts and of the same potential and polarity 74.4-D

- (cc) Not applicable to trolley span wires 77.4-E

- (dd) Special clearances for pole-top and dead-end construction
 - 1. Conductors dead-ended in vertical configuration on poles 54.4-C4
 - 2. Conductors dead-ended in horizontal configuration 54.4-D7
 - 3. Conductors in pole-top construction 54.4-D8

- (ee) Clearance requirements for certain voltage classifications 54.4-D2

- (ff) Not applicable to communication conductors 84.4-D
- (gg) Clearance from crossarms may be reduced for certain conductors
 - 1. Suitably insulated leads to protected runs 54.4-E
 - 2. Leads of 0-5000 volts to equipment 54.4-E
 - 3. Leads of 0-5000 volts to cutouts or switches 58.5-C
- (hh) Reduced clearance permitted from temporary fixtures and lighting circuits 0-300 volts 78.3A(1)
- (ii) Special Clearances Required Above Public and Private Swimming Pools:
 - 1. Supply line conductors 54.4-A4
 - 2. Supply service drops 54.8-B5
 - 3. Communication line conductors 84.4-A5
 - 4. Communication service drops 84.8-C5
 - 5. Supply guys, span wires 56.4-A3
 - 6. Communication guys 86.4-A3
- (jj) May be decreased in partial underground distribution 54.4-D2
- (kk) Shall be increased by 0.025 ft. per kV in excess of 300 kV.
- (ll) Shall be increased by 0.04 ft per kV in excess of 300 kV.
- (mm) proposed clearances to be submitted tot the CPUC prior to construction for circuits in excess of 550 kV.
- (nn) Voltage shown in the table shall mean line – to – ground voltage for direct current (DC) systems.
- (oo) May be reduced for grounded or multi-conductor cables.
 - 1. Grounded cables 57.4-H
 - 2. Multi-Conductor cables 54.10-B6

- (pp) May be reduced to 4 feet for voltages below 7,500 volts 54.4-D3
- (qq) May be reduced to 6 feet for voltages below 75 kV
- (rr) May be reduced for supply service drops 54.8-D1
- (ss) May be reduced to communication service drops 84.4-E1
- (tt))Where a federal agency or surrogate thereof has issued a crossing permit, clearances of that permit shall govern.
- (uu) Or Where sailboating is prohibited and where other boating activities are allowed
- (vv) Clearance above contiguous ground shall be 5 feet greater than in cases 11 or 12 for the type of water area served for boat launch facilities and for area contiguous thereto, that are posted, designated or specifically prepared for rigging of sailboats or other watercraft.
- (ww) For controlled impoundments, the surface areas and corresponding clearances shall be based upon the high water level. for other waters, the surface area shall be that enclosed by its annual flood level. the clearance over rivers, streams and canals shall be based upon the largest surface areas of any one-mile long segment which includes the crossing. the clearance over a canal, river or stream normally used to provide access for sailboats to a larger body of water shall be the same as that required for the larger body of water
- (xx) Water areas are lakes, ponds, reservoirs, tidal waters, rivers, streams and canals without surface obstructions

Final*

Revised G.O. 95

PROPOSED G.O. 95

54.4 Clearances

Allowable variations in clearances due to side swing of suspension insulators, temperature, loading, etc. are given in Rules 37 and 38.

A. ABOVE GROUND

- 1) Across Arid or Mountainous Areas: Across arid or mountainous areas supply circuits carrying 22,500-30,000 volts, inclusive, may have a clearance of less than 30 feet (Table 1, Case 4, Column F) but not less than 25 feet above ground subject to a reduction of not more than 10 per cent because of temperature and loading as specified in Rule 43. Upon special permission from the Rail Road Commission, a minimum clearance of 25 feet above ground may be applied in similar areas to circuits in excess of 30,000 volts, not including Class E circuits. For circuits in excess of 30,000 volts, in which case no reduction of the 25 feet will be permitted for conditions less than maximum loadings or temperature specified in Rules 43.1 and 43.2.
- 2 Lead Wires for Transformers: Transformer lead wires shall have clearances above ground as specified in Table 1 except as modified by the provisions of Rule 58.3-B1a.
- 3 Over swimming Pools: (see Fig. 54-8) Installations of conductors, service drops and guys over swimming pools shall be avoided where practicable. Where line conductors, service drop conductors or guys are installed over swimming pools the following rules apply:
 - (a) Line Conductors: Where unprotected line conductors are installed over a swimming pool they shall have radial clearances from the top edge of the swimming pool walls and vertical clearances above the highest water level of the pool surface not less than the following:
 - 1) 0 - 750 Volts 20 feet
 - 2) 750 - 22,500 Volts 25 feet

3) 22.5 - 300 kV 30 feet
(See Table 1, Case 3, Columns D, E and F)

(b) Service Drops 0 - 750 Volts: Where service drop conductors are installed over a swimming pool:

- 1) Phase conductors shall be suitably insulated (see Rule 20.8–G).
- 2) Vertical clearances above the highest water level of the pool surface and radial clearances from the top edge of the pool wall shall be:
 - a) 16 feet for public and commercially operated pools.
 - b) 12 feet for residential pools.
- 3) No service drop may be installed less than 16 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 8 feet radially of the diving board or platform that is over the water surface of the pool.
- 4) No service drop may be installed less than 12 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 3 feet radially of the diving board or platform that is not over the water surface of the pool.

(c) Ungrounded Portions of Guys:

- 1) Shall have radial clearances from the top edge of the swimming pool wall of not less than 18 feet.
- 2) Shall have vertical clearances above the highest water level of the pool surface of not less than 18 feet.
- 3) Shall not be installed less than 18 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 8 feet radially of the diving board or platform that is over the water surface of the pool.

- 4) Shall not be installed less than 12 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 6 feet radially of the diving board or platform that is not over the water surface of the pool.

(d) Grounded Portions of Guys:

- 1) Shall have vertical clearances above the highest water level of the pool surface of not less than 16 feet.
- 2) Shall not be installed less than 16 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 8 feet radially of the diving board or platform that is over the water surface of the pool.
- 3) Shall not be installed less than 8 feet vertically above the horizontal plane through a diving board or platform, such plane being the area within 3 feet radially of the diving board or platform that is not over the water surface of the pool.

Minimum Vertical and Radial Clearances over Swimming Pools	A Minimum Vertical	B Minimum Radial
Unprotected Line Conductors (Vertical Over Highest Water Level and Radial from Top Edge of Pool Walls)		
1. 0 - 750 Volts	20 Feet	20 Feet
2. 750 - 22,500 Volts	25 Feet	25 Feet
3. 22.5 - 300 kV	30 Feet	30 Feet
Service Drops (Vertical Over Highest Water Level and Radial from Top Edge of Pool Walls)		
4. Pools Public and Commercial	16 Feet	16 Feet
5. Pools Residential	12 Feet	12 Feet
Service Drops (Over Diving Boards or Platforms)		
6. Portion of Board or Platform That is Over Water Surface	16 Feet	8 Feet
7. Portion of Board or Platform That is not Over Water Surface	12 Feet	3 Feet
Guys (Ungrounded Portions)		
8. Over Highest Water Level and from Top Edge of Pool Walls	18 Feet	18 Feet

9. Over Diving Board or Platform (The Portion that is Over the Water Surface)	18 Feet	8 Feet
10. Over Diving Board or Platform (The Portion that is not Over the Water Surface)	12 Feet	6 Feet
Guys (Grounded Portions)		
11. Over the Highest Water Level	16 Feet	—
12. Over Diving Board or Platform (The Portion that is Over the Water Surface)	16 Feet	8 Feet
13. Over Diving Board or Platform (The Portion that is not Over the Water Surface)	8 Feet	3 Feet

Clearance Over Swimming Pools
Figure 54-8

Table 1

Basic Minimum Allowable Vertical Clearance of Wire Above Railroads, Thoroughfares , Ground or Water Surface; Also clearances from Poles, Buildings, Structures or Other Objects(nn)
 (Letter References Denote Modifications of Minimum Clearances as Referred to in Note Following this Table)

	Nature of Clearance	Wire or Conductor Concerned						
		A Span wires other than trolley span wires), overhead guys and messengers	B Communication conductors (including open wire, cables and service drops), supply service drops of 0-750 volts	C Trolley Contact, feeder and span wires 0-5000 volts	D Supply conductors of 0- 750 volts and supply cables treated as in Rule 57.8	E Supply Conductors and supply cables, 750-22,500 volts	F Supply Conductors and supply cables 22.5 – 300 kV	G (mm) Supply Conductors and supply cables more 300 - 550 kV
1	Crossing above tracks of railroads which transport or propose to transport freight cars (max height 15 ft 1in) where not operated by overhead contact wires (a) (b) (c) (d)	25 ft	25 ft	22 ft	25 ft	28 ft	34 ft	34 ft
2	Crossing or paralleling above tracks of railroads operated by overhead trolleys (b) (c) (d)	26 ft (e)	26 ft (e) (f) (g)	19 ft (h) (i)	27 ft (e) (g)	30 ft (g)	34 ft (g)	34 ft (g) (kk)
3	Crossing or along thoroughfares in Urban districts or crossings thoroughfares in rural districts (c) (d)	18 ft (j) (k) (ii)	18 ft (j) (l) (m) (ii) (aa)	19 ft (hh)	20 ft (ii)	25 ft (o) (ii)	30 ft (o) (ii)	30 ft (o) (ii) (kk)
4	Above ground along thoroughfares in rural districts or across other areas capable of being transversed by vehicles or agricultural equipment.	15 ft (k)	15 ft (m) (n) (p)	19 ft	19 ft	25 ft (o)	30 ft (o) (p)	30 ft. (o) (kk)
5	Vertical ground in areas accessible to pedestrians only.	7 ft	10 ft (m) (q)	19 ft	12 ft	17 ft	25 ft (o)	25 ft. (o) (kk)
6	Vertical clearance above buildings and bridges (or other structures which do not ordinarily support conductors and on which men can walk) whether attached or unattached.	8 ft (r)	8 ft (r)	8 ft	8 ft	12 ft	12 ft	20 ft (ll)
7	Horizontal clearance of conductor from buildings (except generating and substations), bridges or other structures (upon which men may work) where such conductor is not	-----	3 ft (u)	3 ft	3 ft (u) (v)	6 ft (v)	6 ft (v)	15 ft (v)

	attached thereto. (a) (t)							
8	Distance of conductor from center line of pole, wheter attached or unattached (w) (x) (y)	-----	15 in (a) (aa)	15 in (aa) (bb) (cc)	15 in (o) (aa) (dd)	15 or 18 in (o) (dd) (ee) (jj)	18 in (dd) (ee) (jj)	Not Applicable
9	Distance of conductor from surface of pole, crossarm or other overhead line structure upon which it is supported, providing it complies with Case 8 above (x) (ee)	-----	3 in (aa) (ff)	3 in (aa) (cc) (gg)	3 in (aa) (dd) (gg)	3 in (dd) (gg)	¼ pin spacing shown in Table 2 Case 15 (dd)	½ pin spacing shown in Table 2 Case 15 (dd)
10	Radial centerline clearance of conductor or cable (unattached) from non-climbable street lighting or traffic signal poles or standards, including mastarms, brackets and lighting fixtures.	-----	1 ft (oo) (u) (rr) (ss)	15 in. (bb) (cc)	3 ft (oo)	6 ft (pp)	10 ft (qq)	10 ft (ll)
11	Water areas not suitable for sailboating (tt) (uu) (ww) (xx)	15'	15'	---	15'	17'	25'	25' (kk)
12	Water areas suitable for sailboating, surface area of: (tt) (vv) (ww) (xx)							
	(a) Less Than 20 acrea	18'	18'	---	18'	20'	27'	27' (kk)
	(b) 20 to 200 acres	26'	26'	---	26'	28'	35'	35' (kk)
	(c) Over 200 to 2,000 acres	32'	32'	---	32'	34'	41'	41' (kk)
	(d) Over 2,000 acres	38'	38'	---	38'	40'	47'	47' (kk)

a) Shall not be reduced more than 5% because of temperature or loading 37

1. Supply Lines 54.4-B1
2. Communication Lines 84.4-B1

(b) Shall be increased for supply conductors on Suspension insulators, under certain conditions 37

(c) Special clearances are provided for traffic signal equipment 58.1-C

(d) Special clearances are provided for street lighting equipment 58.2-B

(e) Based on trolley pole throw of 26 feet. May be reduced where suitably protected.

1. Supply Guys 56.4-B2
 2. Supply cables and messengers 57.4-B2
 3. Communication Guys 86.4-B2
 4. Communication cables and messengers 87.4-B2
- (f) May be reduced depending on height of trolley contact conductors.
1. Supply Service Drop 54.8-C5
 2. Communication service drops 84.8-D5
- (g) May be reduced and shall be increased depending on trolley throw
1. Supply conductors (except service drops) 54.4-B2
 2. Communication conductors (except service drops) 84.4-B2
- (h) Shall be increase where freight cars are transported.
1. Trolley contact and feeder conductors 74.4-B1
 2. Trolley span wires 77.4-A
- (i) May be reduced for trolley contact and span wires in subways, tunnels and under bridges and in fenced areas.
1. Trolley contact conductors 74.4-E
 2. Trolley span wires 77.4-A
- (j) May be reduced at crossings over private thoroughfares and entrances to private property and over private property.
1. Supply Service drops 54.8-B2
 2. Supply Guys 56.4-A
 3. Communication service drops 84.8-C2
 4. Communication guys 86.4-A
- (k) May be reduced along thoroughfares where not normally accessible to vehicles.

1. Supply Guys 56.4-A1
 2. Communication Guys 86.4-A1
- (l) May be reduced where within 12 feet of curb line of public thoroughfares
1. Supply Service drops 54.8-B1
 2. Communication service drops 84.8-C1
- (m) May be reduced for railways signal cables under special conditions 84.4-A4
- (n) May be reduced in rural districts
1. Intentionally Left Blank
 2. Intentionally Left Blank
 3. Communication conductors along roads 84.4-A2
- (o) May be reduced for transformer, regulator or capacitor leads.
1. Transformer Leads 58.3-B
 2. Regulator or Capacitor Leads 58.4-B
- (p) May be reduced across arid or mountainous areas
1. Supply Conductors of more than 22, 500 Volts 54.4-A1
 2. Communication conductors 84.4-A1
- (q) Shall be increased or may be reduced under special conditions.
1. Increased for supply service drops on industrial or commercial premises 54.8-B3a
 2. Supply service drops on residential premises 54.8-B3b
 3. Communication conductors 84.4-A3
 4. Increased for Communication service drops on industrial or commercial premises 84.8-C3a
 5. Communication service drops on residential premises 84.8-C3b

- (r) May be reduced above roofs of buildings under special conditions
 - 1. Supply overhead guys 56.4-G
 - 2. Supply service drops 54.8-B4
 - 3. Communication overhead guys 86.4-F
 - 4. Communication conductors and cables 84.4-E
 - 5. Communication service drops 84.8-C4

- (s) Also applies at fire escapes, etc.
 - 1. Supply Conductors 54.4-H1
 - 2. Supply service drops on industrial or commercial premises 54.8-B4a
 - 3. Supply service drops on residential premises 54.8-B4b
 - 4. Communication Conductor 84.4-E

- (t) Special Clearances where attached to buildings, bridges or other structures
 - 1. Supply conductors of 750-22,500 volts 54.4-H2
 - 2. Trolley Contact Conductors 74.4-E
 - 3. Communication Conductors 84.4- F

- (u) Reduced clearances permitted under special conditions
 - 1. Supply service drops on industrial or commercial premises 54.8-B4a
 - 2. Supply cables, grounded 57.4-G
 - 3. Communication cables beside buildings, etc. 84.4-E
 - 4. Communication conductors under bridges, etc. 84.4-F
 - 5. Communication service drops. 84.8-C4
 - 6. Communication cables passing on non-climbable streetlight poles, etc. 84.4-D4a

- (v) May be reduced under special conditions.
 - 1. Supply conductors of 750-7500 volts 54.4-H1
 - 2. Supply transformer lead and bus wires where guarded 58.3-B2

- (w) May be reduced at angles in lines and transportation points
 - 1. Supply conductors 54.4-D1
 - 2. Communication Conductors 84.4-D5

- (x) May be reduced for suitably protected lateral or vertical runs.
 - 1. Supply bond wires 53.4
 - 2. Supply ground wires 54.6-B
 - 3. Supply lateral conductors 54.6-C
 - 4. Supply vertical pins 54.6-D
 - 5. Supply risers 54.6-E
 - 6. Communication Ground Wires 84.6-B
 - 7. Communication lateral conductors 84.6-C
 - 8. Communication vertical runs 84.6-D
 - 9. Communication risers 84.6-E

- (y) Increased clearances for certain conductors
 - 1. Unattached conductors on colinear lines and crossing lines 32.3
 - 2. Unattached supply conductors 54.4D3
 - 3. Supply Service drops on clearance crossarms 54.8-C2
 - 4. Supply Service drops on pole top extensions 54.8-C3
 - 5. Unattached Supply service drops 54.8-D
 - 6. Communication lines, collinear, conflicting or crossing 84.4-D3
 - 7. Communication conductors passing supply poles and unattached thereto 84.4-D4
 - 8. Communication service drops on clearance crossarms 84.8-D2
 - 9. Communication service drops on pole top extensions 84.8-D3
 - 10. Unattached Communication service drops 84.8-E

- (z) Special provisions for police and fire alarm conductors require increased clearances 92.2
- (aa) May be reduced under special provisions.
 - 1. Supply conductors of 0-750 volts in rack configuration 54.4-D5
 - 2. Supply service drops from racks 54.8-F
 - 3. Supply cables and messengers attached to poles 57.4-F
 - 4. Communication conductors on communication poles 84.4-D
 - 5. Communication conductors on crossarms 84.4-D1
 - 6. Communication conductors attached to poles 84.4-D2
 - 7. Communication service drops attached to poles 84.8-B
 - 8. Communication cables and messengers 87.4-D
 - 9. Supply or communication cables and messengers on jointly used poles 92.1-B
 - 10. Communication service drops on pole top extensions 92.1-C
 - 11. Multiconductor cables with bare neutral 54.10-B1
 - 12. Communication Conductors Across and Along Public Thoroughfares 84.4A6
- (bb) May be reduced for Class T conductors of not more than 750 volts and of the same potential and polarity 74.4-D
- (cc) Not applicable to trolley span wires 77.4-E
- (dd) Special clearances for pole-top and dead-end construction
 - 1. Conductors dead-ended in vertical configuration on poles 54.4-C4
 - 2. Conductors dead-ended in horizontal configuration 54.4-D7
 - 3. Conductors in pole-top construction 54.4-D8
- (ee) Clearance requirements for certain voltage classifications 54.4-D2
- (ff) Not applicable to communication conductors 84.4-D

- (gg) Clearance from crossarms may be reduced for certain conductors
 - 1. Suitably insulated leads to protected runs 54.4-E
 - 2. Leads of 0-5000 volts to equipment 54.4-E
 - 3. Leads of 0-5000 volts to cutouts or switches 58.5-C
- (hh) Reduced clearance permitted from temporary fixtures and lighting circuits 0-300 volts 78.3A(1)
- (ii) Special Clearances Required Above Public and Private Swimming Pools:
 - 1. Supply line conductors 54.4-A4
 - 2. Supply service drops 54.8-B5
 - 3. Communication line conductors 84.4-A5
 - 4. Communication service drops 84.8-C5
 - 5. Supply guys, span wires 56.4-A3
 - 6. Communication guys 86.4-A3
- (jj) May be decreased in partial underground distribution 54.4-D2
- (kk) Shall be increased by 0.025 ft. per kV in excess of 300 kV.
- (ll) Shall be increased by 0.04 ft per kV in excess of 300 kV.
- (mm) proposed clearances to be submitted tot the CPUC prior to construction for circuits in excess of 550 kV.
- (nn) Voltage shown in the table shall mean line – to – ground voltage for direct current (DC) systems.
- (oo) May be reduced for grounded or multi-conductor cables.
 - 1. Grounded cables 57.4-H
 - 2. Multi-Conductor cables 54.10-B6

- (pp) May be reduced to 4 feet for voltages below 7,500 volts 54.4-D3
- (qq) May be reduced to 6 feet for voltages below 75 kV
- (rr) May be reduced for supply service drops 54.8-D1
- (ss) May be reduced to communication service drops 84.4-E1
- (tt))Where a federal agency or surrogate thereof has issued a crossing permit, clearances of that permit shall govern.
- (uu) Or Where sailboating is prohibited and where other boating activities are allowed
- (vv) Clearance above contiguous ground shall be 5 feet greater than in cases 11 or 12 for the type of water area served for boat launch facilities and for area contiguous thereto, that are posted, designated or specifically prepared for rigging of sailboats or other watercraft.
- (ww) For controlled impoundments, the surface areas and corresponding clearances shall be based upon the high water level. for other waters, the surface area shall be that enclosed by its annual flood level. the clearance over rivers, streams and canals shall be based upon the largest surface areas of any one-mile long segment which includes the crossing. the clearance over a canal, river or stream normally used to provide access for sailboats to a larger body of water shall be the same as that required for the larger body of water
- (xx) Water areas are lakes, ponds, reservoirs, tidal waters, rivers, streams and canals without surface obstructions

ITEM 4

~~Rule~~ Rule 54.4-C4b

~~Rule~~ Rule 54.4-D6b

RATIONALE FOR PROPOSED RULE CRANGE
RULE 54.4-C4b
CONDUCTOR -CLEARANCES
BETWEEN CONDUCTORS -DEAD ENDED ON POLE
IN VERTICAL CONFIGURATION

It appears the purpose of the existing rule was to provide a margin of safety for work being performed in close proximity to unprotected 750-7500 volt conductors.

Present safety requirements necessitate the covering of these unprotected conductors within the working area.

EXISTING G.O. 95 RULE 54.4-C4b

54.4C-4 Dead Ended on Pole in Vertical Configuration:

- b) Conductors of More than 750 Volts supported on climbable poles: Where conductors of more than 750 Volts are supported in vertical configuration directly on a climbable pole without the use of crossarms at the line terminations, angles or corners, the following requirements apply:

The vertical separation between conductors of the same circuit shall not be less than the clearances specified in Table 2, Cases 15 and 20;

The vertical separation between conductors of different circuits shall not be less than the clearances specified in Table 2, cases 8 to 13, inclusive;

Not more than two conductors of a circuit of 750-5000 volts shall be supported directly on a pole in vertical configuration without the use of crossarms. The number of conductors of a circuit of more than 5000 volts so supported on a pole shall be limited to four. Branch circuits may be taken from such construction without the use of crossarms provided a climbing and working space as specified in Rule 54.7 and Rule 54.11 is maintained; and

The clearance of conductors from surface of pole shall not be less than as specified in Rule 54.4-D6b.

See Rule 54.7-A1 and Rule 54.11-F for climbing space requirements for conductors dead ended on poles in vertical configuration.

Proposed G.O. 95 RULE 54.4-C4b

54.4C-4 Dead Ended on Pole in Vertical Configuration:

- b) Conductors of More than 750 Volts supported on climbable poles: Where conductors of more than 750 Volts are supported in vertical configuration directly on a climbable pole without the use of crossarms at the line terminations, angles or corners, the following requirements apply:

The vertical separation between conductors of the same circuit shall not be less than the clearances specified in Table 2, Cases 15 and 20;

The vertical separation between conductors of different circuits shall not be less than the clearances specified in Table 2, cases 8 to 13, inclusive;

Not more than ~~two~~ four conductors of a circuit of more than 750-~~5000~~ volts shall be supported directly on a pole in vertical configuration without the use of crossarms. ~~The number of conductors of a circuit of more than 5000 volts so supported on a pole shall be limited to four.~~ Branch circuits may be taken from such construction without the use of crossarms provided a climbing and working space as specified in Rule 54.7 and Rule 54.11 is maintained; and

The clearance of conductors from surface of pole shall not be less than as specified in Rule 54.4-D6b.

See Rule 54.7-A1 and Rule 54.11-F for climbing space requirements for conductors dead ended on poles in vertical configuration.

Final *
Proposed G.O. 95 RULE 54.4-C4b

54.4C-4 Dead Ended on Pole in Vertical Configuration:

- b) Conductors of More than 750 Volts supported on climbable poles: Where conductors of more than 750 Volts are supported in vertical configuration directly on a climbable pole without the use of crossarms at the line terminations, angles or corners, the following requirements apply:

The vertical separation between conductors of the same circuit shall not be less than the clearances specified in Table 2, Cases 15 and 20;

The vertical separation between conductors of different circuits shall not be less than the clearances specified in Table 2, cases 8 to 13, inclusive;

Not more than four conductors of a circuit of more than 750volts shall be supported directly on a pole in vertical configuration without the use of crossarms. Branch circuits may be taken from such construction without the use of crossarms provided a climbing and working space as specified in Rule 54.7 and Rule 54.11 is maintained; and

The clearance of conductors from surface of pole shall not be less than as specified in Rule 54.4-D6b.

See Rule 54.7-A1 and Rule 54.11-F for climbing space requirements for conductors dead ended on poles in vertical configuration.

RATIONALE FOR PROPOSED RULE CHANGE
RULE 54.4-D6b,
CONDUCTOR -CLEARANCES
FROM POLES -DEAD ENDED ON POLE

It appears the purpose of the existing rule was to provide a margin of safety for work being performed in close proximity to unprotected 750-7500 volt conductors.

Present safety requirements necessitate the covering of these, unprotected conductors within the working area.

EXISTING G.O. 95 RULE

RULE 54.4-D6b

b) More Than 750 Volts supported on climbable poles:

Where conductors are supported on a climbable pole in vertical configuration, the energized portions of such conductors shall have clearances of not less than 15 inches from the surface of pole for voltages between 750 and 7500 volts and 18 inches from the surface of pole for voltages in excess of 7500 volts.

Not more than two conductors of a circuit of 750-5000 volts shall be attached directly to a pole in vertical configuration without the use of crossarms. The number of conductors of a circuit of more than 5000 volts so supported on a pole shall be limited to four. Branch circuits may be taken from such construction without the use of crossarms provided a climbing and working space as specified in Rules 54.7 and 54.11 is maintained.

PROPOSED G.O. 95 RULE

RULE 54.4-D6b

b) More Than 750 Volts supported on climbable poles:

Where conductors are supported on a climbable pole in vertical configuration, the energized portions of such conductors shall have clearances of not less than 15 inches from the surface of pole for voltages between 750 and 7500 volts and 18 inches from the surface of pole for voltages in excess of 7500 volts.

Not more than ~~two~~ four conductors of a circuit of ~~more than 750-5000~~ volts shall be attached directly to a pole in vertical configuration without the use of crossarms. ~~The number of conductors of a circuit of more than 5000 volts so supported on a pole shall be limited to four.~~ Branch circuits may be taken from such construction without the use of crossarms provided a climbing and working space as specified in Rules 54.7 and 54.11 is maintained.

FINAL *
PROPOSED G.O. 95 RULE

RULE 54.4-D6b

b) More Than 750 Volts supported on climbable poles:

Where conductors are supported on a climbable pole in vertical configuration, the energized portions of such conductors shall have clearances of not less than 15 inches from the surface of pole for voltages between 750 and 7500 volts and 18 inches from the surface of pole for voltages in excess of 7500 volts.

Not more than four conductors of a circuit of more than 750 volts shall be attached directly to a pole in vertical configuration without the use of crossarms. Branch circuits may be taken from such construction without the use of crossarms provided a climbing and working space as specified in Rules 54.7 and 54.11 is maintained.

ITEM 5

~~12/15~~

Rule 54.8

RATIONALE FOR PROPOSED RULE CHANGE
RULE 5...8
CONDUCTORS SERVICE DROPS, 0-750 VOLTS

This change simplifies existing language, moves building clearances to Table 10, and puts more emphasis on using Insulated Conductors (particularly when using allowed reduced clearances).

Existing Rule
Rule 54.8

54.8 Service Drops, 0-750 Volts

A Material and Size

Supply service drops of 0-750 volts shall be of material and size as specified in Table 8 and Rule 49.4-C7a and shall have a weather-resistant covering at least equivalent to double-braid weatherproofing.

NOTE.-Resolution No. 756 effective May 29, 1951 authorized the use of multiple conductor service drop cable with a bare neutral conductor for service drops of 0-750 volts provided that the attachment of such cable at the pole and building ends shall be by means of an insulator.

B Clearances Above Ground, Buildings, Etc.

- 1 Above Public Thoroughfares: Service drop conductors shall have a vertical clearance of not less than 18 feet above public thoroughfares, except that this clearance may grade from 18 feet at a position not more than 12 feet horizontally from the curb line, provided the clearance at the center line of any public thoroughfare shall in no case be less than 18 feet. Where there are no curbs the foregoing provisions shall apply using the outer limits of possible vehicular movement in lieu of a curb line.
- 2 Above Private Thoroughfares and Other Private Property:
 - a) Industrial or Commercial Premises: Over private driveways, lanes, or other private property areas accessible to vehicles on premises used for industrial or commercial purpose, service drops shall have a vertical clearance of not less than 16 feet.
 - b) Residential Premises: Over private driveways or lanes or other premises used for residential purpose only, service drops shall have a vertical clearance of not less than 12 feet. If the building served does not permit an attachment which will afford a clearance of at least 12 feet over such areas without the installation of a structure on the building to provide additional height, the vertical clearance of service

drops of 0-300 volts only may be less than 12 feet but shall be maintained as great as possible and shall be not less than 10 feet.

3 Above Ground in Areas Accessible to Pedestrians Only:

- a) Industrial and Commercial Premises: Over areas accessible to pedestrians only on premises used for industrial or commercial purposes, service drops shall be maintained at a vertical clearance of not less than 12 feet.
- b) Residential Premises: Over areas accessible to pedestrians only on residential premises, service drops shall be maintained at a vertical clearance of not less than 10 feet. If the building served does not permit an attachment which will afford at least 10 feet clearance over such areas without the installation of a structure on the building to provide additional height, the vertical clearance of service drops of 0-300 volts only may be less than 10 feet but shall be maintained as great as possible and shall be not less than 8 feet 6 inches. If the building served would require the installation of an attachment structure to provide height sufficient to afford a vertical clearance of at least 8 feet 6 inches, the full clearance of 10feet shall be maintained.

4 From Buildings and Structures: Service drops shall be so arranged as to hamper and endanger workmen and firemen as little as possible in the performance of their duties.

- a) Industrial and Commercial premises: On premises used for industrial or commercial purposes service drops shall be maintained at a vertical clearance of not less than 8 feet over all or any portions of buildings and structures, except that service drops of 0-300 volts may be less than 8 feet, but not less than 12 inches, above the cornice, decorative appendage, eave, roof or parapet wall of the building served provided:

The current carrying service conductors are insulated for the voltage being supplied (see Rule 20.8-F), and the point of attachment of the service drops is not more than 18 inches

back of the front face of the building wall facing the pole line from which the service drops originate.

Service drops are not required to clear buildings any specified horizontal distance but shall be so installed that they clear fire escapes exits, windows, doors and other points at which human contact might be expected a horizontal distance of not less than 3 feet.

Where service drop crosses over metallic or non-metallic nonwalkable overhang or patio cover vertical clearance may be less than 8 feet, but not less than 24 inches providing such service drops consist of abrasion-resistant cables having a grounded metallic sheath and are insulated for the voltage being supplied.

Service drops are not required to clear buildings any specified horizontal distance but shall be so installed that they clear fire escapes, exits, windows, doors and other points at which human contact might be expected, a horizontal distance of not less than 3 feet. Where attached to the surface of buildings the installation shall be made in accordance with the Electrical Safety Orders of the Industrial Accident Commission, effective May 1, 1934.

- b) Residential Premises: On premises used for residential purpose only, service drops of 300-750 volts shall be maintained at a vertical clearance of not less than 8 feet over all buildings and structures.

The clearance above buildings of service drops of 0-300 volts shall be not less than the distance specified in Table 10.

Table 10
Minimum Allowable Clearances of Service Drops of 0-300 Volts Above Buildings.

Type of Roof	Minimum clearance above		
	Building Served	Other Buildings on Premises served	Buildings on other premises
Metal roof 3/8 pitch or less (a)	8 ft.(c)	8 ft.	8 ft.
Metal roof, more than 3/8 pitch	2 ft.(c)	2 ft.	8 ft.
Nonmetallic roof, 3/8 pitch or less	(b)	2 ft.	8 ft.
Nonmetallic roof, more than 3/8 pitch	(b)	2 ft.	2 ft.

- a. 3/8 pitch is a approximately 37 degrees from the horizontal.
- b. No limit specified but the greatest clearance should be obtained.
- c. Where insulated abrasion-resistant conductors are may be reduced to 12 inches.

On premises used for residential purposes only the clearance above building of service drops of 0-300 volts may be less than the distance specified in Table 10 but not less than 12 inches over the building served nor less than 24 inches above other buildings on the premises served, provided:

The current-carrying conductors consist of abrasion-resistant cable having a grounded metallic sheath or neutral supported service drop cable manufactured in accordance with Standard No. WC-9-1961 or Standard No. WC-3-1959 of the National Electric Manufactures Association and are insulated for the voltage being supplied and the roof is metallic or nonmetallic, nonwalkable over hang or patio cover.

Service Drops are not required to clear buildings on residential premises any specified horizontal distance, but shall be so installed that they clear fire escapes, exits, windows, doors, and other points at which human contact might be expected, a horizontal distance of not less than 3 feet. Service drops above a horizontal plane through the top extremity of an opening should maintain the maximum

practical radial clearance, which in no event shall be less than 1 foot.

5 OVER SWIMMING POOLS: (See Rule 54.4-A4 and Fig 54-8)

NOTE: Added January 2, 1962 by Resolution No. E-1109.

NOTE: PORTIONS OF THIS RULE HAVE BEEN REVISED AND MOVED TO RULE 54.4-A4.

C Clearances Between Supply Service Drops and Other Conductors

The clearance of supply service drop conductors from other conductors shall be not less than the minimum clearances specified in Rule 38, Table 2, Column D, with the following modifications:

- 1 From the Fire Alarm or Other Communication Line Conductors:
 - a) Crossing in Spans: At crossing in spans, supply service drop conductors may have a clearance of less than 48 inches (Table 2, Case 3, Column; and Case 4, Column C) but not less than 24 inches above any communication line conductors or below communication line conductors not supported on a messenger, provided the crossing is 6 feet or more from any pole which does not support both conductors involved in the crossing (see App. G, Fig 42).
 - b) Supported on the same Pole: Supply service drop conductors, other than those on a pole-top clearance attachment, may have a clearance of less than 48 inches (Table 2, Case 8, Column D; and Case 9, Column C) above or below communication line conductors supported by the same pole and not on a messenger provided such clearance is 6 feet or more from any pole which does not support both conductors involved, and provided clearances at least equal to those shown in table 11 are maintained.

Table 11
 Minimum Radial Clearance Between Supply Service Drop
 Conductors and Communication Line Conductors
 Not on Messengers

Radial distance of Crossing from supporting pole (feet)	Minimum radial Clearance (inches)	
	From Police and Fire alarm Conductors	From other communication conductors
5 or Less	6	12
10 or less, but not more than 5	9	18
15 or less, but not more than 10	15	24
20 or less, but not more than 15	21	24
More Than 20	24	24

Supply service drop conductors may have a clearance of less than 48 inches (as specified in Table 2, Case 8, Column D; and Case 9, Column C) but not less than 24 inches above and laterally from communication line conductors supported on a messenger by the same pole provided such clearance is 6 feet or more from any pole which does not support both conductors. The vertical clearances of not less than 24 inches above or 48 inches below communication conductors supported on messengers are not required where the supply service drop conductors are 24 inches or more horizontally from the vertical plane of the communication messenger. (See App. G, Fig 42.)

- 2 On Clearance Crossarms: Supply service drops may be supported on a clearance crossarm at a vertical distance less than 48 inches (specified in Table 2, Case 8, Column D, and Case 9, Column C) but not less than 24 inches above or below either supply circuits of 0-750 volts or communication circuits not supported on a messenger, or above communication or supply circuits which are supported on a messenger, provided the supply service drop unprotected conductors are at least 25 inches horizontally from the center line of a pole or are attached to suitable brackets (at least

25 inches from center line of pole) on each end of the clearance arm and carried on the underside of the clearances arm from end to end in fiber or plastic conduit or under wood protective covering as specified in Rule 54.6-C .

The installation of service drops in accordance with this rule will not entail any change in the communication conductors supported on the pole. (See App. G, Fig 40)

- 3 On Pole Top Extensions: Supply service drops may be carried in a clearance crossing on pole top extensions or brackets above either supply circuits of 0-750 volts or communication circuits, with a vertical conductor clearance less than 48 inches (Table 2, Case 8, Column D; Case 9 Column C) but not less than 2 feet provided the service drop conductors clear the center line of the pole (projected) not less than 25 inches horizontally, and also provided the service drop conductors clear the outside pin position conductors of the other circuit not less than 2 feet. Where, in addition to the pole top bracket or extension, the supply service drop conductors are supported on a bracket on the end of the other line crossarm, a clearance of not less than 12 inches will be permitted at the points of crossing of line conductors in the outside pin positions. In such construction the crossarm of the extension shall be of wood. The installation of service drops in accordance with this rule will not entail any change in the communication conductors supported on the pole. (See App. G, Fig 41.)
- 4 From Communication Service Drops: The radial clearance between supply service drop conductors may be less than 48 inches as specified in Table 2, Column C, Cases 4 and 9; Column D Cases 3 and 8, but shall be not less than 24 inches. Where within 15 feet of the point attachment of either service drop on a building, this clearance may be further reduced but shall be not less than 12 inches.
- 5 Above Trolley Contact Conductors: Service drops may be installed above trolley contact conductors, including messenger in catenary construction, at a vertical distance of not less than 4 feet, provided the service drops clear the top of rails a vertical distance of not less than 26 feet where the railroad crossed transports standard freight cars, or not less than 23 feet where the railroad does not transport standard freight cars. (See Rule 74.4-B1.)

- 6 From Conductors of 750-7500 Volts: Service drops may cross above or below line conductors of 750-7500 volts supported on the same pole at clearances less than specified in Table 2, Case 10, Column D, provided such drops shall be not less than 2 feet vertically and 1 foot horizontally from the supply line conductors.

D Clearance from other Poles

The clearance between service drop conductors and the center line of any pole not supporting them shall be not less than 22 ½ inches (Rule 32.3). In case the pole involved in this clearance is within 10 feet of a pole supporting the service drop, this clearance may be less than 22 ½ inches but shall not less than 15 inches.

- 1 From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Supply service drops of 0 - 750 volts passing (unattached) non-climbable street lighting and traffic signal poles or standards, including mastarms, brackets and lighting fixtures may have a clearance less than 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches, except when the conductors are mechanically protected from abrasion by materials specified in Rule 22.2. Such mechanical protection shall extend not less than 15 inches in each direction along the cable from center line of pole standard, attaching mastarms or fixtures; whether passing above below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen when changing lamps or maintaining equipment.

E Clearances From Conductors on Combination Arms

In Combination arm construction the following clearances are required between service drop conductors of 0-750 volts and the conductors of 750-7500:

- 1 36-Inch Minimum Pole Pin Position Separation:

Where Conductors of the two voltage classification are supported on opposite ends of a crossarm with a minimum horizontal

separation of 36 inches between pole pin positions, service drops which run directly from such crossarm shall not cross conductors of the 750-7500 volt classification on the same arm.

2 42-Inch Minimum Pole Pin Position Separation:

a) Service from Line Arms: Where conductors of the two voltage classifications are supported on opposite ends of the crossarm with a minimum horizontal separation of 42 inches between pole pin positions, service drops may be run directly from the 0-750 volt portion of a line arm and may cross below conductors of 750-7500 volts on the same arm. Under these conditions the vertical separation at the point of crossing shall be not less than 6 feet radially from the center line of pole.

b) Services from Buck Arms: Where conductors of the two voltage classifications are supported on opposite ends of the buck arm with a minimum horizontal separation of 42 inches between pole pin positions and not less than 2 feet vertical separation between line arm conductor level and buck arms or service buck arms, provided:

Such service drops shall clear conductors of 750-7500 volts by not less than 2 feet vertically at the point of crossing;

Such service drops shall not pass through the climbing space specified in Rule 54.7-A3c;

Such service drops shall not cross under the 750-7500 volt end of the line arm within the third pin position; and

Where such service drops are run from double buck arms, or from single buck arms installed on the side of the pole below the 750-7500 volt portion of related line arm, the pole position on the 750-7500 volt end of the line arm shall be left vacant.

F From Racks

Service drops may be run directly from low voltage racks on poles. Where multiple conductor service cable is used, the cable grip shall be attached

to the neutral insulator of the rack on the pole or suitable insulation shall be used between the point of attachment on the rack or pole and the surface of the cable, except where the rack hardware is effectively grounded through the medium of a metal pole.

Proposed Rule
Rule 54.8

54.8 Service Drops, 0-750 Volts

A Material and Size

Supply service drops of 0-750 volts shall be of material and size as specified in Table 8 and Rule 49.4-C7a ~~and shall have a weather-resistant covering at least equivalent to double braid weatherproofing.~~

NOTE.-Resolution No. 756 effective May 29, 1951 authorized the use of multiple conductor service drop cable with a bare neutral conductor for service drops of 0-750 volts provided that the attachment of such cable at the pole and building ends shall be by means of an insulator.

B Clearances Above Ground, Buildings, Etc.

- 1 Above Public Thoroughfares: Service drop conductors shall have a vertical clearance of not less than 18 feet above public thoroughfares, except that this clearance may grade from 18 feet at a position not more than 12 feet horizontally from the curb line, provided the clearance at the center line of any public thoroughfare shall in no case be less than 18 feet. Where there are no curbs the foregoing provisions shall apply using the outer limits of possible vehicular movement in lieu of a curb line.
- 2 Above Private Thoroughfares and Other Private Property:
 - a) Industrial or Commercial Premises: Over private driveways, lanes, or other private property areas accessible to vehicles on premises used for industrial or commercial purpose, service drops shall have a vertical clearance of not less than 16 feet.
 - b) Residential Premises: Over private driveways or lanes or other premises used for residential purpose only, service drops shall have a vertical clearance ~~of not less than 12 feet.~~ ~~If the building served does not permit an attachment which will afford a clearance of at least 12 feet over such areas without the installation of a structure on the building to provide additional height, the vertical clearance of service~~

~~drops of 0-300 volts only may be less than 12 feet but shall be maintained as great as possible and shall be not less than 10 12 feet. EXCEPTION: This clearance may be reduced for insulated services that conform with rule 20.8G to not less than 10 feet.~~

3 Above Ground in Areas Accessible to Pedestrians Only:

~~a) Industrial and Commercial Premises: Over areas accessible to pedestrians only on premises used for industrial or commercial purposes, service drops shall be maintained at a vertical clearance of not less than 12 feet. EXCEPTION: This clearance insulated services that conform with rule 20.8G to~~

~~b) Residential Premises: Over areas accessible to pedestrians only on residential premises, service drops shall be maintained at a vertical clearance of not less than 10 feet. If the building served does not permit an attachment which will afford at least 10 feet clearance over such areas without the installation of a structure on the building to provide additional height, the vertical clearance of service drops of 0-300 volts only may be less than 10 feet but shall be maintained as great as possible and shall be not less than 8 feet 6 inches. If the building served would require the installation of an attachment structure to provide height sufficient to afford a vertical clearance of at least 8 feet 6 inches, the full clearance of 10 feet shall be maintained.~~

4 From Buildings and Structures: Service drops ~~should~~ shall be so arranged ~~so~~ as to hamper ~~or~~ and endanger ~~workmen~~ workers and ~~firemen~~ firefighters ~~as little as possible in~~ while the performance of performing their duties.

a) Vertical Clearances: Service drop vertical clearances shall be maintained over all portions of buildings and structures as required by Table 10. ~~Industrial and Commercial premises: On premises used for industrial or commercial purposes service drops shall be maintained at a vertical clearance of not less than 8 feet over all or any portions of buildings and structures, except that service drops of 0-300 volts may be less than 8 feet, but not less than 12 inches, above the~~

cornice, decorative appendage, eave, roof or parapet wall of the building served provided:

The current carrying service conductors are insulated for the voltage being supplied (see Rule 20.8-F), and the point of attachment of the service drops is not more than 18 inches back of the front face of the building wall facing the pole line from which the service drops originate.

Service drops are not required to clear buildings any specified horizontal distance but shall be so installed that they clear fire escapes, exits, windows, doors and other points at which human contact might be expected a horizontal distance of not less than 3 feet.

Where service drop crosses over metallic or non-metallic nonwalkable overhang or patio cover vertical clearance may be less than 8 feet, but not less than 24 inches providing such service drops consist of abrasion-resistant cables having a grounded metallic sheath and are insulated for the voltage being supplied.

Service drops are not required to clear buildings any specified horizontal distance but shall be so installed that they clear fire escapes, exits, windows, doors and other points at which human contact might be expected, a horizontal distance of not less than 3 feet. Where attached to the surface of buildings the installation shall be made in accordance with the Electrical Safety Orders of the Industrial Accident Commission, effective May 1, 1934.

- b) **Horizontal Clearances:** Service drops are not required to clear buildings by any specific horizontal distance.

EXCEPTION: A horizontal distance of not less than 3 feet should be maintained around fire escapes, exits, windows or doors. Residential Premises: On premises used for residential purpose only, service drops of 300-750 volts shall be maintained at a vertical clearance of not less than 8 feet over all buildings and structures.

The clearance above buildings of service drops of 0-300 volts shall be not less than the distance specified in Table 10.

Table 10
Minimum Allowable Clearances of Service Drops of 0-300 Volts Above Buildings.

Type of Roof	Minimum clearance above		
	Building Served	Other Buildings on Premises served	Buildings on other premises
Metal roof 3/8 pitch or less (a)	8 ft.(c)	8 ft.	8 ft.
Metal roof, more than 3/8 pitch	2 ft.(c)	2 ft.	8 ft.
Nonmetallic roof, 3/8 pitch or less	(b)	2 ft.	8 ft.
Nonmetallic roof, more than 3/8 pitch	(b)	2 ft.	2 ft.

- a. — 3/8 pitch is a approximately 37 degrees from the horizontal.
- b. — No limit specified but the greatest clearance should be obtained.
- c. — Where insulated abrasion-resistant conductors are may be reduced to 12 inches.

On premises used for residential purposes only the clearance above building of service drops of 0-300 volts may be less than the distance specified in Table 10 but not less than 12 inches over the building served nor less than 24 inches above other buildings on the premises served, provided:

The current-carrying conductors consist of abrasion-resistant cable having a grounded metallic sheath or neutral supported service drop cable manufactured in accordance with Standard No. WC-1961 or Standard No. WC-3-1959 of the National Electric Manufactures Association and are insulated for the voltage being supplied and the roof is metallic or nonmetallic, nonwalkable over hang or patio cover.

Service Drops are not required to clear buildings on residential premises any specified horizontal distance, but shall be so installed that they clear fire escapes, exits, windows, doors, and other points at which human contact might be expected, a horizontal distance of not less than 3 feet. Service drops above a horizontal plane through the top

extremity of an opening should maintain the maximum practical radial clearance, which in no event shall be less than 1 foot.

5 OVER SWIMMING POOLS: (See Rule 54.4-A4 and Fig 54-8)

NOTE: Added January 2, 1962 by Resolution No. E-1109.

NOTE: PORTIONS OF THIS RULE HAVE BEEN REVISED AND MOVED TO RULE 54.4-A4.

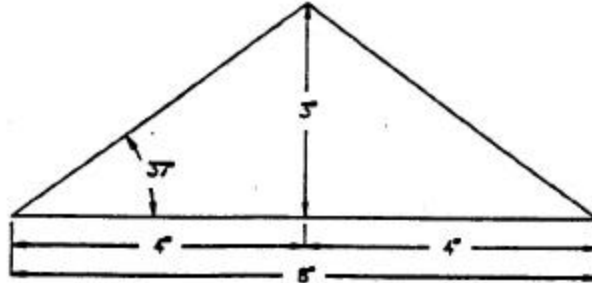
Table 10:
Minimum Allowable Clearance of Service Drops of
0 - 750 Volts from Buildings

	<u>Minimum Clearance from Buildings</u>	
	<u>Weather Resistant Covered Conductors</u> <u>0 - 750 Volts</u>	<u>Insulated Conductors</u> <u>(Rule 20.8-G)</u> <u>0 - 750 Volts</u>
<u>Vertical Clearances Above:</u>		
<u>1) All portions of buildings including metallic or non-metallic cornice, decorative appendage, eaves, roof or parapet wall of the building served.</u>	<u>8 Feet</u>	<u>(a) (b)</u>
<u>2) Metallic or non-metallic non-walkable overhang, patio cover or other structure.</u>	<u>8 Feet</u>	<u>(a) (b)</u>
<u>3) Other buildings on the same premises.</u>	<u>8 Feet</u>	<u>2 Feet</u>
<u>4) Buildings on other premises.</u>	<u>8 Feet</u>	<u>8 Feet (c)</u>
<u>Horizontal & Radial Clearances:</u>		
<u>1) From fire escapes, exits, windows and doors.</u>	<u>3 Feet</u>	<u>3 Feet</u>

(a) No limit specified but the greatest practicable clearance should be obtained.

(b) The point of attachment of the service drop for industrial and commercial premises is not to be more than 18 inches back of the front face of the building wall facing the pole line from which the service drop originates.

- (c) Reduce to 2 feet for non-metallic roofs, more than 3/8 pitch (approximately 37 degrees from horizontal, see sketch)



C Clearances Between Supply Service Drops and Other Conductors

The clearance of supply service drop conductors from other conductors shall be not less than the minimum clearances specified in Rule 38, Table 2, Column D, with the following modifications:

- 1 From the Fire Alarm or Other Communication Line Conductors:
 - a) Crossing in Spans: At crossing in spans, supply service drop conductors may have a clearance of less than 48 inches (Table 2, Case 3, Column; and Case 4, Column C) but not less than 24 inches above any communication line conductors or below communication line conductors not supported on a messenger, provided the crossing is 6 feet or more from any pole which does not support both conductors involved in the crossing (see App. G, Fig 42).
 - b) Supported on the same Pole: Supply service drop conductors, other than those on a pole-top clearance attachment, may have a clearance of less than 48 inches (Table 2, Case 8, Column D; and Case 9, Column C) above or below communication line conductors supported by the same pole and not on a messenger provided such clearance is 6 feet or more from any pole which does not support both conductors involved, and provided clearances at least equal to those shown in table 11 are maintained.

Table 11
 Minimum Radial Clearance Between Supply Service Drop
 Conductors and Communication Line Conductors
 Not on Messengers

Radial distance of Crossing from supporting pole (feet)	Minimum radial Clearance (inches)	
	From Police and Fire alarm Conductors	From other communication conductors
5 or Less	6	12
10 or less, but not more than 5	9	18
15 or less, but not more than 10	15	24
20 or less, but not more than 15	21	24
More Than 20	24	24

Supply service drop conductors may have a clearance of less than 48 inches (as specified in Table 2, Case 8, Column D; and Case 9, Column C) but not less than 24 inches above and laterally from communication line conductors supported on a messenger by the same pole provided such clearance is 6 feet or more from any pole which does not support both conductors. The vertical clearances of not less than 24 inches above or 48 inches below communication conductors supported on messengers are not required where the supply service drop conductors are 24 inches or more horizontally from the vertical plane of the communication messenger. (See App. G, Fig 42.)

- 2 On Clearance Crossarms: Supply service drops may be supported on a clearance crossarm at a vertical distance less than 48 inches (specified in Table 2, Case 8, Column D, and Case 9, Column C) but not less than 24 inches above or below either supply circuits of 0-750 volts or communication circuits not supported on a messenger, or above communication or supply circuits which are supported on a messenger, provided the supply service drop unprotected conductors are at least 25 inches horizontally from the center line of a pole or are attached to suitable brackets (at least

25 inches from center line of pole) on each end of the clearance arm and carried on the underside of the clearances arm from end to end in fiber or plastic conduit or under wood protective covering as specified in Rule 54.6-C .

The installation of service drops in accordance with this rule will not entail any change in the communication conductors supported on the pole. (See App. G, Fig 40)

- 3 On Pole Top Extensions: Supply service drops may be carried in a clearance crossing on pole top extensions or brackets above either supply circuits of 0-750 volts or communication circuits, with a vertical conductor clearance less than 48 inches (Table 2, Case 8, Column D; Case 9 Column C) but not less than 2 feet provided the service drop conductors clear the center line of the pole (projected) not less than 25 inches horizontally, and also provided the service drop conductors clear the outside pin position conductors of the other circuit not less than 2 feet. Where, in addition to the pole top bracket or extension, the supply service drop conductors are supported on a bracket on the end of the other line crossarm, a clearance of not less than 12 inches will be permitted at the points of crossing of line conductors in the outside pin positions. In such construction the crossarm of the extension shall be of wood. The installation of service drops in accordance with this rule will not entail any change in the communication conductors supported on the pole. (See App. G, Fig 41.)
- 4 From Communication Service Drops: The radial clearance between supply service drop conductors may be less than 48 inches as specified in Table 2, Column C, Cases 4 and 9; Column D Cases 3 and 8, but shall be not less than 24 inches. Where within 15 feet of the point attachment of either service drop on a building, this clearance may be further reduced but shall be not less than 12 inches.
- 5 Above Trolley Contact Conductors: Service drops may be installed above trolley contact conductors, including messenger in catenary construction, at a vertical distance of not less than 4 feet, provided the service drops clear the top of rails a vertical distance of not less than 26 feet where the railroad crossed transports standard freight cars, or not less than 23 feet where the railroad does not transport standard freight cars. (See Rule 74.4-B1.)

- 6 From Conductors of 750-7500 Volts: Service drops may cross above or below line conductors of 750-7500 volts supported on the same pole at clearances less than specified in Table 2, Case 10, Column D, provided such drops shall be not less than 2 feet vertically and 1 foot horizontally from the supply line conductors.

D Clearance from other Poles

The clearance between service drop conductors and the center line of any pole not supporting them shall be not less than 22 ½ inches (Rule 32.3). In case the pole involved in this clearance is within 10 feet of a pole supporting the service drop, this clearance may be less than 22 ½ inches but shall not less than 15 inches.

- 1 From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Supply service drops of 0 - 750 volts passing (unattached) non-climbable street lighting and traffic signal poles or standards, including mastarms, brackets and lighting fixtures may have a clearance less than 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches, except when the conductors are mechanically protected from abrasion by materials specified in Rule 22.2. Such mechanical protection shall extend not less than 15 inches in each direction along the cable from center line of pole standard, attaching mastarms or fixtures; whether passing above below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen when changing lamps or maintaining equipment.

E Clearances From Conductors on Combination Arms

In Combination arm construction the following clearances are required between service drop conductors of 0-750 volts and the conductors of 750-7500:

- 1 36-Inch Minimum Pole Pin Position Separation:

Where Conductors of the two voltage classification are supported on opposite ends of a crossarm with a minimum horizontal

separation of 36 inches between pole pin positions, service drops which run directly from such crossarm shall not cross conductors of the 750-7500 volt classification on the same arm.

2 42-Inch Minimum Pole Pin Position Separation:

a) Service from Line Arms: Where conductors of the two voltage classifications are supported on opposite ends of the crossarm with a minimum horizontal separation of 42 inches between pole pin positions, service drops may be run directly from the 0-750 volt portion of a line arm and may cross below conductors of 750-7500 volts on the same arm. Under these conditions the vertical separation at the point of crossing shall be not less than 6 feet radially from the center line of pole.

b) Services from Buck Arms: Where conductors of the two voltage classifications are supported on opposite ends of the buck arm with a minimum horizontal separation of 42 inches between pole pin positions and not less than 2 feet vertical separation between line arm conductor level and buck arms or service buck arms, provided:

Such service drops shall clear conductors of 750-7500 volts by not less than 2 feet vertically at the point of crossing;

Such service drops shall not pass through the climbing space specified in Rule 54.7-A3c;

Such service drops shall not cross under the 750-7500 volt end of the line arm within the third pin position; and

Where such service drops are run from double buck arms, or from single buck arms installed on the side of the pole below the 750-7500 volt portion of related line arm, the pole position on the 750-7500 volt end of the line arm shall be left vacant.

F From Racks

Service drops may be run directly from low voltage racks on poles. Where multiple conductor service cable is used, the cable grip shall be attached

to the neutral insulator of the rack on the pole or suitable insulation shall be used between the point of attachment on the rack or pole and the surface of the cable, except where the rack hardware is effectively grounded through the medium of a metal pole.

Final Rule
Rule 54.8

54.8 Service Drops, 0-750 Volts

A Material and Size

Supply service drops of 0-750 volts shall be of material and size as specified in Table 8 and Rule 49.4-C7a.

NOTE.-Resolution No. 756 effective May 29, 1951 authorized the use of multiple conductor service drop cable with a bare neutral conductor for service drops of 0-750 volts provided that the attachment of such cable at the pole and building ends shall be by means of an insulator.

B Clearances Above Ground, Buildings, Etc.

- 1 Above Public Thoroughfares: Service drop conductors shall have a vertical clearance of not less than 18 feet above public thoroughfares, except that this clearance may grade from 18 feet at a position not more than 12 feet horizontally from the curb line, provided the clearance at the center line of any public thoroughfare shall in no case be less than 18 feet. Where there are no curbs the foregoing provisions shall apply using the outer limits of possible vehicular movement in lieu of a curb line.
- 2 Above Private Thoroughfares and Other Private Property:
 - a) Industrial or Commercial Premises: Over private driveways, lanes, or other private property areas accessible to vehicles on premises used for industrial or commercial purpose, service drops shall have a vertical clearance of not less than 16 feet.
 - b) Residential Premises: Over private driveways or lanes or other premises used for residential purpose only, service drops shall have a vertical clearance not less than 12 feet. EXCEPTION: This clearance may be reduced for insulated services that conform with rule 20.8G to not less than 10 feet.
- 3 Above Ground in Areas Accessible to Pedestrians Only:

Over areas accessible to pedestrians only on service drops shall be maintained at a vertical clearance of not less than 12 feet.
EXCEPTION: This clearance insulated services that conform with rule 20.8G to not less than 8 feet 6 inches.

4 From Buildings and Structures: Service drops should be so arranged so as to hamper or endanger workers and firefighters as while performing their duties.

a) Vertical Clearances: Service drop vertical clearances shall be maintained over all portions of buildings and structures as required by Table 10.

b) **Horizontal Clearances:** Service drops are not required to clear buildings by any specific horizontal distance.

EXCEPTION: A horizontal distance of not less than 3 feet should be maintained around fire escapes, exits, windows or doors.

5 OVER SWIMMING POOLS: (See Rule 54.4-A4 and Fig 54-8)

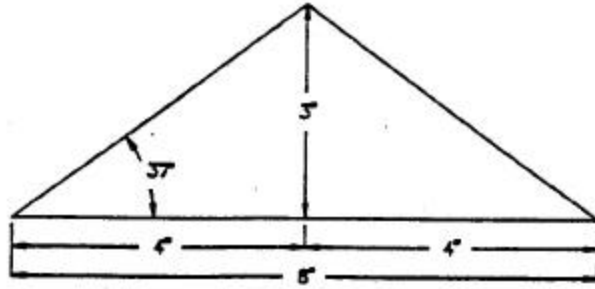
NOTE: Added January 2, 1962 by Resolution No. E-1109.

NOTE: PORTIONS OF THIS RULE HAVE BEEN REVISED AND MOVED TO RULE 54.4-A4.

Table 10:
Minimum Allowable Clearance of Service Drops of
0 - 750 Volts from Buildings

	Minimum Clearance from Buildings	
	Weather Resistant Covered Conductors 0 - 750 Volts	Insulated Conductors (Rule 20.8-G) 0 - 750 Volts
Vertical Clearances Above:		
1) All portions of buildings including metallic or non-metallic cornice, decorative appendage, eaves, roof or parapet wall of the building served.	8 Feet	(a) (b)
2) Metallic or non-metallic non-walkable overhang, patio cover or other structure.	8 Feet	(a) (b)
3) Other buildings on the same premises.	8 Feet	2 Feet
4) Buildings on other premises.	8 Feet	8 Feet (c)
Horizontal & Radial Clearances:		
1) From fire escapes, exits, windows and doors.	3 Feet	3 Feet

- (a) No limit specified but the greatest practicable clearance should be obtained.
- (b) The point of attachment of the service drop for industrial and commercial premises is not to be more than 18 inches back of the front face of the building wall facing the pole line from which the service drop originates.
- (c) Reduce to 2 feet for non-metallic roofs, more than 3/8 pitch (approximately 37 degrees from horizontal, see sketch)



C Clearances Between Supply Service Drops and Other Conductors

The clearance of supply service drop conductors from other conductors shall be not less than the minimum clearances specified in Rule 38, Table 2, Column D, with the following modifications:

- 1 From the Fire Alarm or Other Communication Line Conductors:
 - a) Crossing in Spans: At crossing in spans, supply service drop conductors may have a clearance of less than 48 inches (Table 2, Case 3, Column; and Case 4, Column C) but not less than 24 inches above any communication line conductors or below communication line conductors not supported on a messenger, provided the crossing is 6 feet or more from any pole which does not support both conductors involved in the crossing (see App. G, Fig 42).
 - b) Supported on the same Pole: Supply service drop conductors, other than those on a pole-top clearance attachment, may have a clearance of less than 48 inches (Table 2, Case 8, Column D; and Case 9, Column C) above or below communication line conductors supported by the same pole and not on a messenger provided such clearance is 6 feet or more from any pole which does not support both conductors involved, and provided clearances at least equal to those shown in table 11 are maintained.

Table 11
 Minimum Radial Clearance Between Supply Service Drop
 Conductors and Communication Line Conductors
 Not on Messengers

Radial distance of Crossing from supporting pole (feet)	Minimum radial Clearance (inches)	
	From Police and Fire alarm Conductors	From other communication conductors
5 or Less	6	12
10 or less, but not more than 5	9	18
15 or less, but not more than 10	15	24
20 or less, but not more than 15	21	24
More Than 20	24	24

Supply service drop conductors may have a clearance of less than 48 inches (as specified in Table 2, Case 8, Column D; and Case 9, Column C) but not less than 24 inches above and laterally from communication line conductors supported on a messenger by the same pole provided such clearance is 6 feet or more from any pole which does not support both conductors. The vertical clearances of not less than 24 inches above or 48 inches below communication conductors supported on messengers are not required where the supply service drop conductors are 24 inches or more horizontally from the vertical plane of the communication messenger. (See App. G, Fig 42.)

- 2 On Clearance Crossarms: Supply service drops may be supported on a clearance crossarm at a vertical distance less than 48 inches (specified in Table 2, Case 8, Column D, and Case 9, Column C) but not less than 24 inches above or below either supply circuits of 0-750 volts or communication circuits not supported on a messenger, or above communication or supply circuits which are supported on a messenger, provided the supply service drop unprotected conductors are at least 25 inches horizontally from the center line of a pole or are attached to suitable brackets (at least

25 inches from center line of pole) on each end of the clearance arm and carried on the underside of the clearances arm from end to end in fiber or plastic conduit or under wood protective covering as specified in Rule 54.6-C .

The installation of service drops in accordance with this rule will not entail any change in the communication conductors supported on the pole. (See App. G, Fig 40)

- 3 On Pole Top Extensions: Supply service drops may be carried in a clearance crossing on pole top extensions or brackets above either supply circuits of 0-750 volts or communication circuits, with a vertical conductor clearance less than 48 inches (Table 2, Case 8, Column D; Case 9 Column C) but not less than 2 feet provided the service drop conductors clear the center line of the pole (projected) not less than 25 inches horizontally, and also provided the service drop conductors clear the outside pin position conductors of the other circuit not less than 2 feet. Where, in addition to the pole top bracket or extension, the supply service drop conductors are supported on a bracket on the end of the other line crossarm, a clearance of not less than 12 inches will be permitted at the points of crossing of line conductors in the outside pin positions. In such construction the crossarm of the extension shall be of wood. The installation of service drops in accordance with this rule will not entail any change in the communication conductors supported on the pole. (See App. G, Fig 41.)
- 4 From Communication Service Drops: The radial clearance between supply service drop conductors may be less than 48 inches as specified in Table 2, Column C, Cases 4 and 9; Column D Cases 3 and 8, but shall be not less than 24 inches. Where within 15 feet of the point attachment of either service drop on a building, this clearance may be further reduced but shall be not less than 12 inches.
- 5 Above Trolley Contact Conductors: Service drops may be installed above trolley contact conductors, including messenger in catenary construction, at a vertical distance of not less than 4 feet, provided the service drops clear the top of rails a vertical distance of not less than 26 feet where the railroad crossed transports standard freight cars, or not less than 23 feet where the railroad does not transport standard freight cars. (See Rule 74.4-B1.)

- 6 From Conductors of 750-7500 Volts: Service drops may cross above or below line conductors of 750-7500 volts supported on the same pole at clearances less than specified in Table 2, Case 10, Column D, provided such drops shall be not less than 2 feet vertically and 1 foot horizontally from the supply line conductors.

D Clearance from other Poles

The clearance between service drop conductors and the center line of any pole not supporting them shall be not less than 22 ½ inches (Rule 32.3). In case the pole involved in this clearance is within 10 feet of a pole supporting the service drop, this clearance may be less than 22 ½ inches but shall not less than 15 inches.

- 1 From Non-climbable Street Lighting or Traffic Signal Poles or Standards:

Supply service drops of 0 - 750 volts passing (unattached) non-climbable street lighting and traffic signal poles or standards, including mastarms, brackets and lighting fixtures may have a clearance less than 36 inches specified in Table 1, Case 10, Column D, but shall have a clearance of not less than 15 inches, except when the conductors are mechanically protected from abrasion by materials specified in Rule 22.2. Such mechanical protection shall extend not less than 15 inches in each direction along the cable from center line of pole standard, attaching mastarms or fixtures; whether passing above below or alongside. The conductors shall be installed in such a manner so as not to interfere with light distribution from lighting fixtures and shall not hamper workmen when changing lamps or maintaining equipment.

E Clearances From Conductors on Combination Arms

In Combination arm construction the following clearances are required between service drop conductors of 0-750 volts and the conductors of 750-7500:

- 1 36-Inch Minimum Pole Pin Position Separation:

Where Conductors of the two voltage classification are supported on opposite ends of a crossarm with a minimum horizontal

separation of 36 inches between pole pin positions, service drops which run directly from such crossarm shall not cross conductors of the 750-7500 volt classification on the same arm.

2 42-Inch Minimum Pole Pin Position Separation:

a) Service from Line Arms: Where conductors of the two voltage classifications are supported on opposite ends of the crossarm with a minimum horizontal separation of 42 inches between pole pin positions, service drops may be run directly from the 0-750 volt portion of a line arm and may cross below conductors of 750-7500 volts on the same arm. Under these conditions the vertical separation at the point of crossing shall be not less than 6 feet radially from the center line of pole.

b) Services from Buck Arms: Where conductors of the two voltage classifications are supported on opposite ends of the buck arm with a minimum horizontal separation of 42 inches between pole pin positions and not less than 2 feet vertical separation between line arm conductor level and buck arms or service buck arms, provided:

Such service drops shall clear conductors of 750-7500 volts by not less than 2 feet vertically at the point of crossing;

Such service drops shall not pass through the climbing space specified in Rule 54.7-A3c;

Such service drops shall not cross under the 750-7500 volt end of the line arm within the third pin position; and

Where such service drops are run from double buck arms, or from single buck arms installed on the side of the pole below the 750-7500 volt portion of related line arm, the pole position on the 750-7500 volt end of the line arm shall be left vacant.

F From Racks

Service drops may be run directly from low voltage racks on poles. Where multiple conductor service cable is used, the cable grip shall be attached

to the neutral insulator of the rack on the pole or suitable insulation shall be used between the point of attachment on the rack or pole and the surface of the cable, except where the rack hardware is effectively grounded through the medium of a metal pole.

ITEM 6

~~54~~ 54.10-D

RATIONALE FOR PROPOSED RULE
CHANGE RULE 54.10-D
LOW VOLTAGE MULTICONDUCTOR CABLE WITH BARE NEUTRAL
0-750 VOLTS
CONDUCTOR SPACING

Rule 38, Table 2, Case No.17, Item D established a 3 inch radial separation for incidental pole wiring for 0-750 volt conductors. This radial separation applies to all types of conductors including bare. It is not necessary to increase this requirement to 6 inches for "Low Voltage Multiconductor Cable with Bare Neutral, 0-750 Volts". Rule 54.10-C1 requires that "the phase conductors including jumper connections shall be covered with an insulation suitable for the voltage..." providing even a greater safety margin than the 3 inch requirements of Table 2 by itself.

EXISTING RULE
RULE 54.10-D
CONDUCTOR SPACING

54.10-D

D. CONDUCTOR SPACING

A vertical separation between individual conductors when supported *in* individual clevises or a multiconductor rack shall be not less .than 6.inches.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINED)
RULE 54.10-D
CONDUCTOR SPACING

54-10-D

~~D. CONDUCTOR SPACING~~

~~A vertical separation between individual conductors when supported *in* individual clevises or a multiconductor rack shall be not less than 6.inches.~~

PROPOSED RULE CHANGE (FINAL) *
RULE 54-10-D
CONDUCTOR SPACING
(Eliminate existing Rule 54.10-D)

ITEM 7

~~SECRET~~ Rule 54.12

RATIONALE FOR PROPOSED RULE CHANG
RULE 54.12 (NEW RULE)
LOW VOLTAGE EXTENDED RACKS, 0-750 VOLTS

Deviations from General Order 95 which permit the use of extended rack construction were granted in Resolution No. E-1013 on February 9, 1959 and revised by Decision 82-03-020 in 1982. These deviations were granted solely to Pacific Gas and Electric Company. It is proposed to make this type of construction available to all utilities in the State of California. A new Rule 54.12 titled "Low Voltage Extended Racks, 0-750 Volts" will be added to General Order 95, Section V. Also, a new drawing Fig. 54-9 showing climbing space will be added.

Related rules to change are: Rule 54.9 "Low Voltage Rack, 0-750 Volts", by adding a reference to new rule 54.12 and inserting a more detailed title: and Rule 54.4-C5, which currently refers to Rule 54.9, will also refer to the new Rule 54.12.

Proposed New Rule
(Final)*

Rule 54.12 (new Rule)

54.12 Low Voltage Extended Racks, 0 - 750 Volts (Conductors 15 inches or More from Centerline of Pole, But Not Less than 3 inches from the Surface of Pole)

A. General

Conductors of 0 - 750 volts may be attached to poles by means of vertical racks of insulators or individual extended supports in vertical rack configuration. Such construction is hereinafter termed "extended rack construction". Where extended rack construction is employed, the following rules shall apply.

Note: For Low Voltage Rack Construction (Conductors Less than 15 Inches from Centerline Of Pole, But Not Less than 2-1/2 inches from The Surface Of Pole) See Rule 54.9 .

B. Pole Arrangement and Clearance

- (1) Clearance from Poles: Conductors in extended rack construction shall have minimum clearances of 15 inches from center line of pole and 3 inches from the surface of pole as specified in Table 1, Column D, Cases 8 and 9 , respectively.
- (2) Conductor Arrangement: Where conductors, both line and service drop, are supported by extended racks, such extended racks may be attached to three sides of a pole (there being 4 sides) at the levels of any extended rack group. Climbing space in conjunction with such attachments shall be maintained as specified in [Rule 54.12-F](#) .

C. Conductor Material

All conductors of a rack group in the same vertical plane shall be of the same material.

D. Conductor Spacing and Spreader Brackets

- (1) Vertical Separation: The vertical separation between conductors, supported as a group in extended rack construction, shall not be less than 8 inches, such separation to be maintained in a span by suitably insulating spreader brackets attached to such line conductors within the span.
- (2) Spreader Brackets: Spreaders shall be used at points in spans where one or more midspan service drops are attached to and supported by the line conductors. Also, spreaders shall be so spaced as to limit spans between spreaders or between spreaders and poles to not over 135 feet.

E. Vertical Clearance between Conductor Levels

A vertical clearance shall be maintained between the top conductor supported in the extended rack group at one level and conductors supported on the same pole at the next level above as provided in Table 2, Cases 9 to 13 and for lead wires Rule 54.4–C6 .

Related Extended Rack Construction and Other Types of Construction: Where conductors supported in extended rack construction are connected to conductors supported on other types of construction (crossarm etc.) climbing space shall be maintained in the same quadrant or on the same side of pole in accordance with climbing space requirements in Rules 54.7 , 54.9 , 54.10 or 54.12–F whichever is related to the climbing space selected.

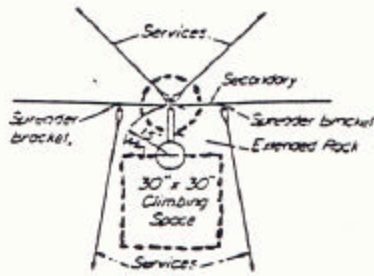
F. Climbing Space in Extended Rack Construction

The climbing space in extended rack construction shall be maintained through the level of conductors supported in extended rack construction and for a vertical distance of not less than 4 feet above and below such conductors. The position of the climbing space through the level of conductors in extended rack construction shall be related to climbing space for conductor levels above and below such extended rack construction in accordance with Rules 54.7 , 54.10 , 54.11 and 93 . The depth of the climbing space shall be measured from the center line of the pole.

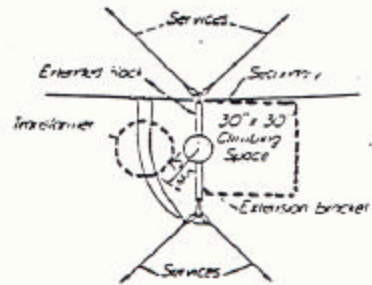
- (1) Dimensions: The dimensions of the climbing space shall be 30 inches square, and shall be provided on one side of the pole with the extremities of such width equidistant from the centerline of

pole. On poles on which transformers are pole-bolted in line with primary conductors, a 30 inch square climbing space shall be provided in one quadrant or one side of the pole (See Figure 54-9).

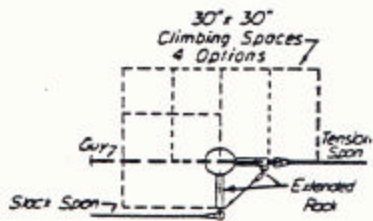
- (2) With Conductors Deadended and on Corner Poles: On poles with the extended rack conductors dead-ended and on corner poles, a 30 inch climbing space shall be provided in one quadrant or on one side of the pole (see Figure 54-9).
- (3) Allowable Climbing Space Obstructions: Suitably protected vertical runs or risers and ground wires attached to the surface of the poles, and guys, are allowed in climbing spaces provided that no more than two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches) or one vertical riser, run, or ground wire is installed in any 4-foot vertical section of climbing space. The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.



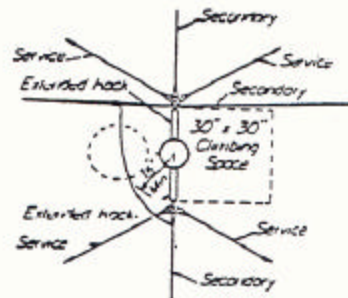
TANGENT OR ANGLE



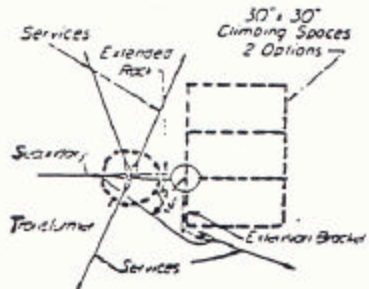
TANGENT OR ANGLE



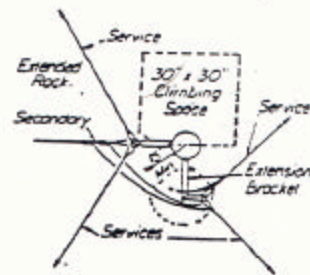
SLACK SPAN



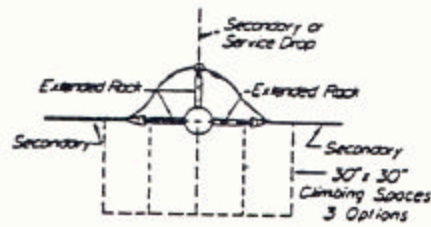
JUNCTION



DEADEND



DEADEND



3-WAY DEADEND

Rule 54.12-F

Fig. 54-9

RELATED RULE CHANGE
(EXISTING RULE)

Rule 54.4-C5

- (5) Rack Construction (see Rule 54.9)

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINED)

Rule 54.4-C5

- (5) Rack Construction (see Rule 54.9)
Extended Rack Construction (see Rule 54.12)

PROPOSED RULE CHANGE
(FINAL) *

Rule 54.4-C5

- (5) Rack Construction (see Rule 54.9)
Extended Rack Construction (see Rule 54.12)

RULE CHANGE
(EXISTING RULE)

54.9 Low Voltage Racks, 0-750 Volts

A General

Conductors of not more than 750 volts may be attached to poles by means of vertical racks of insulators or individual supports in rack configuration and, where so attached, the following rules shall apply.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINED)

54.9 Low Voltage Racks, 0-750 Volts (Conductors Less than 15 Inches from Centerline of Pole, But Not Less than 2-1/2 Inches from The Surface of Pole).

A General

Conductors of ~~not more than 750~~ 0-750 volts may be attached to poles by means of vertical racks of insulators or individual supports in vertical rack configuration ~~and, where so attached,~~ Such construction is hereinafter termed "rack construction." Where rack construction is employed, the following rules shall apply.

Note: For low voltage extended rack construction (conductors 15 inches or more from centerline of pole, but not less than 3 inches from the surface of pole) see Rule 54.12.

PROPOSED RULE CHANGE
(FINAL) *

54.9 Low Voltage Racks, 0-750 Volts (Conductors Less than 15 Inches from Centerline of Pole, But Not Less than 2-1/2 Inches from The Surface of Pole).

A General

Conductors of 0-750 volts may be attached to poles by means of vertical racks of insulators or individual supports in vertical rack configuration. Such construction is hereinafter termed "rack construction." Where rack construction is employed, the following rules shall apply.

Note: For low voltage extended rack construction (conductors 15 inches or more from centerline of pole, but not less than 3 inches from the surface of pole) see Rule 54.12.

ITEM 8

- ~~///~~ Rule 56.4-A1
- ~~///~~ Rule 56.4-C2, C3
- ~~///~~ Rule 56.4-C4
- ~~///~~ Rule 56.4-D
- ~~///~~ Rule 56.4-F

RULE 56.4-A1
GUY CLEARANCES
ABOVE GROUND

The proposed rule change is to simplify and clarify the present language. Changes include re-structuring, re-formatting and minor changes in syntax.

EXISTING RULE
RULE 56.4-A1
GUY CLEARANCES

56.4 Clearances

A Above Ground

- 1 Across or Along Public Thoroughfares: Guys over or across public thoroughfares in urban districts shall have a clearance of not less than 18 feet above ground (Table 1, Case 3, Column A) except that a clearance of not less than 16 feet is permitted for the portions of guys over that part of the public thoroughfare which is an entrance to or exit from industrial or commercial premises; and not less than 14 feet in cases where private residential premises are involved.

Overhead guys along public thoroughfare may have clearances, above ground which is not normally accessible to vehicles, less than as specified in Table 1, Column A, Cases 3 and 4 (18 feet and 15 feet respectively) but sections of such guys between insulators shall have a clearance of not less than 8 feet above the ground, and sections of guys between insulators and poles shall have a clearance of not less than 7 feet above ground, and such guys without insulators shall be not less than 7 feet above ground.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINED)
RULE 56.4-A1
GUY CLEARANCES

56.4 Clearances

A. ABOVE GROUND

1 Over Across or Along Public Thoroughfares:

- (a) Guys over or across public thoroughfares in urban districts shall have a clearance of not less than 18 feet above ground (Table 1, Case 3, Column A) ~~except~~ EXCEPTIONS:
- (1) ~~that~~ a clearance of not less than 16 feet is permitted for the portions of guys over that part of the public thoroughfare which is an entrance to or exit from industrial or commercial premises;.
- (2) ~~and~~ A Clearance of not less than 14 feet is permitted for portions of guys over that part of the public thoroughfare which is an entrance to or exit from in cases where private residential premises are involved.
- (b) Overhead guys along public thoroughfare may have clearances, above ground which is not normally accessible to vehicles, less than as specified in Table 1, Column A, Cases 3 and 4 (18 feet and 15 feet respectively):
- (1) ~~but~~ sections of such guys between insulators shall have a clearance of not less than 8 feet above the ground;.
- (2) ~~and~~ sections of such guys between insulators and poles shall have a clearance of not less than 7 feet above the ground;.
- (3) ~~and~~ such guys without insulators shall ~~be not~~ be less than 7 feet above the ground.

PROPOSED RULE CHANGE
(FINAL)*
RULE 56.4-A1
GUY CLEARANCES

56.4 Clearances

A. ABOVE GROUND

1 Over Across or Along Public Thoroughfares:

- (a) Guys over or across public thoroughfares in urban districts shall have a clearance of not less than 18 feet above ground (Table 1, Case 3, Column A) EXCEPTIONS:
 - (1) A clearance of not less than 16 feet is permitted for the portions of guys over that part of the public thoroughfare which is an entrance to or exit from industrial or commercial premises.
 - (2) A Clearance of not less than 14 feet is permitted for portions of guys over that part of the public thoroughfare which is an entrance to or exit from private residential premises.
- (b) Overhead guys along public thoroughfare may have clearances, above ground which is not normally accessible to vehicles, less than as specified in Table 1, Column A, Cases 3 and 4 (18 feet and 15 feet respectively):
 - (1) Sections of such guys between insulators shall have a clearance of not less than 8 feet above the ground.
 - (2) Sections of such guys between insulators and poles shall have a clearance of not less than 7 feet above the ground.
 - (3) Such guys without insulators shall not be less than 7 feet above the ground.

RATIONALE FOR PROPOSED RULE CHANGE
RULE 56.4-C2 and 56.4-C3
GUY CLEARANCES
56.4-C2 -ON COLINEAR LINES
56.4-C3 -PARRALLEL ON SAME POLES

The proposed rule change is to simplify and clarify the present language. Also, add a new drawing (Fig. 56-1) opposite the text for illustration of Rule 56.4-C3.

EXISTING RULES
RULE 56.4-C2 and 56.4-C3
GUY CLEARANCES

Rule 56.4-C

C From Conductors

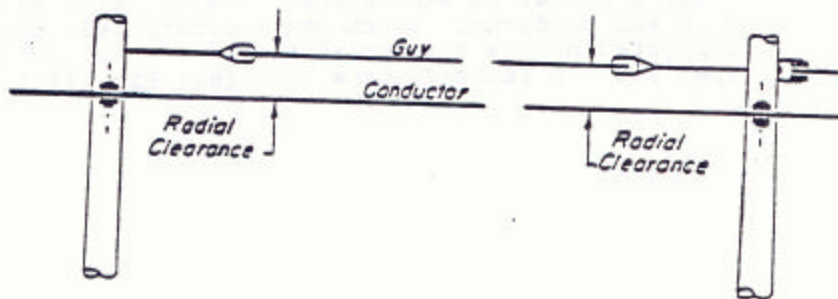
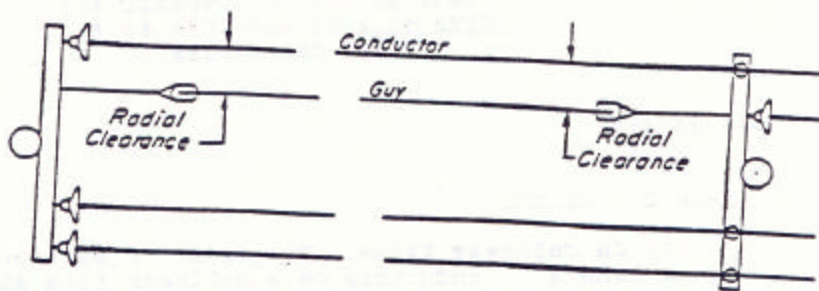
- 2 On Colinear Lines: The radial clearances between guys on a line and conductors on a collinear line shall be not less than as specified in Table 2, Case 18. Vertical clearances not less than as specified in Table 2, Case 1, shall also be maintained at points of crossing between guys on a line and conductors supported on other poles of a colinear line.
- 3 Parallel on Same Poles: The radial clearances between guys and conductors which are approximately parallel and supported by the same poles shall be not less than as specified in Table 2, Case 18.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 56.4-C2 and 56.4-C3
GUY CLEARANCES

Rule 56.4-C

C From Conductors

- 2 On Colinear Lines: The radial clearances between guys on a line and conductors on a collinear line shall ~~be~~ not be less than as specified in Table 2, Case 18. Vertical clearances not less than as specified in Table 2, Case 1, shall also be maintained at points of crossing between guys on a line and conductors supported on other poles of a colinear line.
- 3 Parallel on Same Poles: The radial clearances between guys and conductors which are approximately parallel and supported by the same poles shall ~~be~~ not be less than as specified in Table 2, Case 18. (See Fig. 56-1).



Overhead guys, which are approximately parallel to conductors supported on the same poles the guys are attached to, shall clear such conductors by the following radial distances:

Communication Conductors.....	3"	750-20000 Volt Conductors.....	18"
0-750 Volt Conductors.....	12"	20000-35000 Volt Conductors.....	30"

Rule 56.4-C3

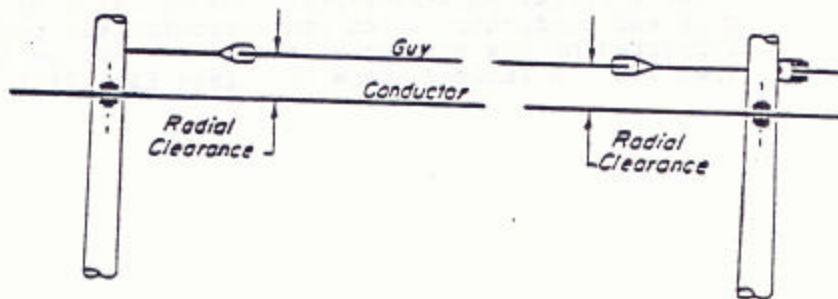
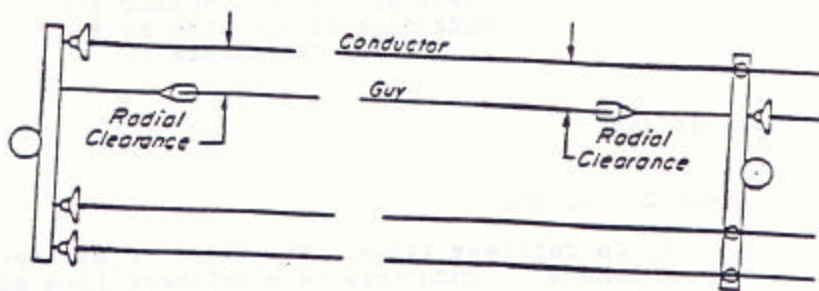
Fig. 56-1

PROPOSED RULE CHANGE
(FINAL)*
RULE 56.4-C2 and 56.4-C3
GUY CLEARANCES

Rule 56.4-C

C From Conductors

- 2 On Colinear Lines: The radial clearances between guys on a line and conductors on a collinear line shall not be less than as specified in Table 2, Case 18. Vertical clearances not less than as specified in Table 2, Case 1, shall also be maintained at points of crossing between guys on a line and conductors supported on other poles of a colinear line.
- 3 Parallel on Same Poles: The radial clearances between guys and conductors which are approximately parallel and supported by the same poles shall not be less than as specified in Table 2, Case 18. (See Fig. 56-1).



Overhead guys, which are approximately parallel to conductors supported on the same poles the guys are attached to, shall clear such conductors by the following radial distances:

Communication Conductors.....	3"	750-20000 Volt Conductors.....	18"
0-750 Volt Conductors.....	12"	20000-35000 Volt Conductors.....	30"

Rule 56.4-C3

Fig. 56-1

RATIONALE FOR PROPOSED RULE CHANGE
RULE 56.4-C4
GUY CLEARANCES
PASSING ON SAME POLES

The proposed rule change is to simplify and clarify the present language. Changes include re-structuring, re-formatting and minor changes in syntax. Also, a drawing is being added opposite the text for reference and ease of application (Fig. 56-2). The requirement for a suitable guard in the exceptions has been broadened to be included in all of the applications.

EXISTING RULE
RULE 56.4-C4
GUY CLEARANCES

- (4) Passing on Same Poles: The radial clearances between guys and conductors supported by or attached to the same poles or crossarms shall be not less than as specified in Table 2, Case 19 except that the clearance between guys and communication messenger and/or cable attached directly to surface of pole may be less than the 3 inches specified in Table 2, Case 19, Column C provided: the guy is not a guy in proximity, or all parts of the guy are not less than 6 feet below 0-750-volt supply conductors supported on same pole, and a wood guard or equivalent is placed on the messenger and/or cable; also, a guy attached to a pole which supports supply conductors at a distance of not less than 6 feet above communication messenger and/or cable shall (1) have an insulator placed in the guy above the communication messenger and/or cable at a distance of not less than 6 feet horizontally from the pole, or (2) have an insulator placed in the guy not less than 3 inches nor more than 6 inches above the messenger and/or cable, and a wood guard or equivalent placed on the messenger and/or cable.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 56.4-C4
GUY CLEARANCES

- (4) Passing on Same Poles: The radial clearances between guys and conductors supported by or attached to the same poles or crossarms shall be not less than as specified in Table 2, Case 19.

~~except that the clearance between guys and communication messenger and/or cable attached directly to surface of pole may be less than the 3 inches specified in Table 2, Case 19, Column C provided: the guy is not a guy in proximity, or all parts of the guy are not less than 6 feet below 0-750-volt supply conductors supported on same pole, and a wood guard or equivalent is placed on the messenger and/or cable; also, a guy attached to a pole which supports supply conductors at a distance of not less than 6 feet above communication messenger and/or cable shall (1) have an insulator placed in the guy above the communication messenger and/or cable at a distance of not less than 6 feet horizontally from the pole, or (2) have an insulator placed in the guy not less than 3 inches nor more than 6 inches above the messenger and/or cable, and a wood guard or equivalent placed on the messenger and/or cable.~~

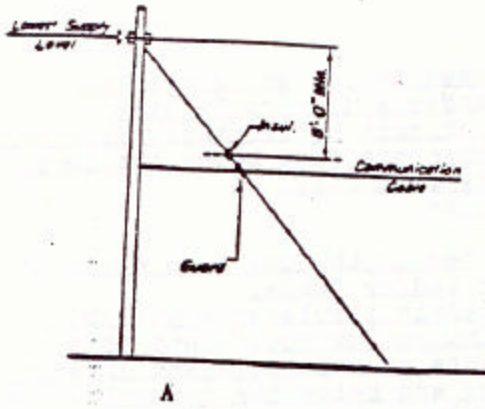
EXCEPTION: The clearance between guys and communication messenger and/or cable attached directly to the surface of a pole may be less than the 3 inches specified in Table 2, Case 19, Column C provided:

- (a) A suitable guard is placed on the messenger and/or cable or guy wire to prevent physical contact and resultant mechanical damage; and
- (b) The guy is not a guy in proximity; or
- (c) An insulator is placed in the guy above the communication messenger and/or cable at a vertical distance of not less than 8 feet below the supply conductor level, (see Figure 56-2 A); or
- (d) All parts of the guy within a radial distance of 6 feet from the face of pole are 6 feet or more below the 0 - 750 volt supply conductors supported on the same pole (see Figure 56-2B); or

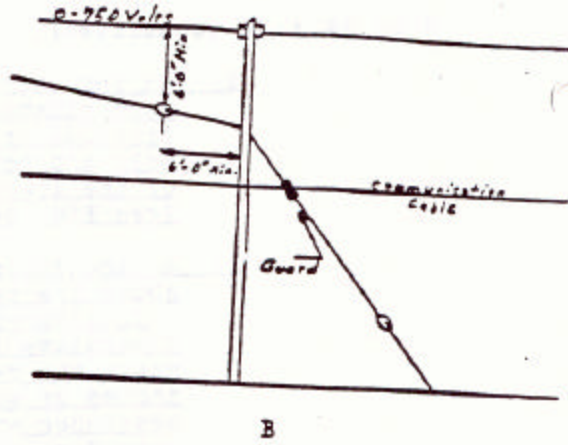
(e) The guy is attached to a pole which supports supply conductors that are 6 feet or more above the communication messenger and/or cable, provided:

1) An insulator is placed in the guy above the communication messenger and/or cable at a distance of 6 feet or more horizontally from the pole and not less than one foot below the level of the lowest supply conductor (see Figure 56-2 C); or

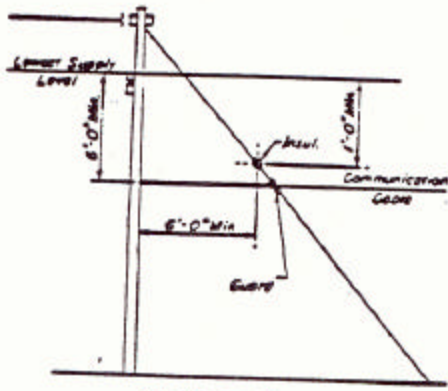
2) An insulator is placed in the guy 3 to 6 inches above the messenger and/or cable. In lieu of a porcelain insulator a suitable fiberglass insulating rod or equivalent that meets the requirements of Rule 56.8 and extends 6 inches or more above and below the communication messenger and/or cable may be used (see Figure 56-2 D).



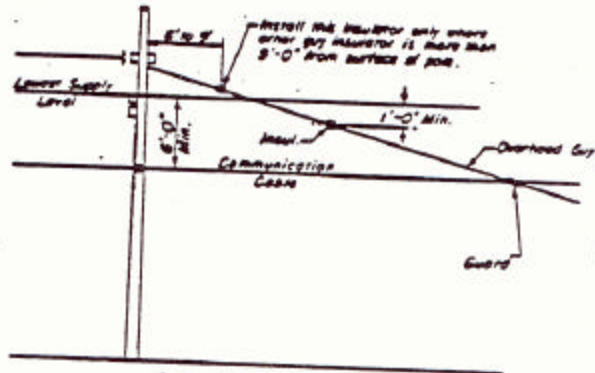
A



B

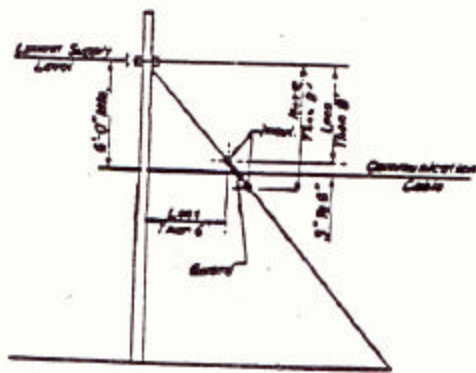


Anchor Guy

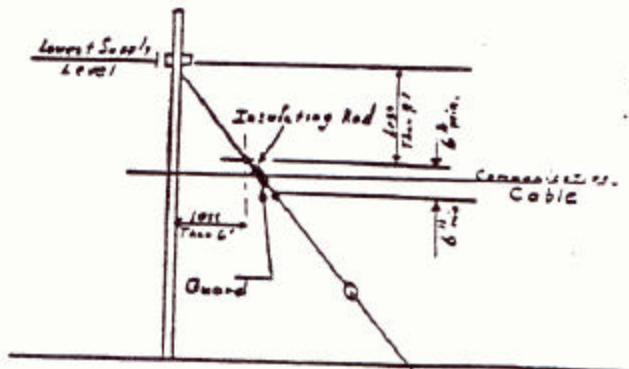


Overhead Guy

C



Porcelain (Glass)



Insulating Rod

D

Rule 56.4-C4
Fig. 56-2

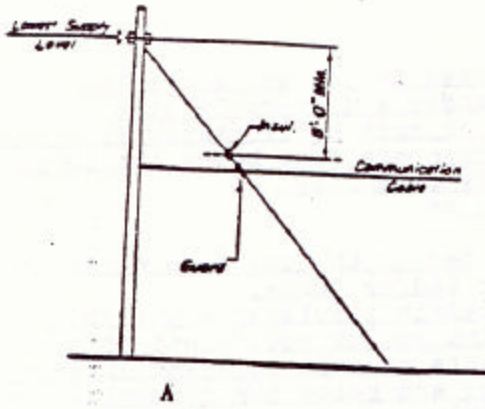
PROPOSED RULE CHANGE
(FINAL)*
RULE 56.4-C4
GUY CLEARANCES

- (4) Passing on Same Poles: The radial clearances between guys and conductors supported by or attached to the same poles or crossarms shall be not less than as specified in Table 2, Case 19.

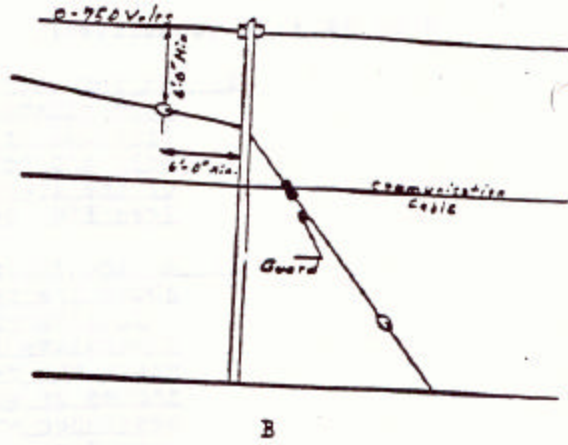
EXCEPTION: The clearance between guys and communication messenger and/or cable attached directly to the surface of a pole may be less than the 3 inches specified in Table 2, Case 19, Column C provided:

- (a) A suitable guard is placed on the messenger and/or cable or guy wire to prevent physical contact and resultant mechanical damage; and
- (b) The guy is not a guy in proximity; or
- (c) An insulator is placed in the guy above the communication messenger and/or cable at a vertical distance of not less than 8 feet below the supply conductor level, (see Figure 56-2 A); or
- (d) All parts of the guy within a radial distance of 6 feet from the face of pole are 6 feet or more below the 0 - 750 volt supply conductors supported on the same pole (see Figure 56-2B); or
- (e) The guy is attached to a pole which supports supply conductors that are 6 feet or more above the communication messenger and/or cable, provided:
 - 1) An insulator is placed in the guy above the communication messenger and/or cable at a distance of 6 feet or more horizontally from the pole and not less than one foot below the level of the lowest supply conductor (see Figure 56-2 C); or
 - 2) An insulator is placed in the guy 3 to 6 inches above the messenger and/or cable. In lieu of a porcelain insulator a suitable fiberglass insulating rod or equivalent that meets the requirements of Rule 56.8 and extends 6 inches or more

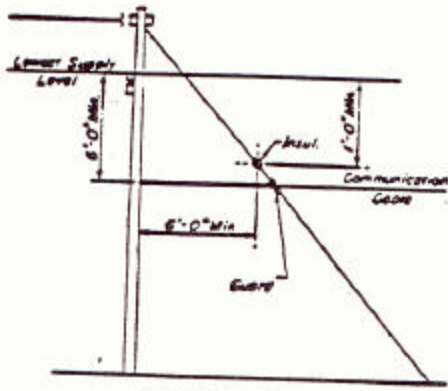
above and below the communication messenger and/or cable may be used (see Figure 56-2 D).



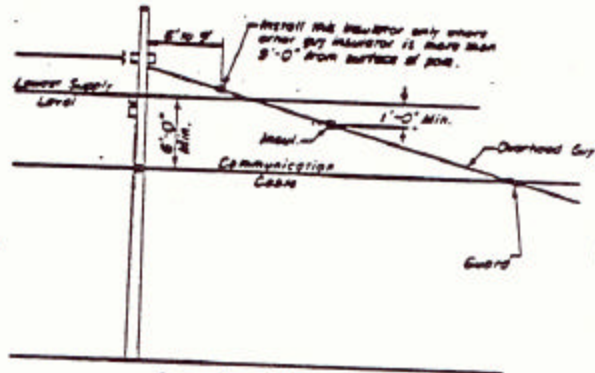
A



B

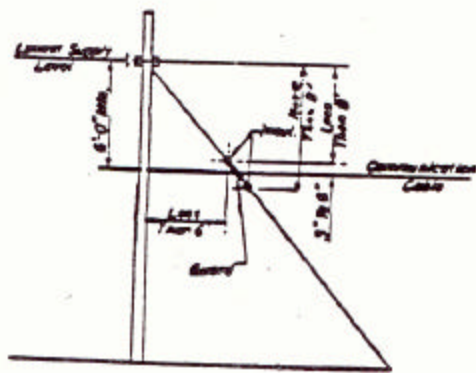


Anchor Guy

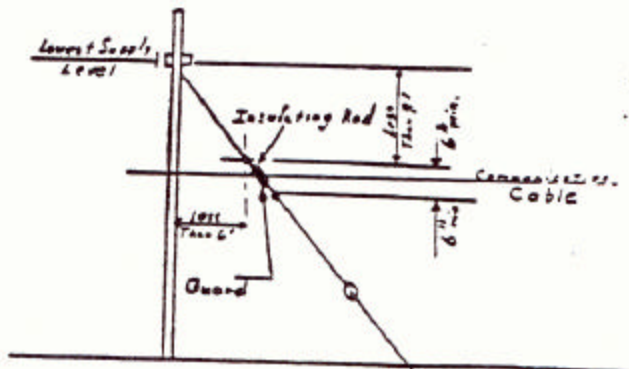


Overhead Guy

C



Porcelain (Glass)



Insulating Rod

D

RATIONALE FOR PROPOSED RULE CHANGE
RULE 56.4-D
GUY CLEARANCES
FROM GUYS OR SPAN WIRES

The proposed rule change is to simplify and clarify the present language. Changes include re-structuring, re-formatting and minor changes in syntax. Also, add reference to Rule 54.7-A3 when two guys are installed in climbing space.

EXISTING RULE
RULE 56.4-D
GUY CLEARANCES

D From Guys or Span Wires

- 1 Crossing in Spans: Vertical clearances at points of crossing not less than 18 inches as specified in Table 2, Case 1, Column A and radial clearances of not less than 12 inches shall be maintained between guys or span wires and other guys or span wires which are not attached to the same poles.
- 2 Passing and attached to Same Pole: The radial clearance between different guys, different span wires, or different guys and span wires, attached to the same pole shall not be less than 3 inches.
- 3 Approximately Parallel and Attached to Same Pole:
 - a) Overhead guys or Span Wires: Where two or more overhead guys or two or more spans wires are approximately parallel and attached to the same poles, either or both of which poles support supply conductors, such guys or spans wires shall have a vertical separation of at least 1 foot between the points of attachment on the pole, or poles, which support the supply conductors. In cases where such separation is not practicable, other means to insure the effectiveness of the guy or span wire insulators shall be employed but in no case shall the distance between any guy or span wire be less than 3-inches, measured perpendicularly at the insulator. This rule shall not prohibit the contact to the same shims and shall not apply to guys or span wires acting in different directions, nor to guys or span wires in which insulators are not required.
 - b) Anchor Guys: Where two or more guys attached to a pole supporting supply conductors are attached to the same grounded anchor, either directly or through the medium of a stub, they shall be separated at the pole by a vertical distance of at least 1 foot, provided any guy wire shall not be less than 3 inches from the surface of the insulator in any other guy. In lieu of securing this 3 inch minimum separation by means of the 1 foot minimum separation of guy attachments at the pole, it shall be afforded by separation of attachments at the pole, it shall be afforded by separation of the grounded anchors or by other practicable means which shall insure the minimum clearance of 3 inches. The

provisions of this rule do not apply to guys which act in different directions from the pole or to guys attached to grounded metal structures or to guys which do not require insulators.

PROPOSED RULE CHANGE
(STRIKEOUT AND UNDERLINE)
RULE 56.4-D
GUY CLEARANCES

D From Guys or Span Wires

- 1 Crossing in Spans: Vertical clearances at points of crossing not less than 18 inches as specified in Table 2, Case 1, Column A and radial clearances of not less than 12 inches shall be maintained between guys or span wires and other guys or span wires which are not attached to the same poles.
- 2 Passing and attached to Same Pole: The radial clearance between different guys, different span wires, or different guys and span wires, attached to the same pole shall not be less than 3 inches.
- 3 Approximately Parallel and Attached to Same Pole:
 - a) Overhead guys or Span Wires: Where two or more overhead guys or two or more spans wires are approximately parallel and attached to the same poles, and either or both ~~of which~~ poles support supply conductors:
 - (1) such guys or spans wires shall have a vertical separation of at least 1 foot between the points of attachment on the pole, or poles, which support the supply conductors.
 - (2) In cases where such separation is not practicable, other means to insure the effectiveness of the guy or span wire insulators shall be employed but in no case shall the distance between any guy or span wire be less than 3-inches, measured perpendicularly at the insulator.
 - (3) This rule shall not prohibit the contact to the same shims and shall not apply to guys or span wires acting in different directions, nor to guys or span wires in which insulators are not required.
 - (4) Where two guys are installed in climbing space, also see Rule 54.7-A3.

- b) Anchor Guys: Where two or more guys attached to a pole supporting supply conductors are attached to the same grounded anchor, either directly or through the medium of a stub:
- (1) they shall be separated at the pole by a vertical distance of at least 1 foot, provided any guy wire shall not be less than 3 inches from the surface of the insulator in any other guy.
 - (2) In lieu of securing this 3 inch minimum separation by means of the 1 foot minimum separation of guy attachments at the pole, it shall be afforded by separation of attachments at the pole, it shall be afforded by separation of the grounded anchors or by other practicable means which shall insure the minimum clearance of 3 inches.
 - (3) The provisions of this rule do not apply to guys which act in different directions from the pole or to guys attached to grounded metal structures or to guys which do not require insulators.
 - (4) Where two guys are installed in climbing space, also see Rule 54.7-A3.

PROPOSED RULE CHANGE
(Final)*
RULE 56.4-D
GUY CLEARANCES

D From Guys or Span Wires

- 1 Crossing in Spans: Vertical clearances at points of crossing not less than 18 inches as specified in Table 2, Case 1, Column A and radial clearances of not less than 12 inches shall be maintained between guys or span wires and other guys or span wires which are not attached to the same poles.
- 2 Passing and attached to Same Pole: The radial clearance between different guys, different span wires, or different guys and span wires, attached to the same pole shall not be less than 3 inches.
- 3 Approximately Parallel and Attached to Same Pole:
 - a) Overhead guys or Span Wires: Where two or more overhead guys or two or more spans wires are approximately parallel and attached to the same poles, and either or both poles support supply conductors:
 - (1) Such guys or spans wires shall have a vertical separation of at least 1 foot between the points of attachment on the pole, or poles, which support the supply conductors.
 - (2) In cases where such separation is not practicable, other means to insure the effectiveness of the guy or span wire insulators shall be employed but in no case shall the distance between any guy or span wire be less than 3-inches, measured perpendicularly at the insulator.
 - (3) This rule shall not prohibit the contact to the same shims and shall not apply to guys or span wires acting in different directions, nor to guys or span wires in which insulators are not required.
 - (4) Where two guys are installed in climbing space, also see Rule 54.7-A3.

- b) Anchor Guys: Where two or more guys attached to a pole supporting supply conductors are attached to the same grounded anchor, either directly or through the medium of a stub:
- (1) They shall be separated at the pole by a vertical distance of at least 1 foot, provided any guy wire shall not be less than 3 inches from the surface of the insulator in any other guy.
 - (2) In lieu of securing this 3 inch minimum separation by means of the 1 foot minimum separation of guy attachments at the pole, it shall be afforded by separation of attachments at the pole, it shall be afforded by separation of the grounded anchors or by other practicable means which shall insure the minimum clearance of 3 inches.
 - (3) The provisions of this rule do not apply to guys which act in different directions from the pole or to guys attached to grounded metal structures or to guys which do not require insulators.
 - (4) Where two guys are installed in climbing space, also see Rule 54.7–A3.

RATIONALE FOR PROPOSED RULE
CHANGE RULE 56.4-F
GUY CLEARANCES
FROM TRANSFER CASES

This proposed rule change simplifies and clarifies the present language.

EXISTING RULE
RULE 56.4-F
GUY CLEARANCES

F. FROM TRANSFORMER CASES

All portions of guys 6 inches or more from the surface of poles or crossarms, at the guy attachment, shall be not less than 4 inches from transformer cases and hangers. Portions of guys within 6 inches of the surface of poles or crossarms to which they are attached shall be not less than 1 ½ inches from transformer cases and hangers.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINED)
RULE 56.4-F
GUY CLEARANCES

F. FROM TRANSFORMER CASES

All portions of guys 6 inches or more from the surface of poles or crossarms, at the guy's point of attachment, shall ~~be~~ not be less than 4 inches from transformer cases and hangers. Portions of guys within 6 inches of the surface of poles or crossarms to which they are attached shall ~~be~~ not be less than 1 ½ inches from transformer cases and hangers.

PROPOSED RULE CHANGE
(FINAL)*
RULE 56.4-F
GUY CLEARANCES

F. FROM TRANSFORMER CASES

All portions of guys 6 inches or more from the surface of poles or crossarms, at the guy's point of attachment, shall not be less than 4 inches from transformer cases and hangers. Portions of guys within 6 inches of the surface of poles or crossarms to which they are attached shall not be less than 1 ½ inches from transformer cases and hangers.

ITEM 9

~~56.5~~ RULE 56.5

RATIONALE FOR PROPOSED RULE CHANGE
RULE 56.5
GUY FASTENINGS

Delete last paragraph. Wrapped guys are no longer used by the industry thus making this portion of the rule obsolete and unnecessary.

EXISTING RULE
RULE 56.5-F
GUY FASTENINGS

56.5 Fastenings

Guy wires shall be protected by the use of guy thimbles or their equivalent where attached to anchor rods or through bolts.

Cedar and other soft wood poles, around which any guy having an ultimate strength of 5,000 pounds or more is wrapped, shall be protected by suitable guy shims. Hooks, lag screws or other equivalent means shall be used where necessary to prevent the guy from slipping along the pole.

PROPOSED RULE CHANGE
(STRIKEOUT AND UNDERLINE)
RULE 56.5-F
GUY FASTENINGS

56.5 Fastenings

Guy wires shall be protected by the use of guy thimbles or their equivalent where attached to anchor rods or through bolts.

~~Cedar and other soft wood poles, around which any guy having an ultimate strength of 5,000 pounds or more is wrapped, shall be protected by suitable guy shims. Hooks, lag screws or other equivalent means shall be used where necessary to prevent the guy from slipping along the pole.~~

PROPOSED RULE CHANGE
(FINAL)*
RULE 56.5-F
GUY FASTENINGS

56.5 Fastenings

Guy wires shall be protected by the use of guy thimbles or their equivalent where attached to anchor rods or through bolts.

ITEM 10

~~///~~ Rule 56.6-A

~~///~~ Rule 56.6-D

RATIONALE FOR PROPOSED RULE CHANGE
RULES 56.6-A AND 56.6-D
REQUIEMENTS FOR SECTIONALIZING WITH INSULATORS
56. 6-A -GUYS IN PROXIMITY
56.6-D- GUYS EXPOSED

This proposed rule change simplifies the rules format. Also, it is proposed to add related figures from Appendix G to the text opposite the rule numbers and change to current numbering sequence (Fig. 56-3 and Fig. 56-4).

At this time it will also be necessary to leave the current App. G, Fig. 45 and Fig. 52 in the appendix because other rules' in the order refer to these figures.

EXISTING RULES
RULE 56.6-A AND 56.6-D
REQUIREMENTS FOR SECTIONALIZING WITH INSULATORS

- A Guys in Proximity to Supply Conductors of Less Than 35,500 Volts (See Rule 21.3-D for definition of proximity and Fig 45 of App. G)

All portions of guys within both a vertical distance of 8 feet from the level of supply conductors of less than 35,500 volts and a radial distance of 6 feet from the surface of wood poles or structures shall not be grounded, through anchors or otherwise. Where necessary to avoid the grounding of such portions, guys shall be sectionalized by means of insulators installed at locations as specified in Rule 56.7.

- D Guys Exposed to 22,500 Volts or More

Guys exposed to conductors of 22,500 volts or more (see App. G, Fig. 52) shall not be sectionalized and shall have their lower ends securely grounded (by means of ground wires, anchor guys, or attachments to securely grounded metal poles or structures). Excepted from the above requirements are:

Guys which are required to be sectionalized in accordance with Rule 56.6-A because of proximity of wood poles and supply conductors of less than 22,500 volts or in accordance with Rule 56.6-B; and

Guys which are sectionalized by wood strain insulators equipped with arcing horns and designed to provide impulse insulation for lightning conditions or glass fiber noninterlocking strain insulators which are designed to provide impulse insulation for lightning conditions.

PROPOSED RULE CHANGE
RULE 56.6-A AND 56.6-D
REQUIREMENTS FOR SECTIONALIZING WITH INSULATORS

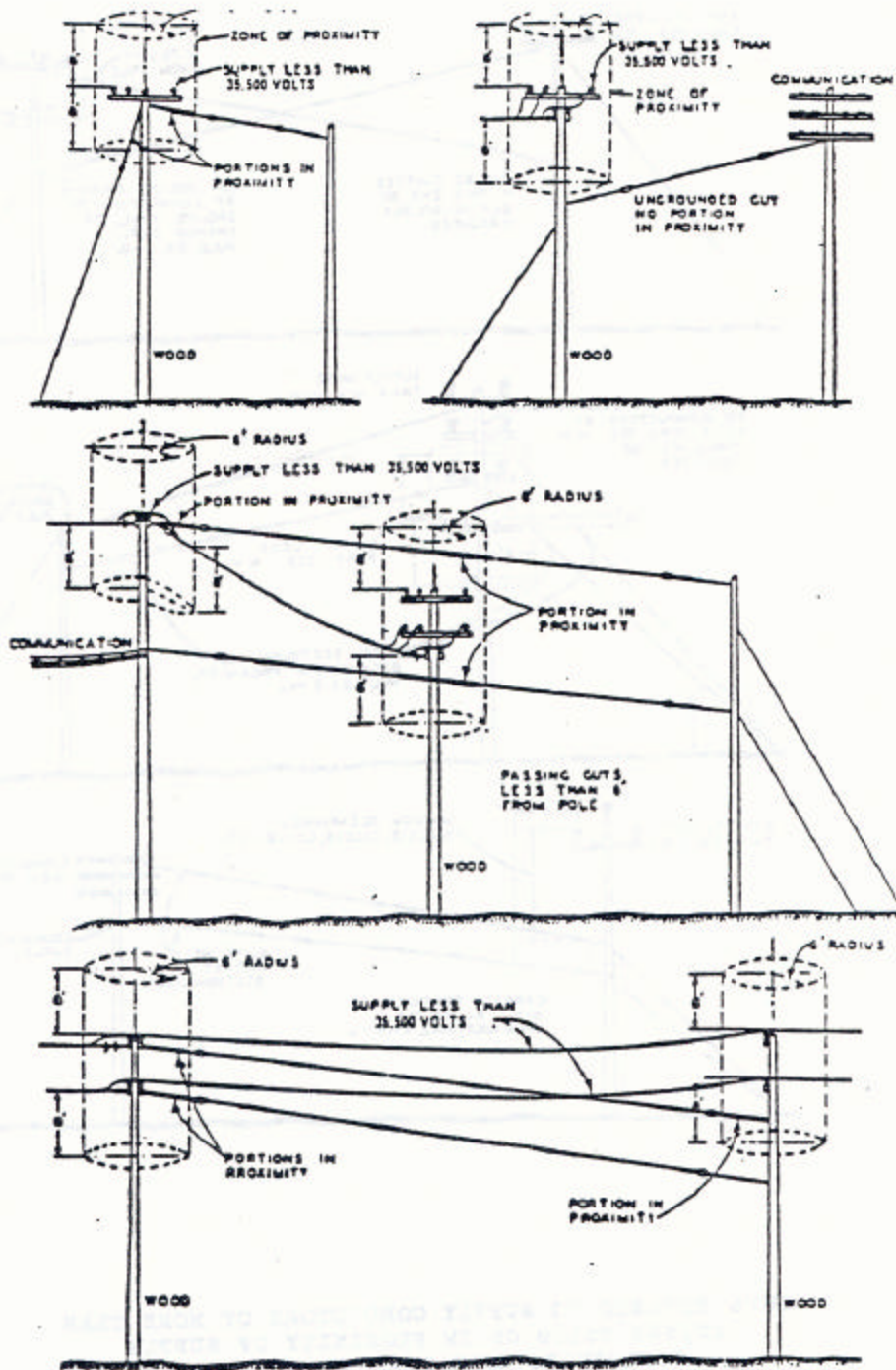
- A Guys in Proximity to Supply Conductors of Less Than 35,500 Volts (See Rule 21.3-D for definition of proximity and ~~Fig 45 of App. G~~ Fig 56-3)

All portions of guys within both a vertical distance of 8 feet from the level of supply conductors of less than 35,500 volts and a radial distance of 6 feet from the surface of wood poles or structures shall not be grounded, through anchors or otherwise. Where necessary to avoid the grounding of such portions, guys shall be sectionalized by means of insulators installed at locations as specified in Rule 56.7.

- D Guys Exposed to 22,500 Volts or More (See Rule 21.3-C for definition of "exposed" and Figure 56-4)

Guys exposed to conductors of 22,500 volts or more (see App. G, Fig. 52) shall not be sectionalized and shall have their lower ends securely grounded (by means of ground wires, anchor guys, or attachments to securely grounded metal poles or structures). ~~Excepted~~ EXCEPTED from the above requirements are:

- (1) Guys which are required to be sectionalized in accordance with Rule 56.6-A because of proximity of wood poles and supply conductors of less than 22,500 volts or in accordance with Rule 56.6-B; and
- (2) Guys which are sectionalized by wood strain insulators equipped with arcing horns and designed to provide impulse insulation for lighting conditions or glass fiber noninterlocking strait insulators which are designed to provide impulse insulation for lighting conditions.

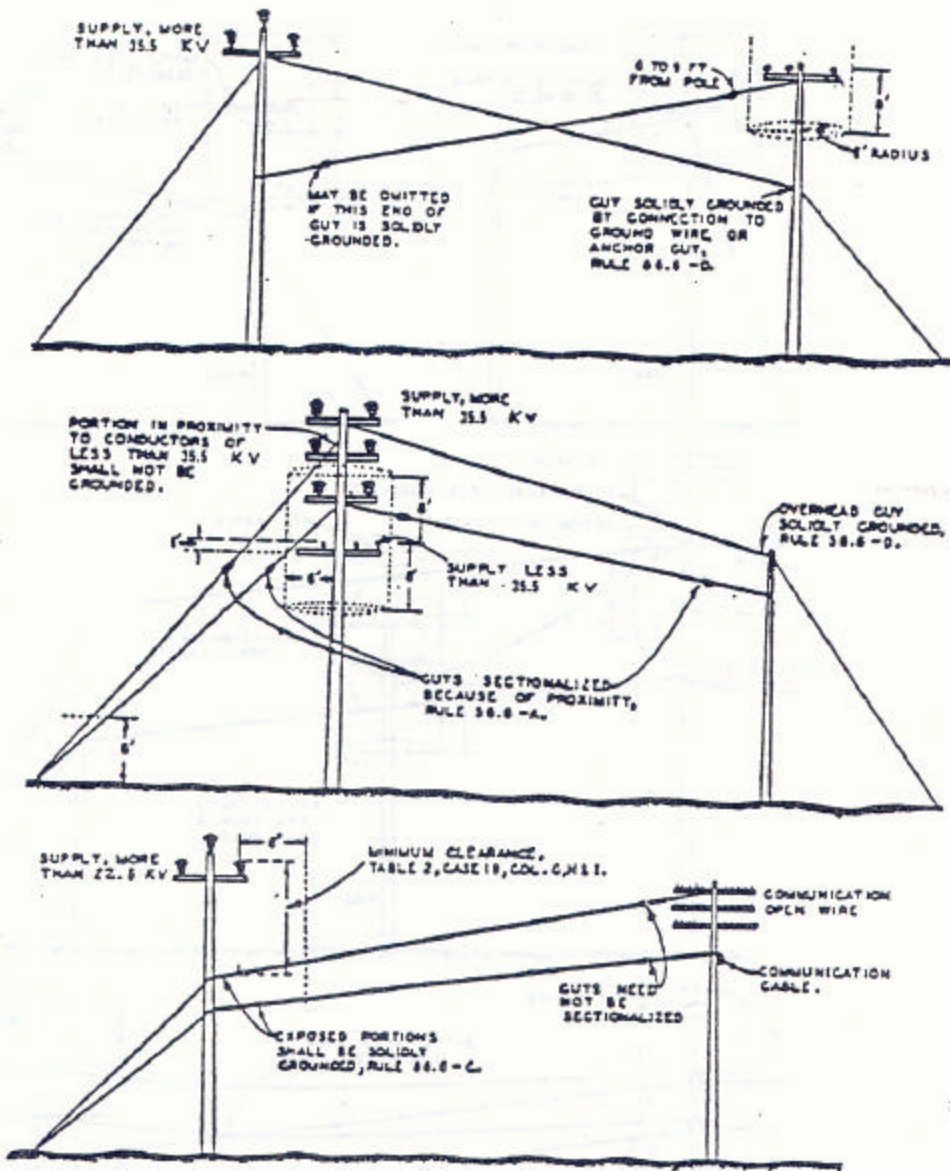


GUYS IN PROXIMITY TO WOOD POLES
AND SUPPLY CONDUCTORS OF 35,000 VOLTS OR LESS

Rules 21.3-D, 56.6-A and 86.6

Fig. 56-3

Fig 56
A.C.



GUYS EXPOSED TO SUPPLY CONDUCTORS OF MORE THAN 22,500 VOLTS OR IN PROXIMITY OF SUPPLY CONDUCTORS MORE THAN 35,000 VOLTS

Rules 21.3-C, 56.5-D and 86.6-C

Fig. 56-4

Fig 52

PROPOSED RULE CHANGE
(FINAL)*
RULE 56.6-A AND 56.6-D
REQUIREMENTS FOR SECTIONALIZING WITH INSULATORS

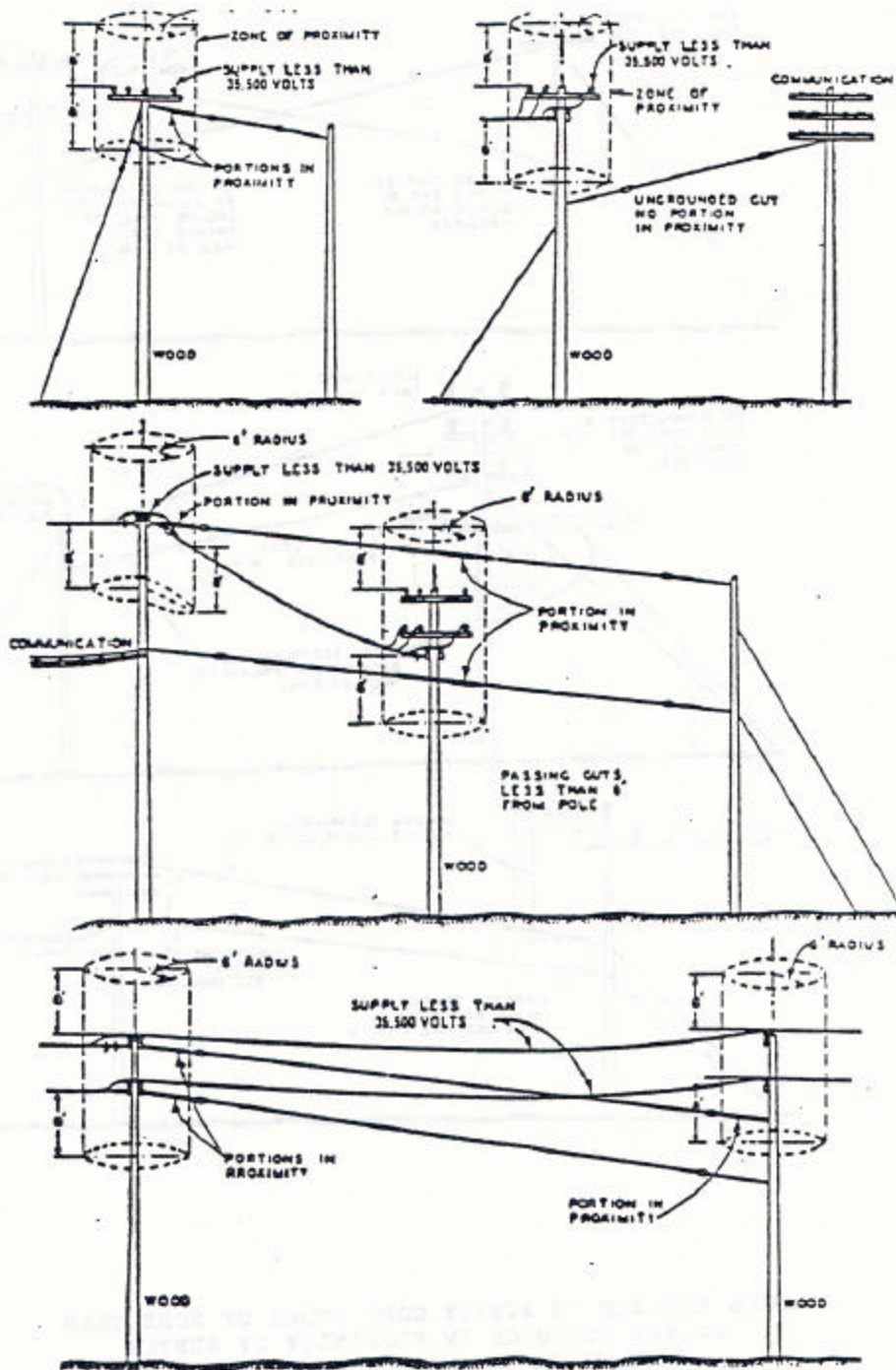
- A Guys in Proximity to Supply Conductors of Less Than 35,500 Volts (See Rule 21.3-D for definition of proximity and Fig 56-3)

All portions of guys within both a vertical distance of 8 feet from the level of supply conductors of less than 35,500 volts and a radial distance of 6 feet from the surface of wood poles or structures shall not be grounded, through anchors or otherwise. Where necessary to avoid the grounding of such portions, guys shall be sectionalized by means of insulators installed at locations as specified in Rule 56.7.

- D Guys Exposed to 22,500 Volts or More (See Rule 21.3–C for definition of “exposed” and Figure 56–4)

Guys exposed to conductors of 22,500 volts or more (see App. G, Fig. 52) shall not be sectionalized and shall have their lower ends securely grounded (by means of ground wires, anchor guys, or attachments to securely grounded metal poles or structures). EXCEPTED from the above requirements are:

- (1) Guys which are required to be sectionalized in accordance with Rule 56.6-A because of proximity of wood poles and supply conductors of less than 22,500 volts or in accordance with Rule 56.6-B; and
- (2) Guys which are sectionalized by wood strain insulators equipped with arcing horns and designed to provide impulse insulation for lightning conditions or glass fiber noninterlocking strait insulators which are designed to provide impulse insulation for lightning conditions.

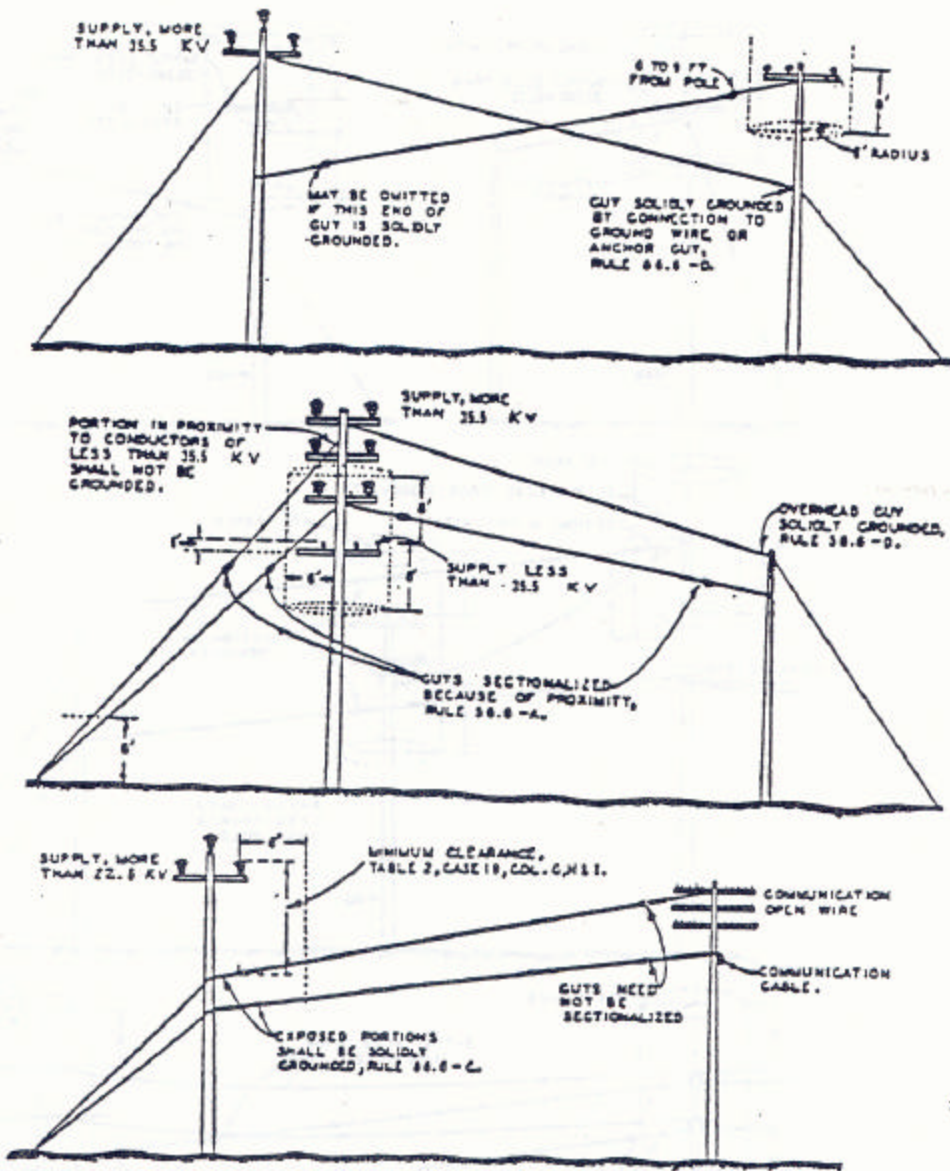


GUYS IN PROXIMITY TO WOOD POLES
AND SUPPLY CONDUCTORS OF 35,000 VOLTS OR LESS

Rules 21.3-D, 56.6-A and 86.6

Fig. 56-3

Fig 56
A.C.



GUYS EXPOSED TO SUPPLY CONDUCTORS OF MORE THAN 22,500 VOLTS OR IN PROXIMITY OF SUPPLY CONDUCTORS MORE THAN 35,000 VOLTS

Rules 21.3-C, 56.5-D and 86.6-C

Fig. 56-4

Fig 52

ITEM 11

~~///~~ Rule 56.7-A

~~///~~ Rule 56.7-B

~~///~~ Rule 56.7-C

RATIONALE FOR PROPOSED RULE CHANGE
RULE 56.7-A
GUYS
LOCATION OF SECTIONALIZING INSULATORS
OVERHEAD GUYS

The proposed rule change is to simplify and clarify the present language. Also, relocate related figures from Appendix G to the text opposite the rule number and change to current numbering sequence (Fig. 56-5, Fig 56-6 and Fig. 56-7).

EXISTING RULE
RULE 56.7-A
LOCATION OF SECTIONALIZING INSULATORS

A Overhead Guys

Insulators installed in overhead guys to sectionalize such guys as required by any portion of Rule 56.6 shall be located at a distance of not less than 6 feet and not more than 9 feet, measured along the guys, from the points of attachment of the guys to poles, crossarms or structures (see App. G, Fig 46). In such overhead guys which are less than 17 feet in length with no section grounded, insulation at one location, approximately equidistant from each support will be sufficient.

Overhead guys attached to wood poles, crossarms or structures and to grounded anchor guys or metal poles shall be sectionalized at not less than one location, 6 to 9 feet (measured along the guys) from the attachment at the wood pole or structure (see App. G, Fig 46).

Branched guys, sometimes referred to as bridle guys, which are attached at two or more positions to the same crossarm or pole line structure, and which are required under the provisions of Rule 56.6 to be sectionalized, shall be sectionalized by means of insulators in each branch or by means of insulators in the main guy and all branches except one, so that no two branches of such guy constitute a continuous metallic path between separate points of attachment to crossarms or structures (see App. G, Fig 50). In conforming with these requirements, insulators in branches of guys should be placed as far as practicable from attachments at pole or crossarm but not more than 9 feet therefrom.

All insulators in overhead guys shall be not less than 8 feet vertically above the ground.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 56.7-A
LOCATION OF SECTIONALIZING INSULATORS

A Overhead Guys

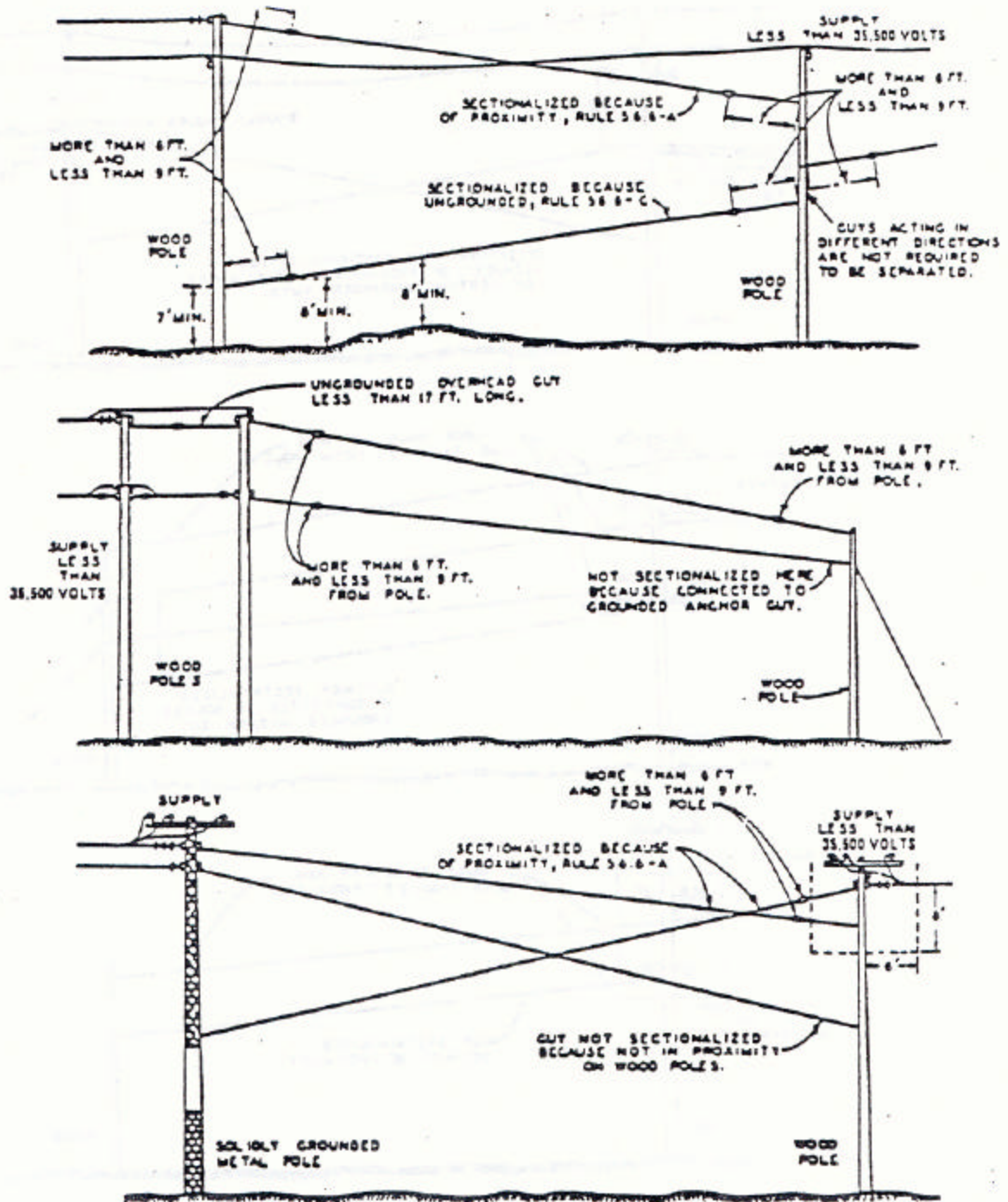
Insulators installed in overhead guys to sectionalize such guys as required by any portion of Rule 56.6 shall be located at a distance of not less than 6 feet and not more than 9 feet, measured along the guys, from the points of attachment of the guys to poles, crossarms or structures (~~see App. G, Fig 46 Fig 56-5 and fig 56-6~~).

In such overhead guys which are less than 17 feet in length with no section grounded, insulation at one location, approximately equidistant from each support will be sufficient.

Overhead guys attached to wood poles, crossarms or structures and to grounded anchor guys or metal poles shall be sectionalized at not less than one location, 6 to 9 feet (measured along the guys) from the attachment at the wood pole or structure (~~see App. G, Fig 46 Fig 56-5 and fig 56-6~~)

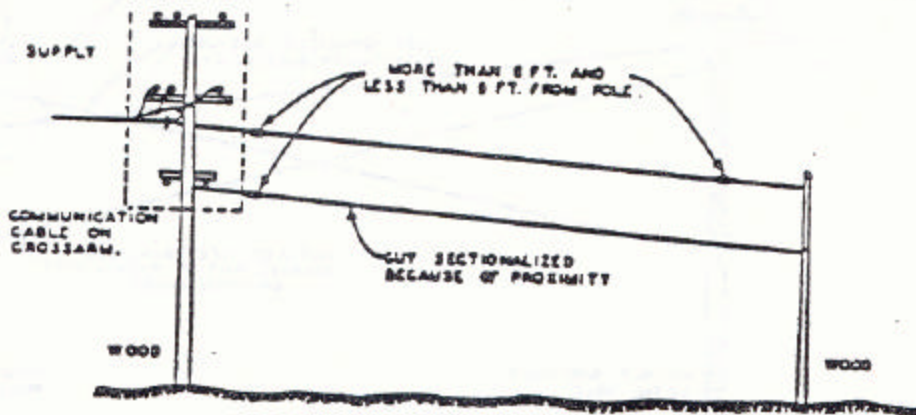
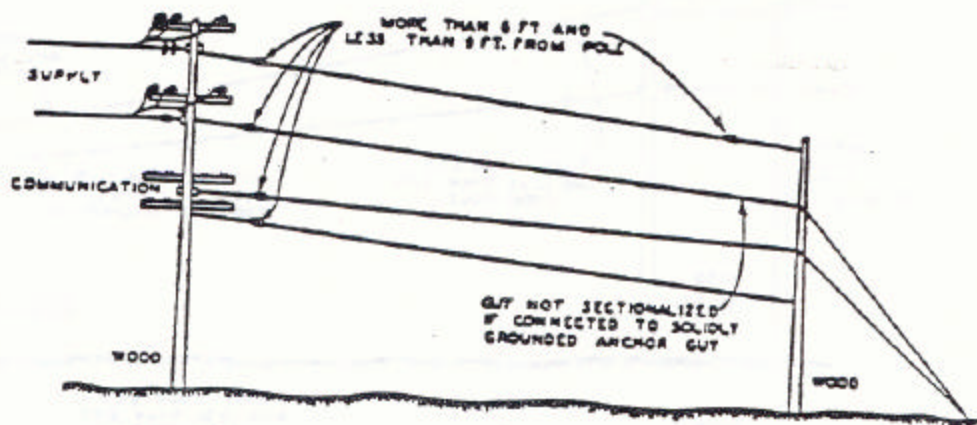
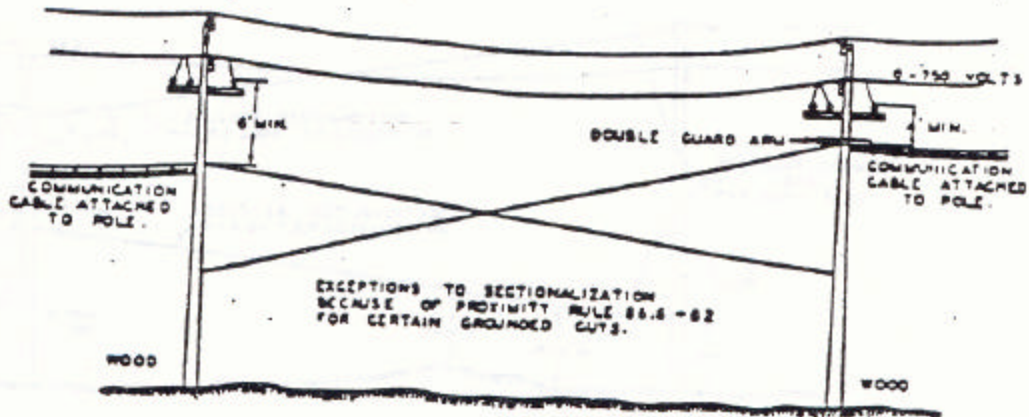
Branched guys, ~~sometimes referred to as~~ (bridle guys), which are attached at two or more positions to the same crossarm or pole line structure, and which are required under the provisions of Rule 56.6 to be sectionalized, shall be sectionalized by means of insulators in each branch or by means of insulators in the main guy and all branches except one, so that no two branches of such guy constitute a continuous metallic path between separate points of attachment to crossarms or structures (~~see App. G, Fig 50 Fig 56-7~~). In conforming with these requirements, insulators in branches of guys should be placed as far as practicable from attachments at pole or crossarm but not more than 9 feet therefrom.

All insulators in overhead guys shall be not less than 8 feet vertically above the ground.



SECTIONALIZATION OF OVERHEAD GUYS
ON SUPPLY LINES
RULE 56.7-A

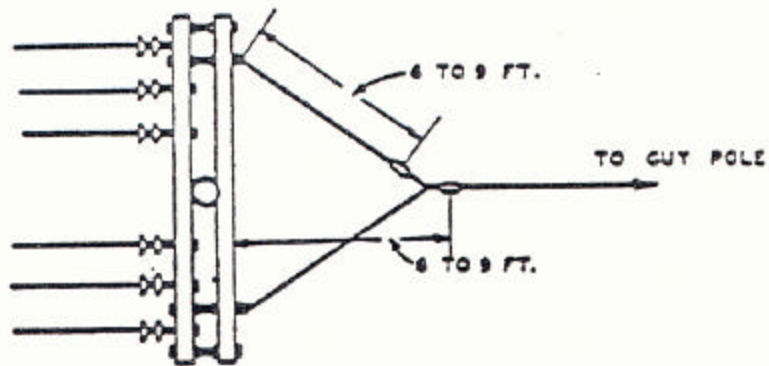
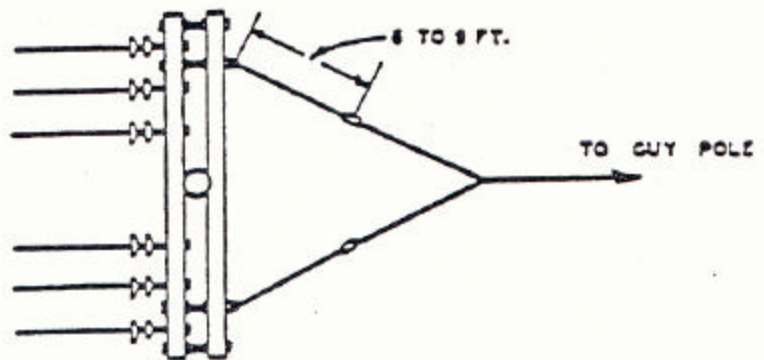
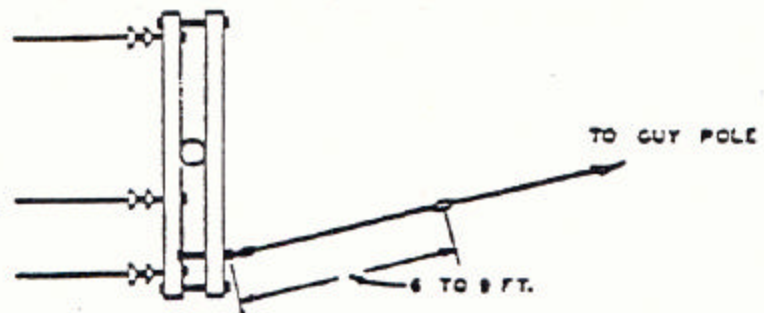
Fig. 56-5



SECTIONALIZATION OF OVERHEAD GUTS
ON JOINTLY USED POLES
RULES 86.7-A AND 86.7-A

Fig. 56-6

AB
rca.



SECTIONALIZATION OF
ARM GUYS AND BRANCHED GUYS

RULE 56.7-A

Fig. 56-7

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 56.7-A
LOCATION OF SECTIONALIZING INSULATORS

A Overhead Guys

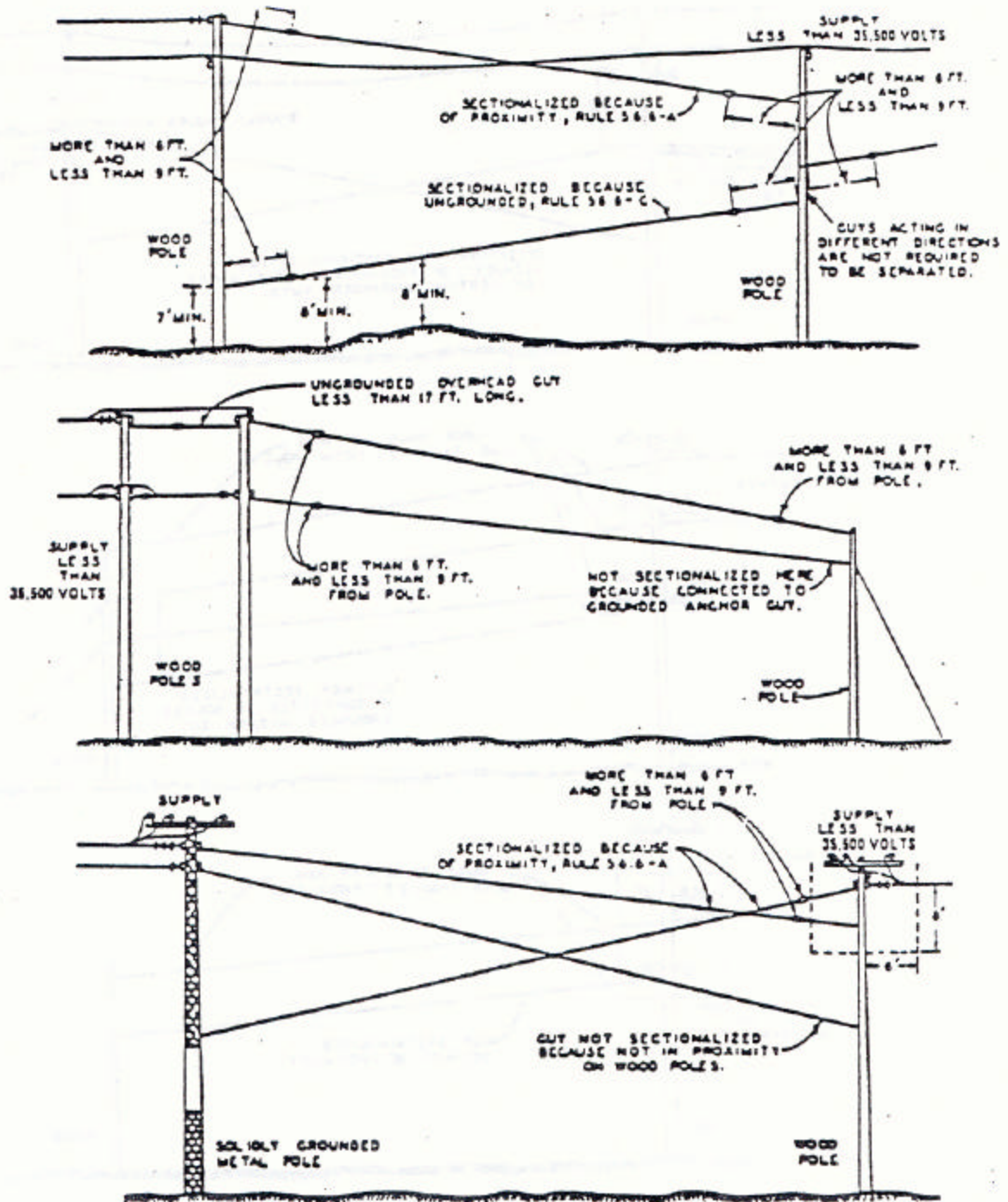
Insulators installed in overhead guys to sectionalize such guys as required by any portion of Rule 56.6 shall be located at a distance of not less than 6 feet and not more than 9 feet, measured along the guys, from the points of attachment of the guys to poles, crossarms or structures (Fig 56-5 and fig 56-6).

In such overhead guys which are less than 17 feet in length with no section grounded, insulation at one location, approximately equidistant from each support will be sufficient.

Overhead guys attached to wood poles, crossarms or structures and to grounded anchor guys or metal poles shall be sectionalized at not less than one location, 6 to 9 feet (measured along the guys) from the attachment at the wood pole or structure (Fig 56-5 and fig 56-6)

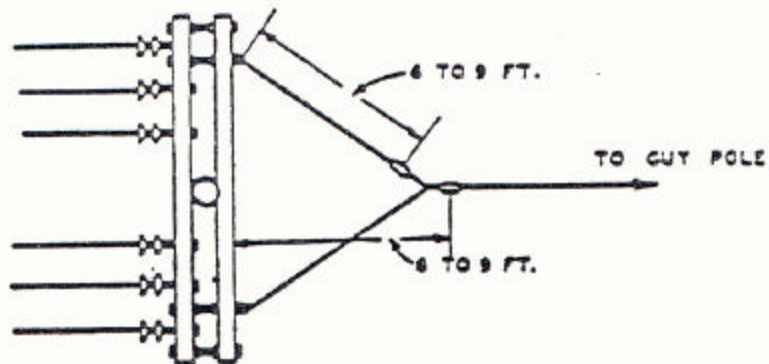
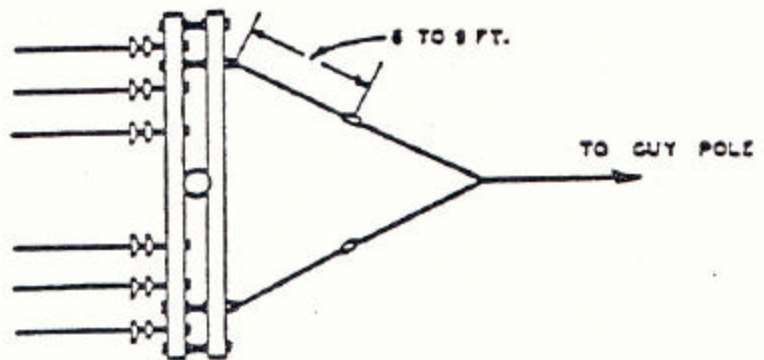
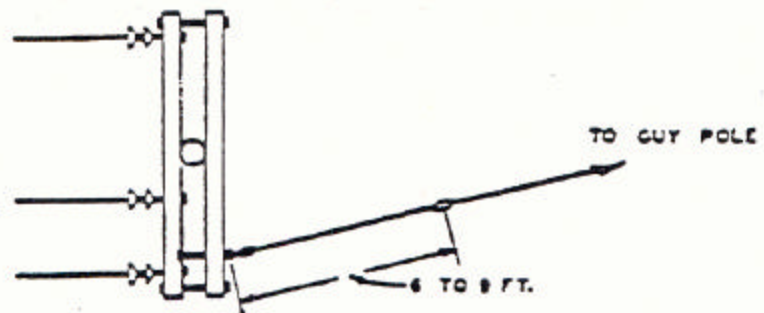
Branched guys, (bridle guys), which are attached at two or more positions to the same crossarm or pole line structure, and which are required under the provisions of Rule 56.6 to be sectionalized, shall be sectionalized by means of insulators in each branch or by means of insulators in the main guy and all branches except one, so that no two branches of such guy constitute a continuous metallic path between separate points of attachment to crossarms or structures (Fig 56-7). In conforming with these requirements, insulators in branches of guys should be placed as far as practicable from attachments at pole or crossarm but not more than 9 feet there-from.

All insulators in overhead guys shall be not less than 8 feet vertically above the ground.



SECTIONALIZATION OF OVERHEAD GUYS
ON SUPPLY LINES
RULE 56.7-A

Fig. 56-5



SECTIONALIZATION OF
ARM GUYS AND BRANCHED GUYS

RULE 56.7-A

Fig. 56-7

RATIONALE FOR PROPOSED RULE CHANGE
RULE 56.7-B
GUYS
LOCATION OF SECTIONALIZING INSULATORS
ANCHOR GUYS

This proposed rule change simplifies and clarifies the present language. Changes include re-structuring, re-formatting and minor changes in syntax. Also, it is proposed to add related figures from Appendix G to the text opposite the rule number and change to current numbering sequence (Fig- 56-8 and Fig. 56-9). At this time it will also be necessary to leave the current App. G, Fig. 49 and Fig. 51 in the appendix because other rules in the order refer to these figures.

EXISTING RULE
RULE 54.7-B
LOCATION OF SECTIONALIZING INSULATORS

B Anchor Guys

An insulator shall be installed in each anchor guy which is required to be sectionalized by Rule 56.6-A or 56.6-B, so that such insulator is located not less than 8 feet above the ground and either 8 feet below the level of the lowest supply conductor or not less than 6 feet from surface of pole and not less than 6 feet from surface of pole and not less than one foot below the level of the lowest supply conductor (see App. G, Fig. 49). These sectionalizing requirements for anchor guys can normally be met by insulation at one location; however, short guys or other conditions may require insulation at two locations, one location being not less than 8 feet above the ground and the other location either not less than 8 feet below the lowest supply conductor, or not less than 6 feet horizontally from pole and not less than one foot below the level of the lowest supply conductor. In order to prevent trees, buildings, messengers, metal-sheathed cables or other similar objects from grounding portions of guys above guy insulators it is suggested that anchor guys be sectionalized, where practicable, near the highest level permitted by this Rule 56.7-B.

Ungrounded portions of anchor guys which pass through the level of communication conductors at positions other than between pole pin positions or outside of the outer pin position shall be sectionalized by insulators placed neither less than 6 inches nor more than 18 inches above the level of the communication conductors (see App. G., Fig. 49b).

Any anchor guy which enters the ground less than 8 feet below the lowest level of supply conductors on the pole or structure shall be treated as an overhead guy which is grounded by means of a grounded anchor guys or metal pole.

A grounded horizontal brace of a "sidewalk" guy shall in no case be less than 8 feet below the level of the lowest unprotected supply conductor on the same pole (see App. G, Fig 51b).

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 54.7-B
LOCATION OF SECTIONALIZING INSNLATORS

B Anchor Guys

An insulator shall be installed in each anchor guy which is required to be sectionalized by Rule 56.6-A or 56.6-B, so that such insulator is ~~located not less than 8 feet above the ground and either 8 feet below the level of the lowest supply conductor or not less than 6 feet from surface of pole and not less than 6 feet from surface of pole and not less than one foot below the level of the lowest supply conductor (see App. G, Fig. 49).~~ ;

- (1) 8 Feet or more above the ground; and
- (2) 8 Feet or more below the level of the lowest supply conductor, or 6 feet or more from surface of pole and one foot or more below the level of the lowest supply conductor (see Figure 56-8).

These sectionalizing requirements for anchor guys can normally be met by insulation at one location; however, short guys or other conditions may require insulation at two locations;;

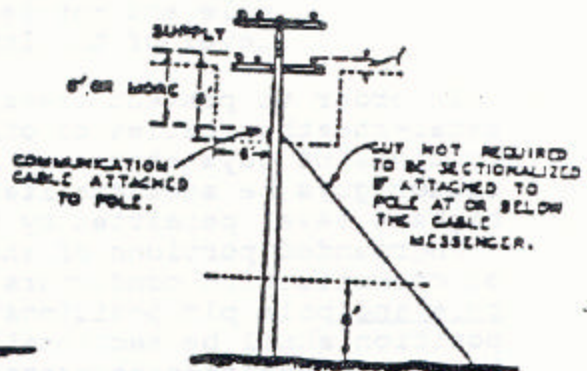
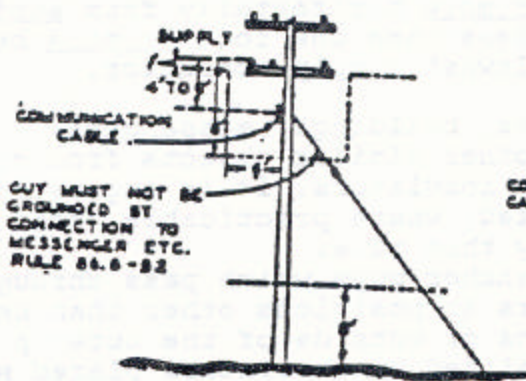
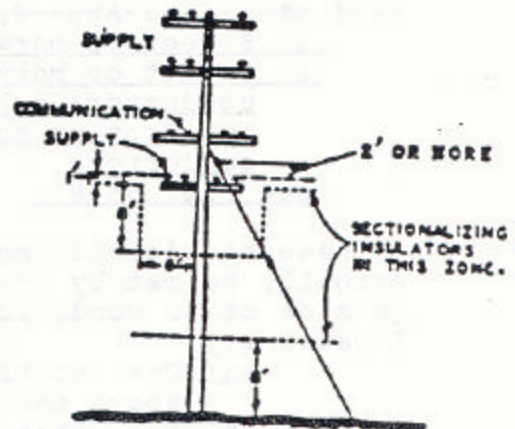
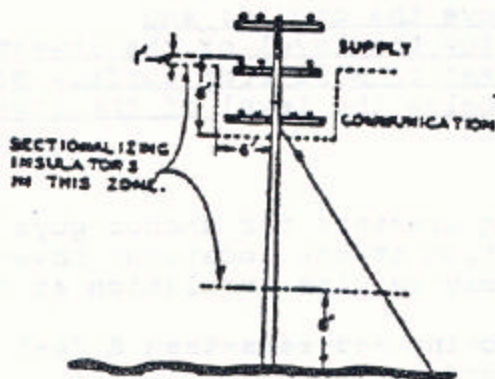
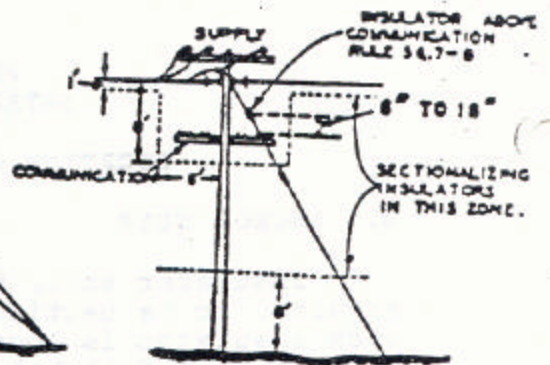
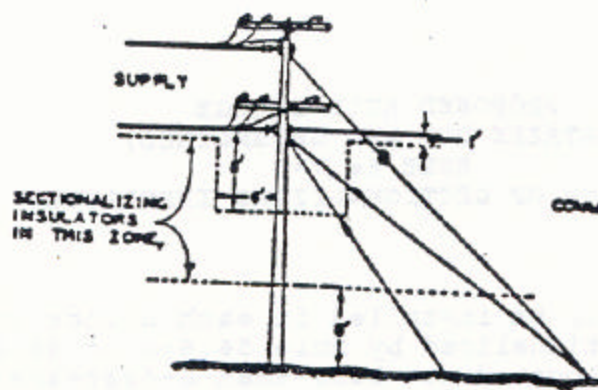
- (a) one location being ~~not less than 8 feet~~ or more above the ground; and
- (b) the other location either ~~not less than 8 feet~~ or more below the lowest supply conductor, or ~~not less than 6 feet~~ or more horizontally from pole and ~~not less than one foot~~ or more below the level of the lowest supply conductor.

In order to prevent trees, buildings, messengers, metal-sheathed cables or other similar objects from grounding portions of guys above guy insulators it is suggested that anchor guys be sectionalized, where practicable, near the highest level permitted by this Rule 56.7-B.

Ungrounded portions of anchor guys which pass through the level of communication conductors at positions other than between the pole and pole pin positions or outside of the outer pin position shall be sectionalized by insulators placed ~~neither less than 6 inches nor more than~~ between 6 and 18 inches above the level of the communication conductors (see ~~App. G, Fig. 49~~ Fig. 56-9).

Any anchor guy which enters the ground less than 8 feet below the lowest level of supply conductors on the pole or structure shall be treated as an overhead guy which is grounded by means of a grounded anchor guys or metal pole.

A grounded horizontal brace of a "sidewalk" guy shall in no case be less than 8 feet below the level of the lowest unprotected supply conductor on the same pole (see ~~App. G, Fig. 51b~~ Fig. 56-9).

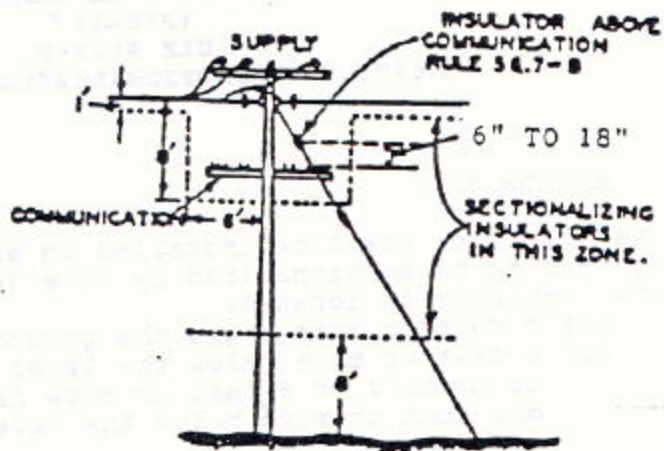


SECTIONALIZATION OF ANCHOR GUYS

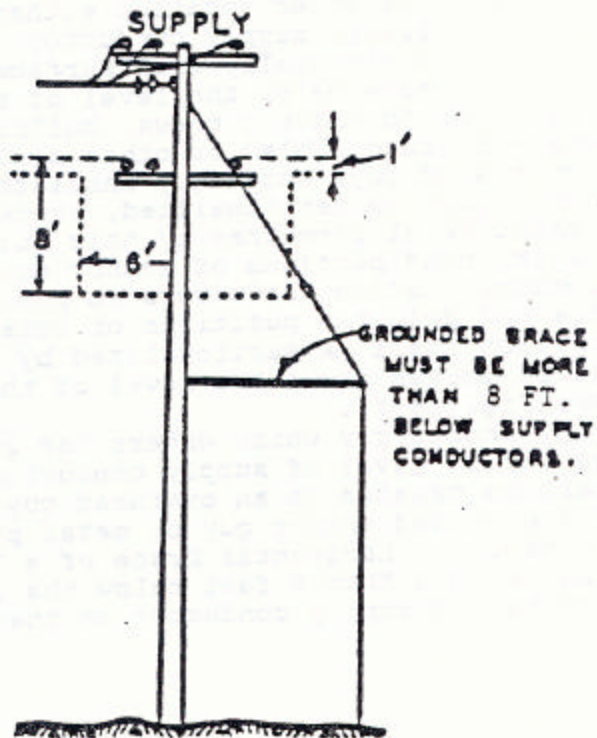
Rule 56.7-B.

Fig. 56-8

Q



Rule 56.7-B



Rule 56.7-B

Fig. 56-9

PROPOSED RULE CHANGE
(Final)*
RULE 54.7-B
LOCATION OF SECTIONALIZING INSNLATORS

B Anchor Guys

An insulator shall be installed in each anchor guy which is required to be sectionalized by Rule 56.6-A or 56.6-B, so that such insulator is:

- (1) 8 Feet or more above the ground; and
- (2) 8 Feet or more below the level of the lowest supply conductor, or 6 feet or more from surface of pole and one foot or more below the level of the lowest supply conductor (see Figure 56-8).

These sectionalizing requirements for anchor guys can normally be met by insulation at one location; however, short guys or other conditions may require insulation at two locations:

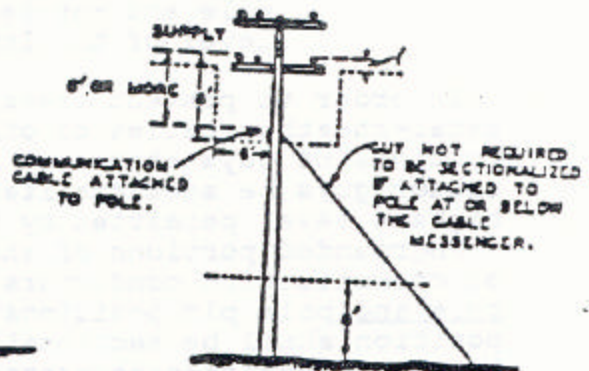
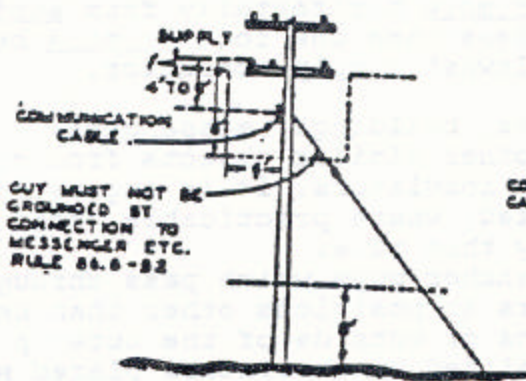
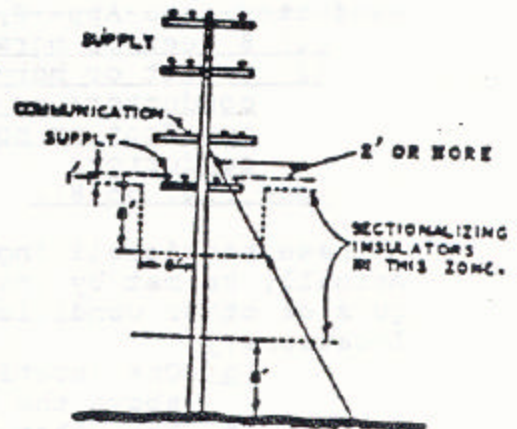
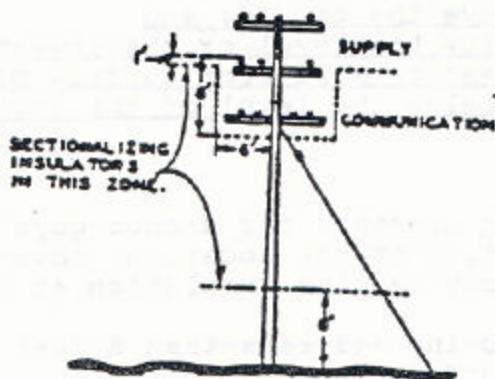
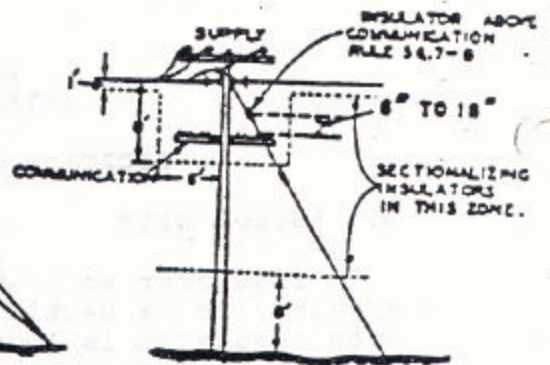
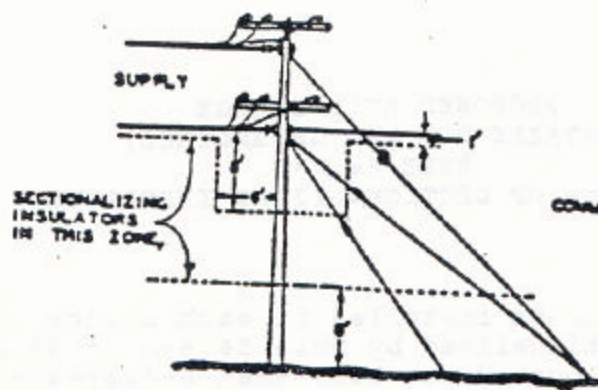
- (a) one location being 8 feet or more above the ground; and
- (b) the other location either 8 feet or more below the lowest supply conductor, or 6 feet or more horizontally from pole and one foot or more below the level of the lowest supply conductor.

In order to prevent trees, buildings, messengers, metal-sheathed cables or other similar objects from grounding portions of guys above guy insulators it is suggested that anchor guys be sectionalized, where practicable, near the highest level permitted by this Rule 56.7-B.

Ungrounded portions of anchor guys which pass through the level of communication conductors at positions other than between the pole and pole pin positions or outside of the outer pin position shall be sectionalized by insulators placed between 6 and 18 inches above the level of the communication conductors (see Fig. 56-9).

Any anchor guy which enters the ground less than 8 feet below the lowest level of supply conductors on the pole or structure shall be treated as an overhead guy which is grounded by means of a grounded anchor guys or metal pole.

A grounded horizontal brace of a "sidewalk" guy shall in no case be less than 8 feet below the level of the lowest unprotected supply conductor on the same pole (see Fig. 56-9).

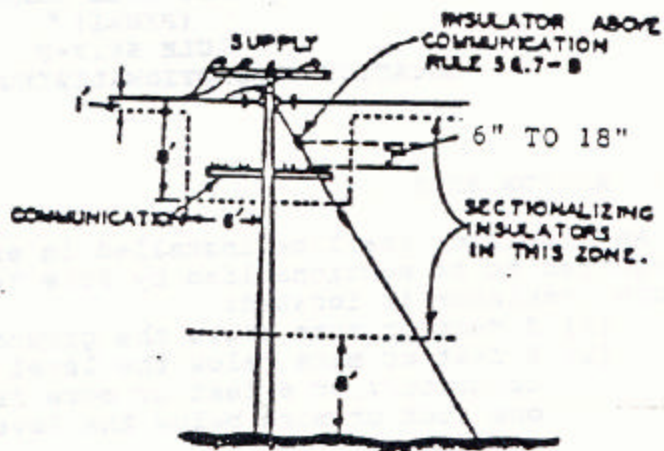


SECTIONALIZATION OF ANCHOR GUYS

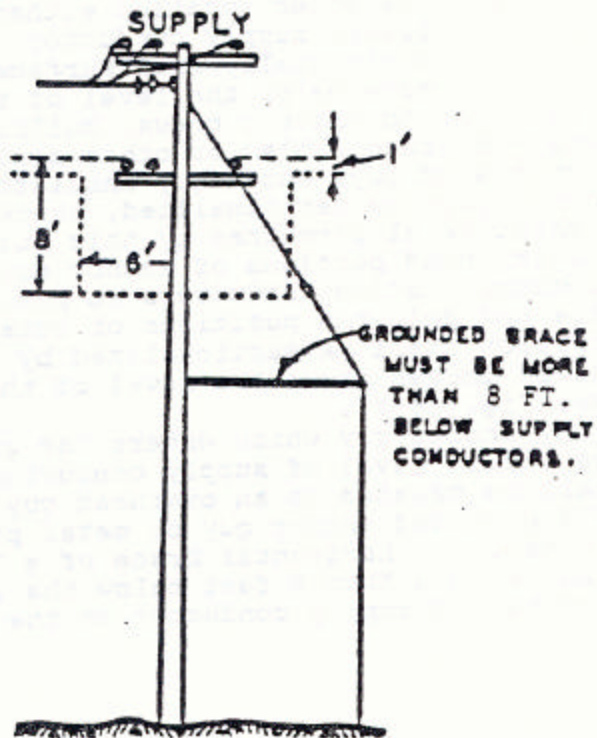
Rule 56.7-B.

Fig. 56-8

Q



Rule 56.7-B



Rule 56.7-B

Fig. 56-9

RATIONALE FOR PROPOSED RULE CHANGE
RULE 56.7-C
GUYS
LOCATION OF SECTIONALIZING INSULATORS
TRUSS GUYS

The proposed rule change is to simplify and clarify the present language with minor changes in syntax. Also, relocate related figure for Appendix G to the text opposite the rule number and change to current numbering sequence (Fig 56-10).

EXISTING RULE
RULE 56.7-C
LOCATION OF SECTIONALIZING INSULATORS

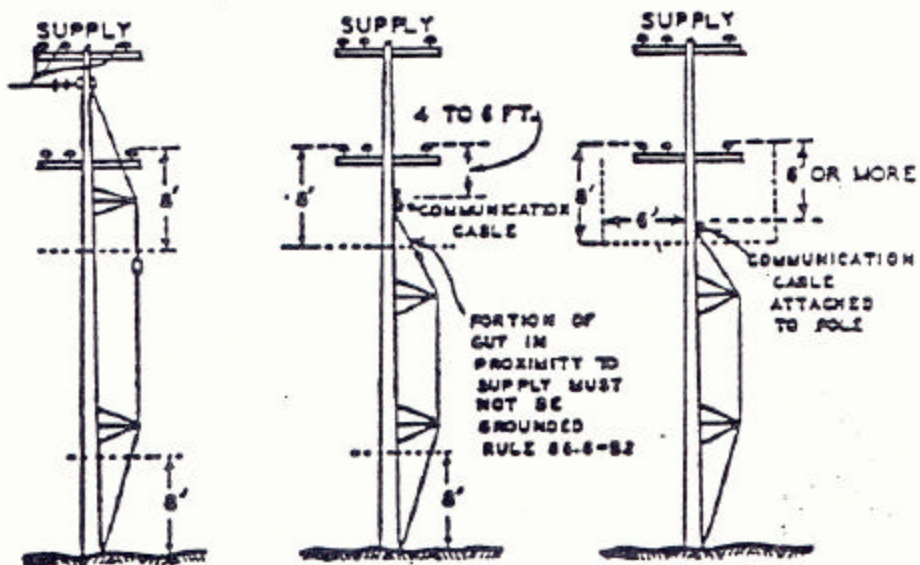
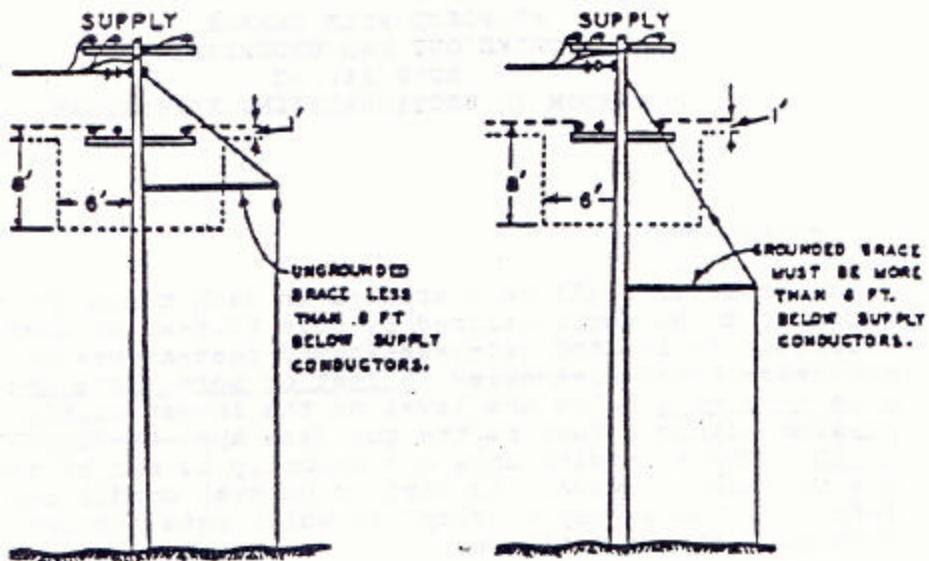
C Truss Guys

An insulator shall be installed in each truss guy which is required to be sectionalized by Rule 56.6-A, so that such insulator is located not less than 8 feet above the ground and not less than 8 feet below the level of the lowest supply conductor passing within 8 feet of the guy (see App. G, Fig. 51). These requirements can normally be met by insulation at one portion; however, in certain unusual conditions the two 8-foot distances may overlap, in which case insulation will be necessary at two positions.

PROPOSED RULE CHANGE
(STRIKEOUT AND UNDERLINED)
RULE 56.7-C
LOCATION OF SECTIONALIZING INSULATORS

C Truss Guys

An insulator shall be installed in each truss guy which is required to be sectionalized by Rule 56.6-A, so that such insulator is located ~~not less than 8 feet above the ground and not less than 8 feet below~~ 8 feet or more above the ground and 8 feet or more the level of the lowest supply conductor passing within 8 feet of the guy (see ~~App. G, Fig. 51~~ Fig. 56-10). These requirements can normally be met by insulation at one portion; however, in certain unusual conditions the two 8-foot distances may overlap, in which case insulation will be necessary at two positions.



SECTIONALIZATION OF
SIDEWALK GUYS AND TRUSS GUYS

Rules 56.7-B and 56.7-C

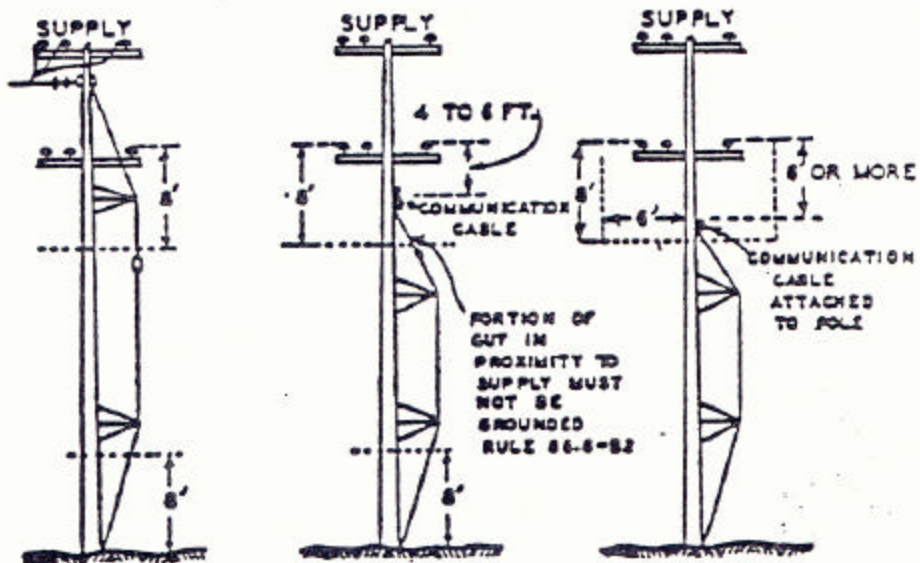
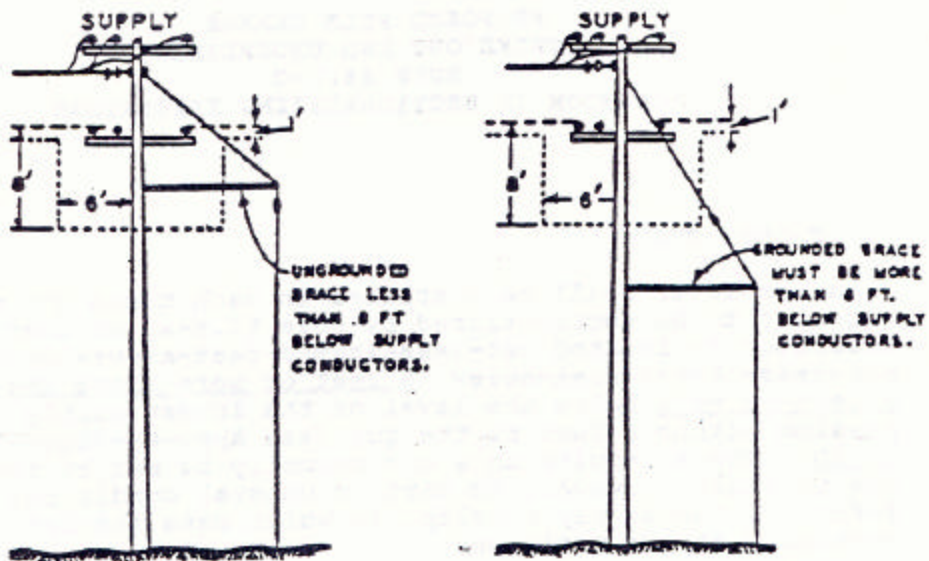
Fig. 56-10

Fig 51

PROPOSED RULE CHANGE
(FINAL)*
RULE 56.7-C
LOCATION OF SECTIONALIZING INSULATORS

C Truss Guys

An insulator shall be installed in each truss guy which is required to be sectionalized by Rule 56.6-A, so that such insulator is located 8 feet or more above the ground and 8 feet or more the level of the lowest supply conductor passing within 8 feet of the guy (see Fig. 56-10). These requirements can normally be met by insulation at one portion; however, in certain unusual conditions the two 8-foot distances may overlap, in which case insulation will be necessary at two positions.



SECTIONALIZATION OF
SIDEWALK GUYS AND TRUSS GUYS

Rules 56.7-B and 56.7-C

Fig. 56-10

Fig 51

ITEM 12

~~Rule~~ Rule 56.8-A

~~Rule~~ Rule 56.8-C

RATIONALE FOR PROPOSED RULE CHANGE
RULE 56.8-A
GUYS
MATERIAL

The proposed rule change will update authorized guy insulator material to include fiberglass (guy strain polymer insulators).

EXISTING RULE
RULE 56.8-A
GUYS

A Material

Insulators used in guys on supply lines shall be porcelain, glass or other suitable material.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 56.8-A
GUYS

A Material

Insulators used in guys on supply lines shall be porcelain, glass, fiberglass or other suitable material.

PROPOSED RULE CHANGE
(FINAL)*
RULE 56.8-A
GUYS

A Material

Insulators used in guys on supply lines shall be porcelain, glass, fiberglass or other suitable material.

RATIONALE FOR PROPOSED RULE CHANGE
RULE 56.8-c
GUY INSULATORS
VOLTAGE REQUIREMENTS

This proposed rule change will bring references to testing standards up to date by referring to the current American National Standard Test Method for Electrical Power Insulators (ANSI C29.1).

EXISTING RULE CHANGE
RULE 56.8-C
GUY INSULATORS

C Voltage Requirements

Insulators used in guys on supply lines shall be so designed that their dry flashover voltage is not more than 75% of their puncture voltage at operating frequencies.

Insulators used in guys on supply lines shall have a dry flashover voltage not less than as specified in Table 13 when tested in accordance with the Standards (No. 41, March 1930) of the American Institute of Electrical Engineers under the maximum mechanical loadings specified by this Order for the guy construction involved.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 56.8-C
GUY INSULATORS

C Voltage Requirements

Insulators used in guys on supply lines shall be so designed that their dry flashover voltage is not more than 75% of their puncture voltage at operating frequencies.

Insulators used in guys on supply lines shall have a dry flashover voltage not less than as specified in Table 13 when tested in accordance with the ~~Standards (No. 41, March 1930) of the American Institute of Electrical Engineers~~ American National Standard (ANSI C29.1-1982) under the maximum mechanical loadings specified by this Order for the guy construction involved.

PROPOSED RULE CHANGE
(FINAL)*
RULE 56.8-C
GUY INSULATORS

C Voltage Requirements

Insulators used in guys on supply lines shall be so designed that their dry flashover voltage is not more than 75% of their puncture voltage at operating frequencies.

Insulators used in guys on supply lines shall have a dry flashover voltage not less than as specified in Table 13 when tested in accordance with the American National Standard (ANSI C29.1–1982) under the maximum mechanical loadings specified by this Order for the guy construction involved.

CORRESPONDING RULE TO CHANGE
GUYS
PROPOSED RULE CHANGE

RULE 38

TABLE 2 (Page 52-55)

Case No. 18, Column C – Delete (bb)

Case No. 19, Column C- Add (bb)

Reference to Rules Modifying Minimum Clearances in Table 2

Existing Reference (bb):

(bb) May be reduced for guys and communication conductors supported on the same pole:

1	Supply	56.4-C
2	Communication	86.4-C

Proposed Change to Reference (bb)

(bb) May be reduced for guys and communication conductors supported on the same pole:

1	Supply	56.4-C <u>4</u>
2	Communication	86.4-C

Rationale For Change

RULE 38

There are no exceptions to Table 2, Case 18, Column C in Rule 56.4-C Page 154 as referenced in (bb)

There are exceptions to Table 2, Case 19, Column C in Rule 56.4-C Page 155 as referenced in (bb)

ITEM 13

- ~~///~~ Rule 57.4-A
- ~~///~~ Rule 57.4-B2
- ~~///~~ Rule 57.4-F
- ~~///~~ Rule 57.4-G

RATIONALE FOR PROPOSED RULE CHANGE
RULE 57.4-A
MESSENGERS AND INSULATED CABLES
CLEARANCES – ABOVE GROUND

The proposed rule change provides specific related rules to reference for applicable clearances requirements and clarifies the intent of the existing rule.

EXISTING RULE

Rule 57

Rule 57.4, Clearances

Rule 57.4-A

- A. Above Ground (see Rule 54.4-A)

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)

Rule 57.4-A

- A. Above Ground (~~see Rule 54.4-A~~)

(1) Messengers and Insulated Cables: The basic clearances specified in Rule 37, Table 1 for conductors, as modified by provisions of Rule 54.4-A, are applicable to messengers and insulated cables (See Rule 57.8).

(2) Grounded and Bonded Messengers and Insulated Cables: The basic clearances specified in Rule 37, Table 1, Column D, are applicable to grounded cables having metallic sheaths, and to effectively grounded messengers (see Rule 57.8).

PROPOSED RULE CHANGE
(FINAL)*

Rule 57.4-A

- A. Above Ground

(1) Messengers and Insulated Cables: The basic clearances specified in Rule 37, Table 1 for conductors, as modified by provisions of Rule 54.4-A, are applicable to messengers and insulated cables (See Rule 57.8).

(2) Grounded and Bonded Messengers and Insulated Cables: The basic clearances specified in Rule 37, Table 1, Column D, are applicable to grounded cables having metallic sheaths, and to effectively grounded messengers (see Rule 57.8).

RATIONALE FOR PROPOSED RULE CHANGE
RULE 54.7-B2
MESSENGERS AND INSULATED CABLES
CLEARANCES –ABOVE RAILWAYS AND TROLLEY LINES

The proposed rule change is to simplify and clarify the present language. The addition of a statement that will permit the use of modern suitable material in place of wood. The suitable material must meet the same electrical and mechanical requirements of the existing rule.

EXISTTING RULE

57.4 Clearances, ABOVE RAILWAYS AND TROLLEY LINES

Rule 57.4-B2

- 2 Operated by Overhead Trolley: The clearances specified in Table 1, Case 2, Columns A and D are based upon a maximum trolley pole throw of 26 feet.

Messengers, and Cables, which are bonded and grounded as specified in Rule 57.8, may have clearances above the rails or running surfaces used by trolley cars or coaches less than the distance specified in Table 1, Case 2, Columns A and D for trolley-throw clearance, provided the messengers and cables are not less than 4 feet above the trolley contact conductor and are encased in wood boxing or moulding 7/8-inch or more in thickness for distance of at least 2 feet horizontally from the vertical plane through each trolley contact conductor.

PROPOSED RULE CHANGE (STRIKE OUT AND UNDERLINED)

57.4 Clearances, ABOVE RAILWAYS AND TROLLEY LINES

Rule 57.4-B2

- 2 Operated by Overhead Trolley: The clearances specified in Table 1, Case 2, Columns A and D 26 feet and 27 feet respectively, are based upon a maximum trolley pole throw of 26 feet, the usual maximum height of a free trolley pole above the top of rails or surface of streets used by trolley cars or coaches.

EXCEPTION: Messengers, and Cables, which are bonded and grounded as specified in Rule 57.8, may have clearances above the rails or ~~running~~ surfaces of streets used by trolley cars or coaches less than the distance specified in Table 1, Case 2, Columns A and D for trolley-throw clearance, provided the messengers and cables are not less than 4 feet above the trolley contact conductor and are encased in wood boxing or moulding with a minimum 7/8-inch ~~or more in thickness~~ (or other suitable material having the same minimum electrical insulating qualities and mechanical strength) for distance of at least 2 feet horizontally from the vertical plane through each trolley contact conductor.

PROPOSED RULE CHANGE
(FINAL)*

57.4 Clearances, ABOVE RAILWAYS AND TROLLEY LINES

Rule 57.4-B2

- 2 Operated by Overhead Trolley: The clearances specified in Table 1, Case 2, Columns A and D 26 feet and 27 feet respectively, are based upon a maximum trolley pole throw of 26 feet, the usual maximum height of a free trolley pole above the top of rails or surface of streets used by trolley cars or coaches.

EXCEPTION: Messengers, and Cables, which are bonded and grounded as specified in Rule 57.8, may have clearances above the rails or surfaces of streets used by trolley cars or coaches less than the distance specified in Table 1, Case 2, Columns A and D for trolley-throw clearance, provided the messengers and cables are not less than 4 feet above the trolley contact conductor and are encased in wood boxing or moulding with a minimum 7/8-inch (or other suitable material having the same minimum electrical insulating qualities and mechanical strength) for distance of at least 2 feet horizontally from the vertical plane through each trolley contact conductor.

RATIONALE FOR PROPOSED RULE CHANGE
RULE 57.4-F
MESSENGERS AND INSULATED CABLES
CLEARANCES – FROM POLES, CROSSARMS AND OTHER CONDUCTORS

The proposed rule change is to simplify and clarify the present language. Changes include re-constructing, re-formatting and minor change in syntax. Also, appropriate Figures from Appendix "G" will be brought forward and inserted into the text of the rule.

EXISTING RULE

57.4 Clearances

F From Poles, Crossarms and Other Conductors

Messengers, and metal sheathed cables, which are bonded and grounded as specified in Rule 57.8 shall have clearances not less than the minimum clearances required for conductors of 0-750 volts with all of the following provisions being applicable:

Such grounded messengers and cables may be attached to the surfaces of poles or wood crossarms at less than the clearances specified in Table 1, Column D, Cases 8 and 9. When attached to pole or wood crossarm at less than 15 inches from center line of pole such grounded messenger or cable shall be not less than 4 feet vertically above or 6 feet vertically below any unprotected supply conductor except that where a guard arm (or arms) is placed above messenger and cable as specified in Rule 57.7, the clearance of 6 feet may be reduced to not less than 4 feet below unprotected conductors of 0-750 volts (see App. G, Fig. 53).

Such grounded messenger and cable when supported on the same crossarm with unprotected conductors in excess of 750 volts shall be placed on the side of pole opposite the unprotected conductors (see App. G, Fig. 54)

Such grounded messenger and cable when supported on the same arm with unprotected conductors of 0-750 volts, shall be placed at not less than pin spacings (Table 2, Case 15, Column D) beyond the outermost unprotected conductor on the same side of pole (see App. G, Fig. 54).

The clearances required in this Rule 57.4-F between a cable and unprotected conductors shall not be held to apply between a grounded cable (and its messenger) and protected conductors of the same circuit on poles where unprotected enter (or leave) a cable. On such poles no grounded section of messenger or cable shall be less than 15 inches from surface pole.

Where two or more cables are attached to the surface of the same wood pole in accordance with the provisions of this Rule 57.4-F, they shall be placed on the same side of pole when their vertical separation is less than 8 feet but in case shall the vertically separation be less than 1 foot.

PROPOSED RULE
(STRIKE OUT AND UNDERLINE)

57.4 Clearances

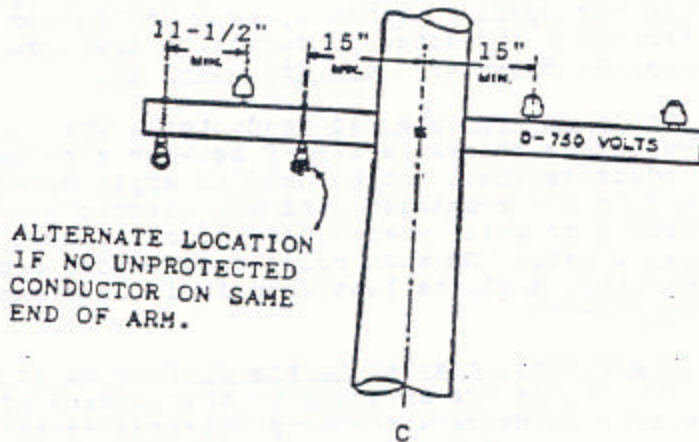
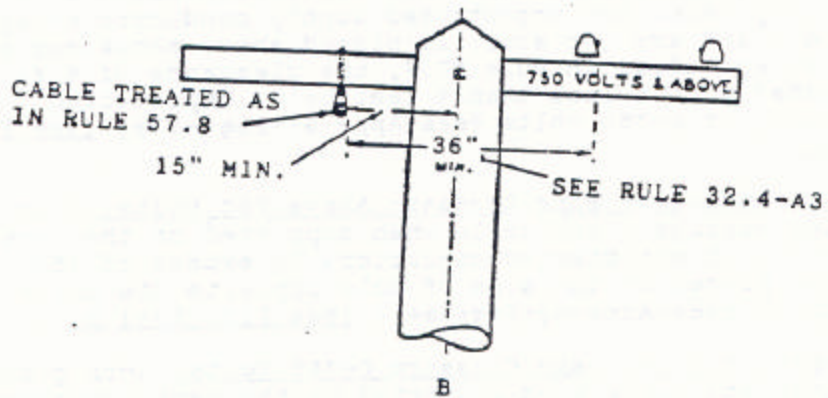
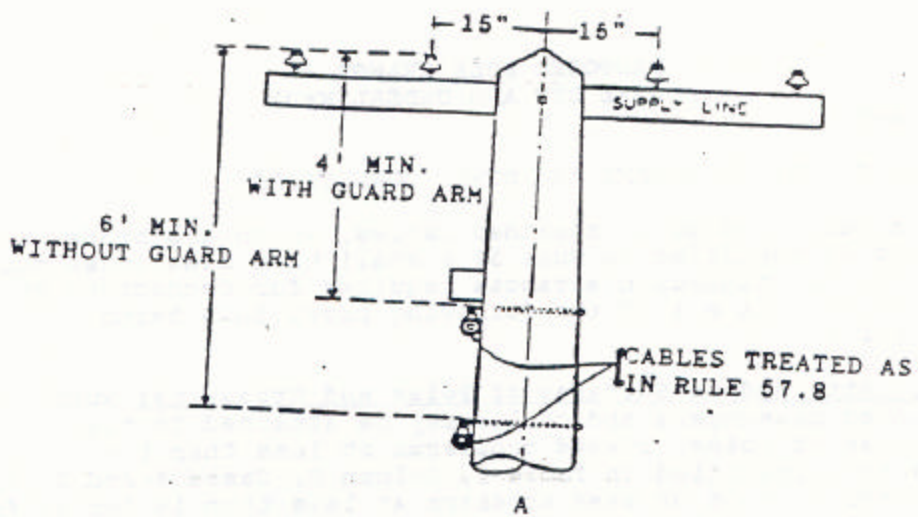
F From Poles, Crossarms and Other Conductors

Messengers, and metal sheathed cables, which are bonded and grounded as specified in Rule 57.8 shall have clearances not less than the minimum clearances required for conductors of 0-750 volts with all of the following provisions being applicable:

- (1) Attached to Surfaces of Poles and Crossarms: Such grounded messengers and cables may be attached to the surfaces of poles or ~~wood~~ crossarms at less than the clearances specified in Table 1, Column D, Cases 8 and 9. When attached to pole or wood crossarm at less than 15 inches from center line of pole such grounded messenger or cable shall ~~be not~~ not be less than 4 feet vertically above or 6 feet vertically below any unprotected supply conductor except that where a guard arm (or arms) is placed above messenger and cable as specified in Rule 57.7, the clearance of 6 feet may be reduced to not less than 4 feet below unprotected conductors of 0-750 volts (~~see App. G, Fig. 53~~) (see Fig 57-1 A).
- (2) Supported on Same Crossarm above 750 Volts: Such grounded messenger and cable when supported on the same crossarm with unprotected conductors in excess of 750 volts shall be placed on the side of pole opposite the unprotected conductors (~~see App. G, Fig. 54~~) (see Fig 57-1 B).
- (3) Supported on Same Crossarm 0 - 750 Volts: Such grounded messenger and cable when supported on the same ~~arm~~ crossarm with unprotected conductors of 0-750 volts, shall be placed at not less than pin spacings (Table 2, Case 15, Column D) beyond the outermost unprotected conductor on the same side of pole (see App. G, Fig. 54).
- (4) Between Cable and Unprotected Conductors: The clearances ~~required in this Rule 57.4-F~~ between a cable and unprotected conductors shall not be held to apply between a grounded cable (and its messenger) and protected conductors of the same circuit on poles where unprotected enter (or leave) a cable. On such

poles no grounded section of messenger or cable shall be less than 15 inches from surface pole.

- (5) Two or More Cables Attached to the Surface of Pole: Where two or more cables are attached to the surface of the same wood pole ~~in accordance with the provisions of this Rule 57.4 F,~~ they shall be placed on the same side of pole when their vertical separation is less than 8 feet but in case shall the vertically separation be less than 1 foot.



Rule 57.4-F

Fig. 57-1

FIG

PROPOSED RULE
(FINAL)*

57.4 Clearances

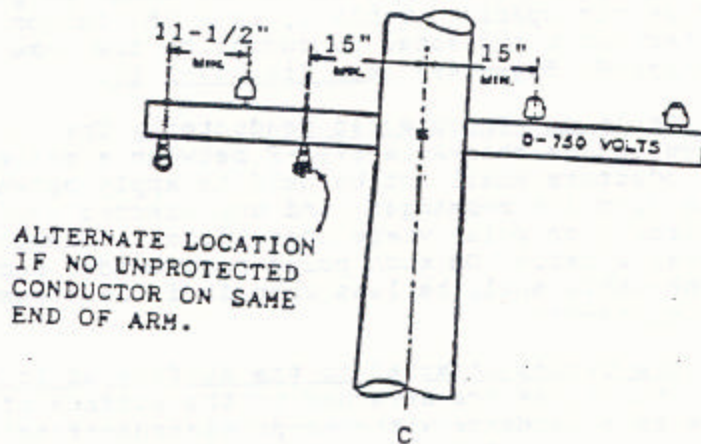
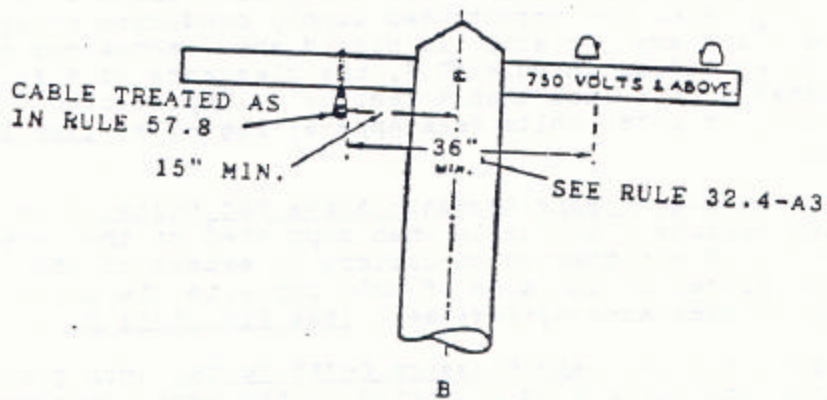
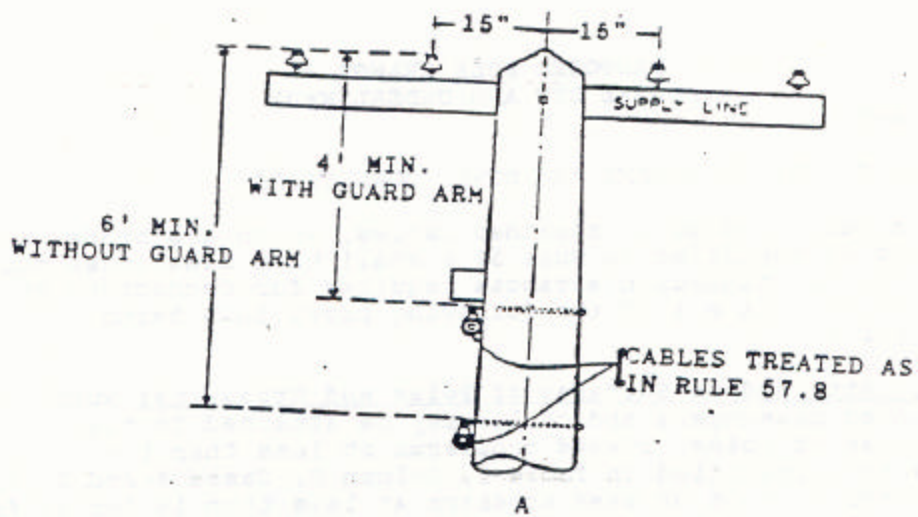
F From Poles, Crossarms and Other Conductors

Messengers, and metal sheathed cables, which are bonded and grounded as specified in Rule 57.8 shall have clearances not less than the minimum clearances required for conductors of 0-750 volts with all of the following provisions being applicable:

- (1) Attached to Surfaces of Poles and Crossarms: Such grounded messengers and cables may be attached to the surfaces of poles or crossarms at less than the clearances specified in Table 1, Column D, Cases 8 and 9. When attached to pole or wood crossarm at less than 15 inches from center line of pole such grounded messenger or cable shall not be less than 4 feet vertically above or 6 feet vertically below any unprotected supply conductor except that where a guard arm (or arms) is placed above messenger and cable as specified in Rule 57.7, the clearance of 6 feet may be reduced to not less than 4 feet below unprotected conductors of 0-750 volts (see Fig 57-1 A).
- (2) Supported on Same Crossarm above 750 Volts: Such grounded messenger and cable when supported on the same crossarm with unprotected conductors in excess of 750 volts shall be placed on the side of pole opposite the unprotected conductors (see Fig 57-1 B).
- (3) Supported on Same Crossarm 0 - 750 Volts: Such grounded messenger and cable when supported on the same crossarm with unprotected conductors of 0-750 volts, shall be placed at not less than pin spacings (Table 2, Case 15, Column D) beyond the outermost unprotected conductor on the same side of pole (see App. G, Fig. 54).
- (4) Between Cable and Unprotected Conductors: The clearances between a cable and unprotected conductors shall not be held to apply between a grounded cable (and its messenger) and protected conductors of the same circuit on poles where unprotected enter

(or leave) a cable. On such poles no grounded section of messenger or cable shall be less than 15 inches from surface pole.

- (5) Two or More Cables Attached to the Surface of Pole: Where two or more cables are attached to the surface of the same wood pole they shall be placed on the same side of pole when their vertical separation is less than 8 feet but in case shall the vertically separation be less than 1 foot.



Rule 57.4-F

Fig. 57-1

FIG

RATTIONALE FOR PROPOSED RULE CHANGE
RULE 57.4-G
MESSENGERS AND INSULATED CABLES
CLEARANCES – FROM BUILDINGS AND OTHER STRUCTURES

The proposed rule change is to simplify and clarify the present language.

EXISTING RULE

Rule 57.4 Clearances

Rule 57.4-G, FROM BUILDINGS AND OTHER STRUCTURES

G From Buildings and Other Structures

Messengers and metal sheathed cables, which are bonded and grounded as specified in Rule 57.8 are not required to clear buildings and other structures any specified horizontal distance and the clearance specified in Table 1, Case 7, Column D does not apply in such instances. Such cables, and messengers, shall be installed so that they do not interfere with the free use of fire escapes, exits, etc., and shall be so arranged as to hamper and endanger workmen and firemen as little as possible in the performance of their duties.

PROPOSED RULE CHANGE (STRIKE OUT AND UNDERLINE)

Rule 57.4 Clearances

Rule 57.4-G, FROM BUILDINGS AND OTHER STRUCTURES

G From Buildings and Other Structures

Messengers and metal sheathed cables, which are bonded and grounded as specified in Rule 57.8 are not required to clear buildings and other structures any specified horizontal distance and the clearance specified in Table 1, Case 7, Column D does not apply in such instances. Such cables, and messengers, shall be installed so that they do not interfere with the free use of fire escapes, exits, etc., and ~~shall be so arranged as to hamper and endanger workmen and firemen as little as possible in the performance of their duties.~~ should be arranged so as not to hamper or endanger workers and firefighters while performing their duties.

PROPOSED RULE CHANGE
(FINAL)*

Rule 57.4 Clearances

Rule 57.4-G, FROM BUILDINGS AND OTHER STRUCTURES

G From Buildings and Other Structures

Messengers and metal sheathed cables, which are bonded and grounded as specified in Rule 57.8 are not required to clear buildings and other structures any specified horizontal distance and the clearance specified in Table 1, Case 7, Column D does not apply in such instances. Such cables, and messengers, shall be installed so that they do not interfere with the free use of fire escapes, exits, etc., and should be arranged so as not to hamper or endanger workers and firefighters while performing their duties.

ITEM 14

~~Rule~~ Rule 57.5

~~Rule~~ Rule 57.7

RATIONALE FOR PROPOSED RULE CHANGE
RULE 57.5
MESSENGERS AND INSULATED CABLES
FASTENINGS

Delete the last paragraph. Wrapped guys are longer used by the industry thus making this position obsolete and unnecessary.

EXISTING RULE

57.5 Fastenings

Hardware used in connection with messengers shall meet the strength requirements of Rule 49.7-C. Dead-end attachments used on messengers or reinforced cables shall have a strength not less than that of the messenger or reinforced cable.

Cedar and other soft-wood poles around which any messenger having an ultimate strength of 5,000 pounds or more is wrapped shall be protected by suitable shims. Hooks, lag screws, or other equivalent means to prevent the messenger from slipping along the pole shall be provided where necessary.

PROPOSED RULE CHANGE (STRIKE OUT AND UNDERLINE)

57.5 Fastenings

Hardware used in connection with messengers shall meet the strength requirements of Rule 49.7-C. Dead-end attachments used on messengers or reinforced cables shall have a strength not less than that of the messenger or reinforced cable.

~~Cedar and other soft-wood poles around which any messenger having an ultimate strength of 5,000 pounds or more is wrapped shall be protected by suitable shims. Hooks, lag screws, or other equivalent means to prevent the messenger from slipping along the pole shall be provided where necessary.~~

PROPOSED RULE CHANGE (FINAL)*

57.5 Fastenings

Hardware used in connection with messengers shall meet the strength requirements of Rule 49.7-C. Dead-end attachments used on messengers or reinforced cables shall have a strength not less than that of the messenger or reinforced cable.

RATIONALE FOR PROPOSED RULE CHANGE
RULE 57.7
MESSENGERS AND INSULATED CABLES
USE OF GUARD ARMS AND COVERINGS

Delete the reference to "of wood" under the requirements for suitable protective covering. Insert a reference to Rule 22.2 which contains the definition and requirements for suitable protective covering.

EXISTING RULE

57.7 Use of Guard Arms and Coverings

Any guard arm which is required to be installed by the provisions of Rule 57.4-F shall be at least 4 feet in length (Rule 20.9-D) and parallel to and not more than 4 inches above the top of the cable or messenger. In lieu of the guard arm, suitable protective covering of wood at least 4 feet in length may be placed around the cable and messenger.

Double guard arms shall be used where such a messenger or cable is dead ended on or wrapped around a wood pole, at a vertical separation of less than 6 feet below unprotected supply conductors of other circuits of 750 volts or less. Portions of cables which take the form of a riser or a grounded lateral or vertical run shall be covered as specified in Rule 54.6-E for risers.

PROPOSED RULE CHANGE (STRIKE OUT AND UNDERLINE)

57.7 Use of Guard Arms and Coverings

Any guard arm which is required to be installed by the provisions of Rule 57.4-F shall be at least 4 feet in length (Rule 20.9-D) and parallel to and not more than 4 inches above the top of the cable or messenger. In lieu of the guard arm, suitable protective covering ~~of wood~~ (Rule 22.2) at least 4 feet in length may be placed around the cable and messenger.

Double guard arms shall be used where such a messenger or cable is dead ended on or wrapped around a wood pole, at a vertical separation of less than 6 feet below unprotected supply conductors of other circuits of 750 volts or less. Portions of cables which take the form of a riser or a grounded lateral or vertical run shall be covered as specified in Rule 54.6-E for risers.

PROPOSED RULE CHANGE
(FINAL)*

57.7 Use of Guard Arms and Coverings

Any guard arm which is required to be installed by the provisions of Rule 57.4-F shall be at least 4 feet in length (Rule 20.9-D) and parallel to and not more than 4 inches above the top of the cable or messenger. In lieu of the guard arm, suitable protective covering (Rule 22.2) at least 4 feet in length may be placed around the cable and messenger.

Double guard arms shall be used where such a messenger or cable is dead ended on or wrapped around a wood pole, at a vertical separation of less than 6 feet below unprotected supply conductors of other circuits of 750 volts or less. Portions of cables which take the form of a riser or a grounded lateral or vertical run shall be covered as specified in Rule 54.6-E for risers.

ITEM 15

~~Rule~~ Rule 59.3-A

~~Rule~~ Rule 59.3-F

RATIONALE FOR PROPOSED RULE CHANGE
RULE 59.3-a
COMOON PRIMARY AND SECONDARY GROUNDED NEUTRAL SYSTEMS
CONDUCTORS – MATERIALS

The proposed rule change deletes the requirement that “Related phase and neutral line conductors shall be of the same material, except that the neutral conductor may be of copper”. This requirement mandates expensive and unnecessary conductor changes and modifications during re-construction projects (such as a major cut-over from 12kV to 21kV with a common neutral). Accepted and sound engineering practices throughout the industry dictate the most efficient and economical use of specific conductor types. This proposed rule change will not diminish safety to the workmen and general public, or service reliability, but will significantly reduce unnecessary costs to the rate payer.

EXISTING RULE

Rule 59, Common Primary and Secondary Grounded Neutral Systems

Rule 59.3 Conductors

59.3 Conductors

A Material

Conductors of common neutral systems shall be of copper, copper-covered steel, bronze, stranded composites of any of the foregoing, aluminum, aluminum cable steel reinforced, or of other corrosion-resisting metal, but shall not be galvanized iron or steel.

Related phase and neutral line conductors shall be of the same material, except that the neutral conductor may be of copper.

PROPOSED RULE CHANGE (STRIKE OUT AND UNDERLINE)

Rule 59, Common Primary and Secondary Grounded Neutral Systems

Rule 59.3 Conductors

59.3 Conductors

A Material

Conductors of common neutral systems shall be of copper, copper-covered steel, bronze, stranded composites of any of the foregoing, aluminum, aluminum cable steel reinforced, or of other corrosion-resisting metal, but shall not be galvanized iron or steel.

~~Related phase and neutral line conductors shall be of the same material, except that the neutral conductor may be of copper.~~

PROPOSED RULE CHANGE
(FINAL)*

Rule 59, Common Primary and Secondary Grounded Neutral Systems

Rule 59.3 Conductors

59.3 Conductors

A Material

Conductors of common neutral systems shall be of copper, copper-covered steel, bronze, stranded composites of any of the foregoing, aluminum, aluminum cable steel reinforced, or of other corrosion-resisting metal, but shall not be galvanized iron or steel.

RATIONALE

RULE 59.3-F – DESIGNATION OF COMMON NEUTRAL

The present rule requires the placement of a metal tag on any common neutral conductor that is closed in the primary pin position as the only means of marking said conductor.

The proposed rule change will allow marking of the common neutral with any weather- and corrosion-resisting material if specific conditions are met. Also, optional marking locations on the crossarm or surface of pole are proposed.

EXISTING RULE

RULE 59.3-F

F Designation of Common Neutral

In common neutral systems, where the common neutral line conductor is installed in a primary pin position, it shall be designated by an approved noncorrosive metal tag having a minimum diameter of not less than 1 inch upon which shall be permanently imprinted the letters "CN" not less than 5/16 inch in height. Said tag shall be attached securely to and maintained on the common neutral conductor at each pin position of line arm and buck arm at a distance not more than 12 inches from the face of the crossarm on the climbing side of each pole and so installed as to be clearly visible at all times.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)

RULE 59.3-F

F Designation of Common Neutral

In common neutral systems, where the common neutral line conductor is installed in a primary pin position, it shall be designated ~~by an approved noncorrosive at each pin position with the letters "CN". A weather- and corrosion-resisting material shall be used and the letters shall be clearly legible.~~

Optional Marking methods are:

1. ~~A metal tag having a minimum diameter of not less than 1 inch upon which shall be permanently imprinted the letters "CN" not less than 5/16 inch in height. Said tag shall be attached securely to and maintained on the common neutral conductor at each pin position of line arm and buck arm at a distance not more than 12 inches from the face of the crossarm on the climbing side of each pole and so installed as to be clearly visible at all times.~~ surface of the conductor supports.

2. ~~Solid letters not less than 3 inches in height or a sign showing the letters "CN" not less than 3 inches in height, solid or with letters cut out there from. Said letters or signs shall be placed on the face of a crossarm, suitable for attaching the letters or signs, directly beneath the common neutral support, or said letters or signs shall be placed on the surface of the pole beneath the common neutral support.~~

PROPOSED RULE CHANGE
(FINAL)*

RULE 59.3-F

F Designation of Common Neutral

In common neutral systems, where the common neutral line conductor is installed in a primary pin position, it shall be designated at each pin position with the letters "CN". A weather- and corrosion-resisting material shall be used and the letters shall be clearly legible.

Optional Marking methods are:

1. A tag having a minimum diameter of not less than 1 inch upon which shall be permanently imprinted the letters "CN" not less than 5/16 inch in height. Said tag shall be attached securely to and maintained on the common neutral conductor at a distance not more than 12 inches from the surface of the conductor supports.
2. Solid letters not less than 3 inches in height or a sign showing the letters "CN" not less than 3 inches in height, solid or with letters cut out there from. Said letters or signs shall be placed on the face of a crossarm, suitable for attaching the letters or signs, directly beneath the common neutral support, or said letters or signs shall be placed on the surface of the pole beneath the common neutral support.

ITEM 16
Rule 74.4-E
Rule 77.4-B

RATIONALE FOR PROPOSED RULE CHANGE
RULE 74.4-E
REQUIREMENTS FOR TROLLEY LINES
CONDUCTOR -CLEARANCES -UNDER BRIDGES, ETC .

This proposed rule change adds language to include overhead clearance reduction for light rail systems operating within exclusive and semi-exclusive rights-of-way as defined by General Order 143-A, Safety Rules and Regulations Governing Light-Rail Transit.

EXISTING RULE

RULE 74.4-E

74.4-E UNDER BRIDGES, ETC.

A reduction of the clearances given in Table 1 to a minimum of 14 feet for trolley contact conductors is permitted for subways, tunnels or bridges, provided the railway does not operate freight cars where the vertical distance from the top of car or load to trolley contact conductor is less than 6 feet, except that for light rail transit systems, the minimum height shall be that set forth in General Order No. 143, "Rules for the Design, Construction and Operation of Light Rail Transit Systems Including Streetcar Operations." This will require the grading of the trolley contact conductor from the prescribed construction down to the reduced elevation. (See App. G, Fig. 64)

No clearance is specified between the trolley contact conductor and the structure. Where the structure is of material which will ground the trolley current in event the collector leaves the contact conductor, a properly insulated trolley trough or equivalent protection shall be installed to prevent contact between the collector and the structure. Where pantograph collectors are used, this protection is not required. See Rule 54.4-I for provisions applicable to conductors other than trolley contact conductors.

Note: Modified June 27, 1978 by Decision No. 89022

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)

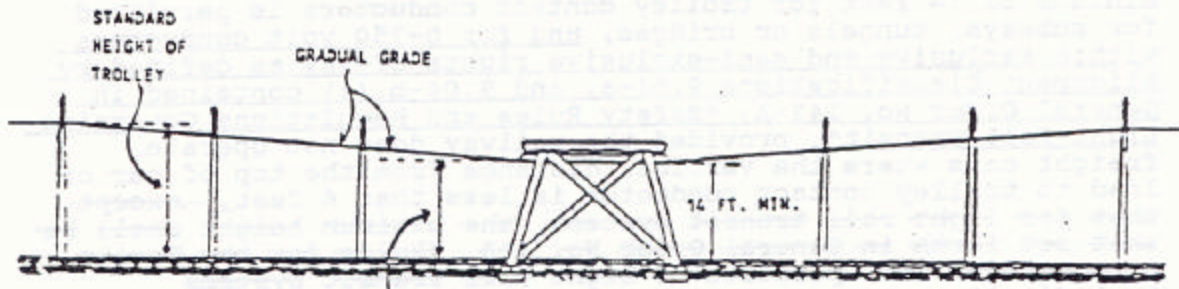
RULE 74.4-E

74.4-E UNDER BRIDGES, ETC.

A reduction of the clearances given in Table 1 to a minimum of 14 feet for trolley contact conductors is permitted for subways, tunnels or bridges, and for 0-750 volt conductors within exclusive and semi-exclusive rights-of-way as defined by Alignment Classifications 9.04-a and 9.04-b(1) contained in General Order No. 143-A. "Safety Rules and Regulations Governing Light Rail Transit", provided the railway does not operate freight cars where the vertical distance from the top of car or load to trolley contact conductor is less than 6 feet, ~~except that for light rail transit systems, the minimum height shall be that set forth in General Order No. 143, "Rules for the Design, Construction and Operation of Light Rail Transit Systems Including Streetcar Operations."~~ This will require the grading of the trolley contact conductor from the prescribed construction down to the reduced elevation. (See ~~App. G, Fig. 64~~ Fig. 74-1)

No clearance is specified between the trolley contact conductor and the structure. Where the structure is of material which will ground the trolley current in event the collector leaves the contact conductor, a properly insulated trolley trough or equivalent protection shall be installed to prevent contact between the collector and the structure. Where pantograph collectors are used, this protection is not required. See Rule 54.4-I for provisions applicable to conductors other than trolley contact conductors.

Note: Modified June 27, 1978 by Decision No. 89022



HEIGHT ALLOWED AT
SUBWAYS TUNNELS
OR BRIDGES, ETC.
14 FT. MIN.

NOTE:
14 FT. MINIMUM IS ALLOWED FOR
0-750 VOLT CONDUCTORS WITHIN
EXCLUSIVE LIGHT-RAIL TRANSIT
RIGHTS-OF-WAY WHICH ARE PROTECTED
BY FENCES OR SUBSTANTIAL BARRIERS
(SEE RULE 74.4-E)

RULE 74.4-E

FIG. 74-1

PROPOSED RULE CHANGE
(FINAL)*

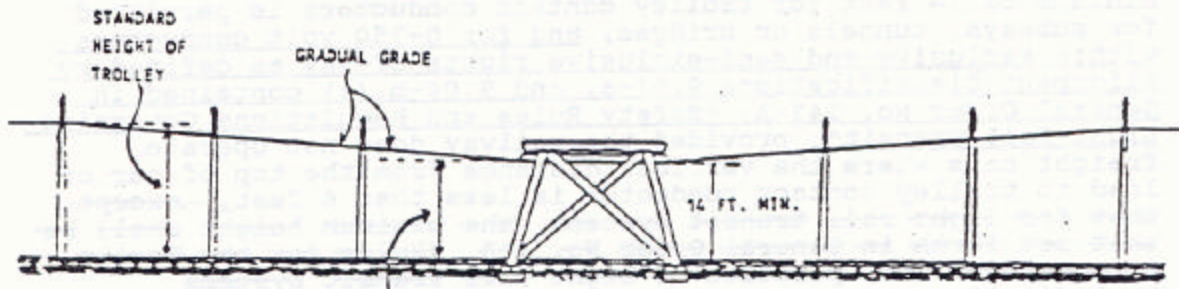
RULE 74.4-E

74.4-E UNDER BRIDGES, ETC.

A reduction of the clearances given in Table 1 to a minimum of 14 feet for trolley contact conductors is permitted for subways, tunnels or bridges, and for 0-750 volt conductors within exclusive and semi-exclusive rights-of-way as defined by Alignment Classifications 9.04-a and 9.04-b(1) contained in General Order No. 143-A. "Safety Rules and Regulations Governing Light Rail Transit", provided the railway does not operate freight cars where the vertical distance from the top of car or load to trolley contact conductor is less than 6 feet.-This will require the grading of the trolley contact conductor from the prescribed construction down to the reduced elevation. (See Fig. 74-1)

No clearance is specified between the trolley contact conductor and the structure. Where the structure is of material which will ground the trolley current in event the collector leaves the contact conductor, a properly insulated trolley trough or equivalent protection shall be installed to prevent contact between the collector and the structure. Where pantograph collectors are used, this protection is not required. See Rule 54.4-I for provisions applicable to conductors other than trolley contact conductors.

Note: Modified June 27, 1978 by Decision No. 89022



HEIGHT ALLOWED AT
SUBWAYS TUNNELS
OR BRIDGES, ETC.
14 FT. MIN.

NOTE:
14 FT. MINIMUM IS ALLOWED FOR
0-750 VOLT CONDUCTORS WITHIN
EXCLUSIVE LIGHT-RAIL TRANSIT
RIGHTS-OF-WAY WHICH ARE PROTECTED
BY FENCES OR SUBSTANTIAL BARRIERS
(SEE RULE 74.4-E)

RULE 74.4-E

FIG. 74-1

RELATED RULE CHANGE

TABLE 1 - CASE 2 – COLUMN C –REFERENCE i

EXISTING RULE

- (i) May be reduced for trolley contact and span wires in subways, tunnels and under bridges.
 - 1. Trolley contact conductors 74.4-E
 - 2. Trolley span wires 77.4-A

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)

- (i) May be reduced for trolley contact and span wires in subways, tunnels and under bridges and in fenced areas.
 - 1. Trolley contact conductors 74.4-E
 - 2. Trolley span wires 77.4-A

PROPOSED RULE CHANGE
(FINAL)

- (i) May be reduced for trolley contact and span wires in subways, tunnels and under bridges and in fenced areas.
 - 1. Trolley contact conductors 74.4-E
 - 2. Trolley span wires 77.4-A

RATIONALE FOR PROPOSED RULE CHANGE
RULE 77.4-B
REQUIREMENTS FOR TROLLEY LINES
SPAN WIRES, BACKBONES, MESSENGERS, ETC. – CLEARANCES
UNDER BRIDGES, ETC.

This proposed rule change adds language to include overhead clearance reduction for light rail systems operating within exclusive and semi-exclusive rights-of-way as defined by General Order 143-A, Safety Rules and Regulations Governing Light-Rail Transit.

EXISTING RULE

B Under Bridges, ETC

A reduction of the clearance given in Table 1 to a clearance of not less than 14 feet above rails is permitted for trolley span wires under bridges, in tunnels, or in subways, provided the railway does not transport freight cars where the vertical distance from the top of car or load to trolley contact conductor is less than 6 feet. The grading of the level of trolley span wires from the basic clearance to this reduced clearance is permitted at approaches to bridges, tunnels, or subways.

PROPOSED RULE CHANGE (STRIKE OUT AND UNDERLINE)

B Under Bridges, ETC

A reduction of the clearance given in Table 1 to a clearance of not less than 14 feet above rails is permitted for trolley span wires under bridges, in tunnels, or in subways, and for 0 - 750 volt conductors within exclusive and semi-exclusive rights-of-way as defined by Alignment Classification 9.04-a. and 9.04-b.(1), contained in General Order No. 143-A, "Safety Rules and Regulations Governing Light-Rail Transit", provided the railway does not transport freight cars where the vertical distance from the top of car or load to trolley contact conductor is less than 6 feet. The grading of the level of trolley span wires from the basic clearance to this reduced clearance is permitted at approaches to bridges, tunnels, or subways.

PROPOSED RULE CHANGE
(FINAL)*

B Under Bridges, ETC

A reduction of the clearance given in Table 1 to a clearance of not less than 14 feet above rails is permitted for trolley span wires under bridges, in tunnels, or in subways, and for 0 - 750 volt conductors within exclusive and semi-exclusive rights-of-way as defined by Alignment Classification 9.04-a. and 9.04-b.(1), contained in General Order No. 143-A , "Safety Rules and Regulations Governing Light-Rail Transit", provided the railways does not transport freight cars where the vertical distance from the top of car or load to trolley contact conductor is less than 6 feet. The grading of the level of trolley span wires from the basic clearance to this reduced clearance is permitted at approaches to bridges, tunnels, or subways.

ITEM 17

~~Rule 84.8-A~~

~~Rule 84.8-B1~~

~~Rule 847.8-B2~~

~~Rule 84.8-C~~

~~Rule 84.8-C1~~

~~Rule 84.8-C2~~

~~Rule 84.8-C3~~

~~Rule 84.8-D1~~

RATIONALE FOR PORPOSED RULE CHANGE
RULE 84.8-A
SERVICE DROPS

Modern technology continues to make obsolete materials used in today's telecommunications industry. This rule change is proposed to allow flexibility within the industry to utilize the newer technologies while maintaining the standards as set forth in Section IV.

EXISTING RULE
RULE 84.8-A
SERVICE DROPS

RULE 84.8-A

A Material And Size

Communication service drops shall be of material and size I as specified in Table 8 and Rule 49.4-C7b with a covering at least equivalent to standard double-braid weatherproofing.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINED)
RULE 84.8-A
SERVICE DROPS

RULE 84.8-A

A Material And Size

~~Communication service drops shall be of material and size I as specified in (See Table 8 and Rule 49.4-C7b) with a covering at least equivalent to standard double-braid weatherproofing.~~

PROPOSED RULE CHANGE
(FINAL)*
RULE 84.8-A
SERVICE DROPS

RULE 84.8-A

A Material And Size (See Table 8 and Rule 49.4-C7b)

RATIONALE FOR PROPOSED RULE CHANGE
RULE 84.8-B1
SERVICE DROPS

This proposed rule change alters grammatical style to reflect modern usage.

EXISTING RULE
RULE 84.8-B1
SERVICE DROPS

RULE 84.8-B1

B Attached To Surface Of Pole

- (1) Service Drops From Open Wire Lines: Where open wire communication line conductors are supported on crossarms, service drop attachments (by means of hooks, knobs or brackets) on the surface of pole shall be not less than 6 feet below or 4 feet above the level of the nearest unprotected supply conductor supported on the same pole.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 84.8-B1
SERVICE DROPS

RULE 84.8-B1

B Attached To Surface Of Pole

- (1) Service Drops From Open Wire Lines:- Supported on Crossarms: ~~Where open wire communication line conductors are supported on crossarms, service drop~~ attachments (by means of hooks, knobs or brackets) on the surface of pole shall not be ~~not~~ less than 6 feet below or 4 feet above the level of the nearest unprotected supply conductor supported on the same pole.

PROPOSED RULE CHANGE
(FINAL)*
RULE 84.8-B1
SERVICE DROPS

RULE 84.8-B1

B Attached To Surface Of Pole

- (1) Service Drops From Open Wire Lines Supported on Crossarms:
Attachments (by means of hooks, knobs or brackets) on the surface of pole shall not be less than 6 feet below or 4 feet above the level of the nearest unprotected supply conductor supported on the same pole.

RATIONALE FOR PROPOSED RULE CHANGE
RULE 84.4-B2
SERVICE DROPS

This proposed rule change has been reformatted for the convenience of the reader to establish subparagraph structure, thus allowing for elimination of text redundancy, obsolete drop hardware and accompanying text instruction and figures. In addition, grammatical style has been altered to reflect contemporary usage.

EXISTING RULE
RULE 84.8-B2
SERVICE DROPS

RULE 84.8-B2

(2) Service Drops From Cabled Lines:

- a) Cable Supported on Crossarm: Service drops attached to crossarms supporting cables shall be not less than 15 inches from center line of pole as required by Table 1, Case 8, Column B.
- b) Cable Without Guard Arm, Supported on Surface of Pole: Where the cable is supported on the surface of pole with messenger and cable 6 feet or more below the level of the nearest unprotected supply conductor, service drops may be attached to opposite sides of poles but not more than two sides (there being four sides). Such service drop attachments shall be not less than 6 feet below the level of any supply conductor of more than 750 volts and shall be not less than 5 feet vertically below the level of any unprotected supply conductor of 0-750 volts. Where drive hooks are used, they shall occupy pole surface areas not more than 8 inches in vertical extent and 1 inch in width, and not more than four hooks shall be placed in each of these areas. See Appendix G, Figure 39
- c) Cable With Guard Arm, Supported on Surface of Pole: Where the cable is supported on the surface of pole at a minimum of 4 feet below the nearest unprotected supply conductor supported on the same pole, and is below a guard arm, service drop attachments may be attached to the face, back and bottom of the guard arm, provided such attachments are not less than 15 inches from center line of pole, the drop wires are below the top surface of the guard arm and the lateral run of the drop wires is installed in accordance with the provisions of Rule 84.6-C.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 84.8-B2
SERVICE DROPS

RULE 84.8-B2

(2) Service Drops From Cabled Lines:

- a) Cable Supported on Crossarm: Service drops attached to crossarms supporting cables shall be not less than 15 inches from center line of pole as required by Table 1, Case 8, Column B.
- b) Cable Without Guard Arm, Supported on Surface of Pole: ~~Where the cable is supported on the surface of pole with messenger and cable 6 feet or more below the level of the nearest unprotected supply conductor, service drops may be attached to opposite sides of poles but not more than two sides (there being four sides).~~
 - 1) ~~Such service drop~~ attachments shall be not be less than 6 feet below the level of any supply conductor of more than 750 volts and shall be not less than r 5 feet vertically below the level of any unprotected supply conductor of 0-750 volts.
 - 2) ~~Where drive hooks are used, they shall occupy pole surface areas not more than 8 inches in height vertical extent and 1 inch in width, and not more than four hooks shall be placed in each of these areas. See Appendix G, Figure 39 84-1 (Rule 84.8-B2b)~~
 - 3) Service drops shall not be attached to more than three sides (there being four sides) while maintaining climbing space.
- c) Cable With Guard Arm, Supported on Surface of Pole: ~~Where the cable is supported on the surface of pole at a minimum of 4 feet below the nearest unprotected supply conductor supported on the same pole, and is below a guard arm, service drop attachments may be attached~~ placed on to the face, back and bottom of the guard arm, ~~provided such attachments are not less than 15 inches from center line of pole, provided the drop wires are below the top surface of the guard arm and the lateral run of the drop wires is installed in accordance with the provisions of Rule 84.6-C.~~

PROPOSED RULE CHANGE
(FINAL)*
RULE 84.8-B2
SERVICE DROPS

RULE 84.8-B2

(2) Service Drops From Cabled Lines:

- a) Cable Supported on Crossarm: Service drops attached to crossarms supporting cables shall be not less than 15 inches from center line of pole as required by Table 1, Case 8, Column B.
- b) Cable Without Guard Arm, Supported on Surface of Pole:
 - 1) Attachments shall not be less than 6 feet below the level of any supply conductor of more than 750 volts and shall be not less than 5 feet vertically below the level of any unprotected supply conductor of 0-750 volts.
 - 2) Drive hooks shall occupy pole surface areas not more than 8 inches in height and 1 inch in width, and not more than four hooks shall be placed in each of these areas. See Figure 84-1 (Rule 84.8-B2b)
 - 3) Service drops shall not be attached to more than three sides (there being four sides) while maintaining climbing space.
- c) Cable With Guard Arm, Supported on Surface of Pole: Attachments may be placed on to the face, back and bottom of the guard arm not less than 15 inches from center line of pole, provided the drop wires are below the top surface of the guard arm and the lateral run of the drop wires is installed with the provisions of Rule 84.6-C.

RATIONALE FOR PROPOSED RULE CHANGE
RULE 84.8-C
SERVICE DROPS

This proposed rule change alters grammatical style to reflect modern usage.

EXISTING RULE
RULE 84.8-C
SERVICE DROPS

C Clearances Above Ground And Buildings

The vertical clearances of communication service drops shall be not less than the minimum clearances specified in Rule 37, Table 1, Column B, with the following modifications.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 84.8-C
SERVICE DROPS

C Clearances Above Ground And Buildings

The vertical clearances ~~of communication service drops~~ shall ~~be~~ be not be less than the minimum clearances specified in Rule 37, Table 1, Column B, with the following modifications:

PROPOSED RULE CHANGE
(FINAL)*
RULE 84.8-C
SERVICE DROPS

C Clearances Above Ground And Buildings

The vertical clearances shall not be less than the minimum clearances specified in Rule 37, Table 1, Column B, with the following modifications:

RATIONALE FOR PROPOSED RULE CHANGE
RULE 84.8-CA
SERVICE DROPS

This rule change is proposed for clarity and simplification of the rule's language. Additionally the rule structure, as currently written, is slightly reformatted to help focus the readers attention on the rule's exception.

EXISTING RULE
RULE 84.8-C1
SERVICE DROPS

RULE 84.8-C1

- (1) Above Public Thoroughfares: Service drop conductors shall have a vertical clearance of not less than 18 feet above public thoroughfares, except that this clearance may grade from 18 feet at a position not more than 12 feet horizontally from the curb line to a clearance of not less than 16 feet at the curb line, provided the clearance at the center line of any public thoroughfare shall in no case be less than 18 feet. Where there are no curbs the foregoing provisions shall apply using the outer limits of possible vehicular movement in lieu of a curb line.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 84.8-C1
SERVICE DROPS

RULE 84.8-C1

- (1) Above Public Thoroughfares: ~~Service drop conductors shall have a vertical clearance of not less than 18 feet, above public thoroughfares, except that~~

EXCEPTION:

~~this clearance may grade from 18 feet at a position not more than 12 feet horizontally from the curb line, to a clearance of not less than 16 feet at the curb line, provided the clearance at the center line of any public thoroughfare shall in no case be less than the 18 feet.~~ foot clearance may be gradually reduced to not less than 16 feet at the curb line. In no case shall the clearance at the center line be less than 18 feet. Where there are no curbs the foregoing provisions shall apply using the outer limits of possible normal longitudinal vehicular movement in lieu of a curb line.

PROPOSED RULE CHANGE
(FINAL)*
RULE 84.8-C1
SERVICE DROPS

RULE 84.8-C1

- (1) Above Public Thoroughfares: 18 feet_

EXCEPTION:

Not more than 12 feet horizontally from the curb line. The 18 foot clearance may be gradually reduced to not less than 16 feet at the curb line. In no case shall the clearance at the center line be less than 18 feet. Where there are no curbs the foregoing provisions shall apply using the outer limits of normal longitudinal vehicular movement in lieu of a curb line.

RATIONALE FOR PROPOSED RULE CHANGE
RULE 84.8-C2
SERVICE DROPS

This rule change is proposed for clarity and simplification of the rule's language and reduce the repetitious use of certain words. Additionally the rule structure, as currently written, is slightly reformatted to help focus the readers attention on the rule's exception.

EXISTING RULE
RULE 84.8-C2
SERVICE DROPS

RULE 84.8-C2

- (2) Above Private Thoroughfares Or Private Property:
- a) Industrial and Commercial Premises: Over private driveways or lanes, or over private property accessible to vehicles, service drops shall have a vertical clearance of not less than 16 feet.
 - b) Residential Premises: Over residential driveways or lanes, or over residential property accessible to vehicles, service drops shall have a vertical clearance of not less than 12 feet. If the building served does not permit an attachment which will provide this 12-foot clearance without the installation of a structure on the building the clearance shall be as great as possible but in no case less than 10 feet.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINED)
RULE 84.8-C2
SERVICE DROPS

RULE 84.8-C2

- (2) Above Private Thoroughfares Or Private Property:
- a) Industrial and Commercial Premises: Over private driveways ~~or lanes~~, or over private property accessible to vehicles, service drops shall ~~have a vertical clearance of not less than~~ be less than 16 feet.
 - b) Residential Premises: Over residential driveways ~~or lanes~~, or ~~over residential~~ property accessible to vehicles, service drops shall ~~have a vertical clearance of not less than~~ be less than 12 feet.

EXCEPTION: If the building served does not permit an attachment which will provide this 12-foot clearance without the installation of a structure on the building, the clearance shall be as great as possible, but in no case less than 10 feet.

Note: In exceptional circumstances see Rule 14.

PROPOSED RULE CHANGE
(FINAL)*
RULE 84.8-C2
SERVICE DROPS

RULE 84.8-C2

(2) Above Private Thoroughfares Or Private Property:

- a) Industrial and Commercial Premises: Over private driveways, lanes or over private property accessible to vehicles, service drops shall not be less than 16 feet.
- b) Residential Premises: Over residential driveways, lanes or property accessible to vehicles, service drops shall be less than 12 feet.

EXCEPTION: If the building served does not permit an attachment which will provide this 12-foot clearance without the installation of a structure on the building, the clearance shall be as great as possible, but in no case less than 10 feet.

Note: In exceptional circumstances see Rule 14.

RATIONALE FOR PROPOSED RULE CHANGE
RULE 84.8-C3
SERVICE DROPS

This rule change is proposed for clarity and simplification of the rule's language. Additionally the rule structure, as currently written, is slightly reformatted to help focus the readers attention on the rule's exception and realign the words "Table, Case and Column" thereby maintaining continuity of format throughout the General Order.

EXISTING RULE
RULE 84.8-C3
SERVICE DROPS

RULE 84.8-C3

- (3) Above Ground In Areas Accessible To Pedestrians Only:
- a) Industrial and Commercial Premises: Over areas accessible to pedestrians only, service drops shall have a vertical clearance of not less than 12 feet.
 - b) Residential Premises: Over areas accessible to pedestrians only, service drops shall be maintained at a vertical clearance of not less than 10 feet. If the building served does not permit an attachment which will provide this 10-foot clearance without the installation of a structure on the building, the clearance shall be as great as possible but in no case less than 8 feet 6 inches.
 - c) Above Ground on Fenced Railway Rights-of-Way: Service drops to railway signal devices shall be maintained at clearances as specified in Rule 84.4-A4. Service drops which are entirely on affected railway rights-of-way in areas accessible to pedestrians only may have clearances above ground less than as specified in Table 1, Column B, Case 5 (10 feet), but not less than 7 feet.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 84.8-C3
SERVICE DROPS

RULE 84.8-C3

(3) Above Ground In Areas Accessible To Pedestrians Only:

- a) Industrial and Commercial Premises: Over areas accessible to pedestrians only, ~~service drops the vertical clearance shall have a vertical clearance of not be~~ less than 12 feet.
- b) Residential Premises: Over areas accessible to pedestrians only, ~~service drops the shall not be maintained at a vertical clearance of not less than 10 feet.~~

EXCEPTION: If the building served does not permit an attachment which will provide this 10-foot clearance without the installation of a structure on the building, the clearance shall be as great as possible but in no case less than 8 feet 6 inches.

- c) Above Ground on Fenced Railway Rights-of-Way: (See Rule 84.4-A4) ~~Service drops to railway signal devices shall be maintained at clearances as specified in Rule 84.4-A4. Service drops which are entirely on affected railway rights-of-way in areas accessible to pedestrians only may have clearances above ground less than as specified in Table 1, Column B, Case 5 (10 feet), but not less than 7 feet.~~

PROPOSED RULE CHANGE
(FINAL)*
RULE 84.8-C3
SERVICE DROPS

RULE 84.8-C3

(3) Above Ground In Areas Accessible To Pedestrians Only:

- a) Industrial and Commercial Premises: Over areas accessible to pedestrians only, the vertical clearance shall not be less than 12 feet.
- b) Residential Premises: Over areas accessible to pedestrians only, the shall not be less than 10 feet.

EXCEPTION: If the building served does not permit an attachment which will provide this 10-foot clearance without the installation of a structure on the building, the clearance shall be as great as possible but in no case less than 8 feet 6 inches.

- c) Above Ground on Fenced Railway Rights-of-Way: (See Rule 84.4-A4)

EXISTING RULE
RULE 84.8-D1
SERVICE DROPS

- (1) Above Or Below Supply Line 'Conductors: (See Rule 32.2-F.)
 - a) Crossings in Spans: Service drops which cross below supply line conductors of 0-750 volts, or above supply line cables where treated as in Rule 57.8, may have a vertical clearance less than as specified in Table 2, Case 4; Column C (48 inches), from such supply conductors, but not less than 24 inch; provided the crossing is 6 feet or more from any pole which supports any conductor involved in the crossing but which does not support both conductors involved in the crossing.
 - b) Supported on the Same Pole: Service drops which are supported on a pole which also supports supply conductors and which are not on a pole-top clearance attachment may have a vertical clearance less than as specified in Table 2, Case 9, Column C (48 inch), above or below supply line conductors provided not less than the clearance shown in Table 15 are maintained.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 84.8-D1
SERVICE DROPS

(1) Above Or Below Supply Line 'Conductors: (See Rule 32.2-F.)

- a) ~~Crossings in Spans: (Table 2, Case 4, Column C [48 inches]): Service drops which cross below supply line conductors of 0-750 volts, or above supply line cables where treated as in Rule 57.8, may have a vertical clearance less than as specified in Table 2, Case 4; Column C (48 inches), from such supply conductors, but not less than 24 inch; provided the crossing is 6 feet or more from any pole which supports any conductor involved in the crossing but which does not support both conductors involved in the crossing.~~

Vertical Clearances may be reduced to not less than 24 inches provided:

- 1 Crossings are below line conductors of 0-750 volts, or above line cables as in Rule 57.8, and
- 2 Crossing is 6 feet or more from any pole supporting one, but not both, involved conductors.

- b) ~~Supported on the Same Pole: (Table 2, Case 9, Column C [48 inches]): Service drops which are supported on a pole which also supports supply conductors and which are not on a pole top clearance attachment may have a vertical clearance less than as specified in Table 2, Case 9, Column C (48 inch), above or below supply line conductors provided not less than the clearance shown in Table 15 are maintained. Vertical clearance may be reduced to not less than the values shown in Table 15 , provided pole-top clearance attachments are not involved.~~

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 84.8-D1
SERVICE DROPS

- (1) Above Or Below Supply Line Conductors: (See Rule 32.2-F.)
 - a) Crossings in Spans: (Table 2, Case 4, Column C [48 inches]): Vertical Clearances may be reduced to not less than 24 inches provided:
 - 1 Crossings are below line conductors of 0-750 volts, or above line cables as in Rule 57.8, and
 - 2 Crossing is 6 feet or more from any pole supporting one, but not both, involved conductors.
 - b) Supported on the Same Pole: (Table 2, Case 9, Column C [48 inches]): Vertical clearance may be reduced to not less than the values shown in Table 15, provided pole-top clearance attachments are not involved.

ITEM 18

~~Rule~~ Rule 92.1-F4

RATIONALE FOR PROPOSED RULE CHANGE
RULE 92.1-F4
VERTICAL CLEARANCES
BETWEEN CONDUCTORS, CABLES, MESSENGERS AND EQUIPMENT
TRANSFORMERS OR REGULATORS

Provide a new Figure to clarify the language of Rule 92.1-F4

EXISTING G.O. 95 RULE
RULE 92.1-F4
TRANSFORMER OR REGULATORS

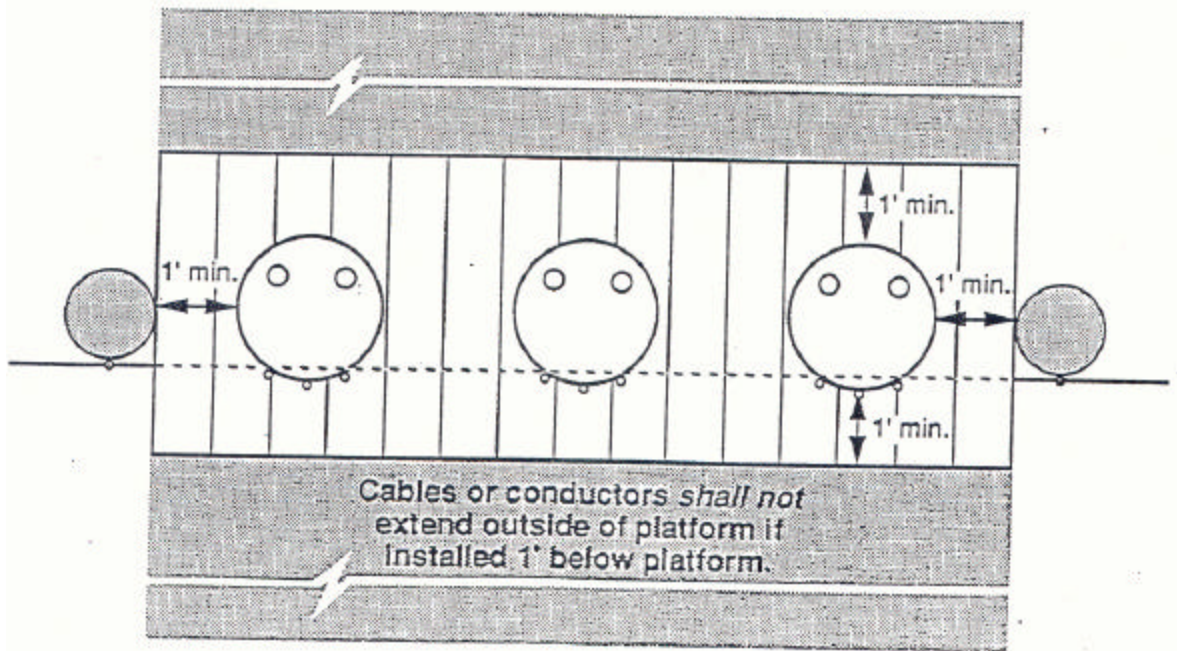
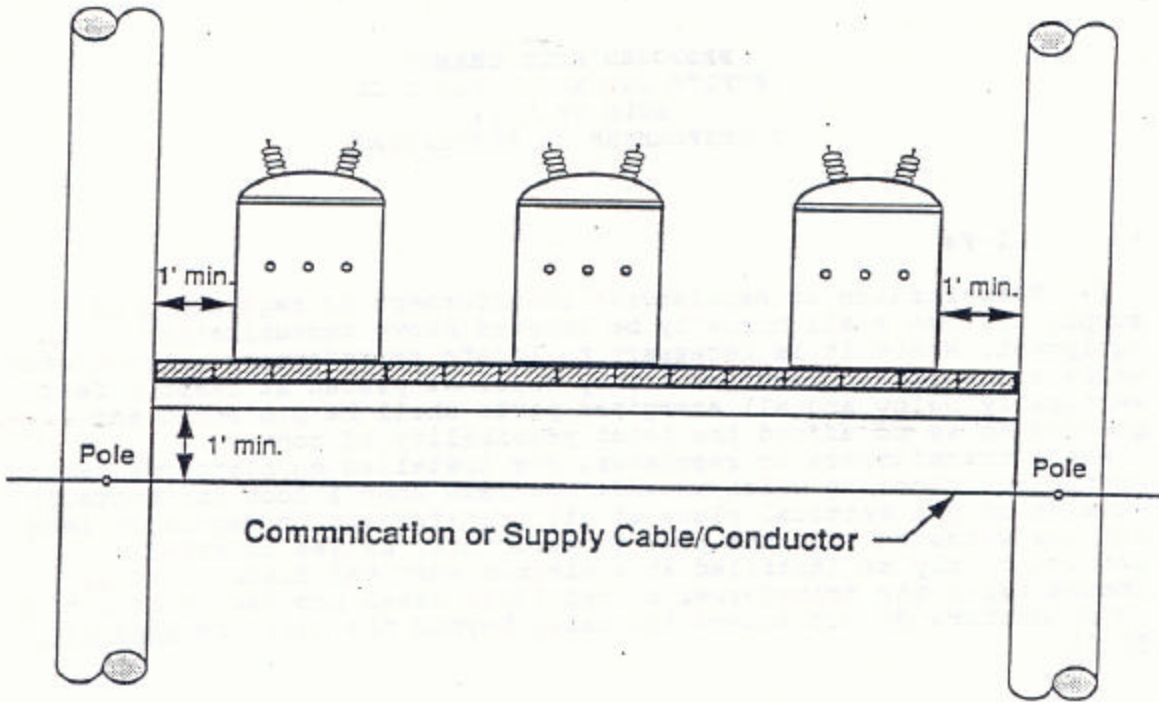
- (4) **Transformers or Regulators:** Transformers or regulators of supply systems shall normally be located above communication equipment. Where it is necessary to locate transformers or regulators below communication equipment they shall be placed at least 6 feet vertically below and all energized parts shall be protected and guarded so as to afford the least possibility of contact.

Where transformers or regulators are installed on platform having continuous flooring which extends not less than 1 foot horizontally outside of the vertical plane of all transformers or regulator lead and bus wires on the same pole or structure, cables or other conductors may be installed at a minimum vertical distance of 12 inches below the transformer or regulator cases provided such cables or conductors do not extend laterally beyond the platform.

PROPOSED RULE
(STRIKE OUT AND UNDERLINE)
RULE 92.1-F4
TRANSFORMER OR REGULATORS

- (4) **Transformers or Regulators:** Transformers or regulators of supply systems shall normally be located above communication equipment. Where it is necessary to locate transformers or regulators below communication equipment they shall be placed at least 6 feet vertically below and all energized parts shall be protected and guarded so as to afford the least possibility of contact.

Where transformers or regulators are installed on platform having continuous flooring which extends not less than 1 foot horizontally outside of the vertical plane of all transformers or regulator lead and bus wires on the same pole or structure, cables or other conductors may be installed at a minimum vertical distance of 12 inches below the transformer or regulator cases provided such cables or conductors do not extend laterally beyond the platform (see Fig. 92-1).



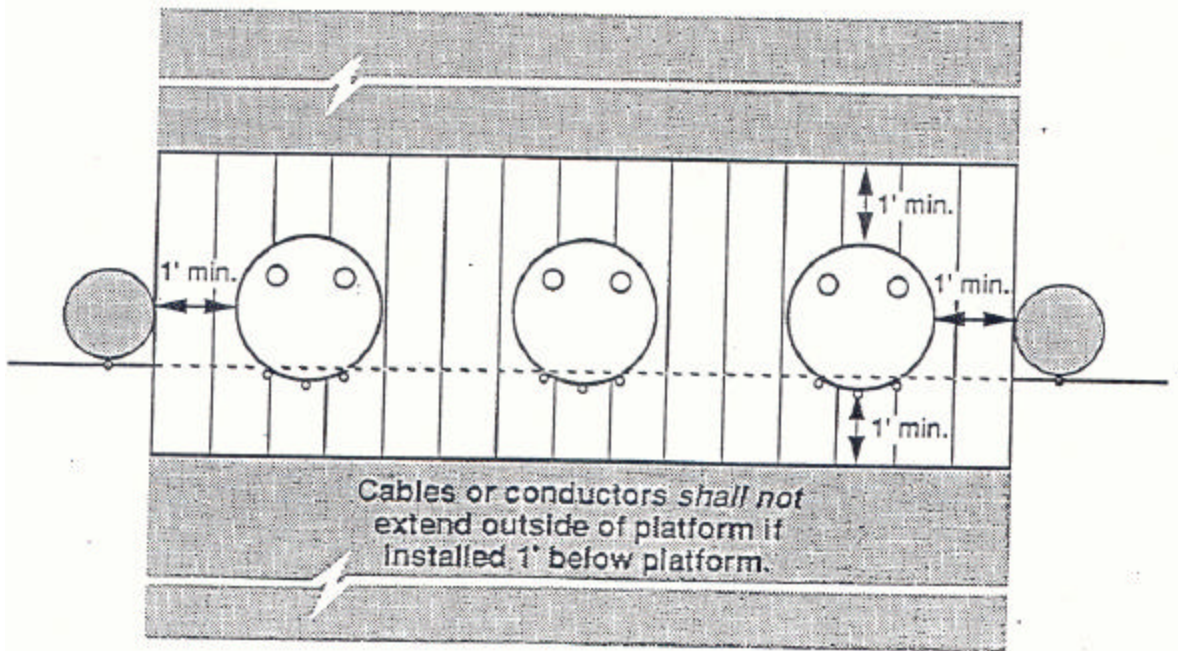
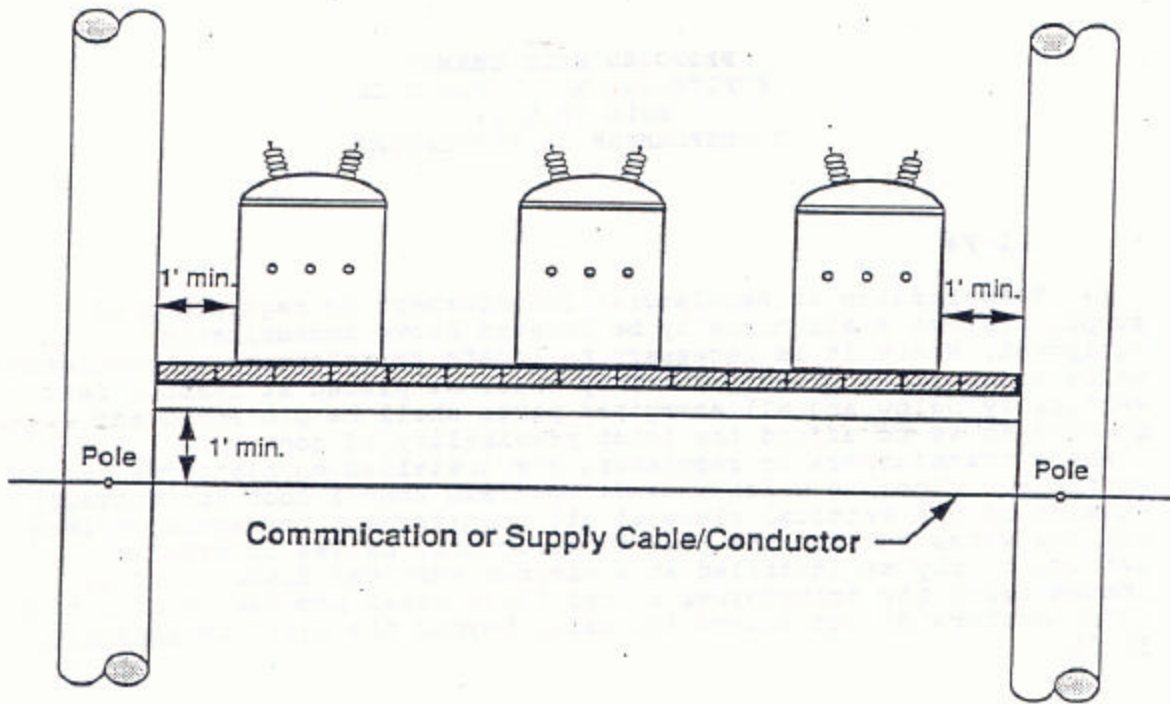
Transformers or Regulators (Rule 92.1-F4)

Figure 92-1

PROPOSED RULE
(FINAL)*
RULE 92.1-F4
TRANSFORMER OR REGULATORS

- (4) **Transformers or Regulators:** Transformers or regulators of supply systems shall normally be located above communication equipment. Where it is necessary to locate transformers or regulators below communication equipment they shall be placed at least 6 feet vertically below and all energized parts shall be protected and guarded so as to afford the least possibility of contact.

Where transformers or regulators are installed on platform having continuous flooring which extends not less than 1 foot horizontally outside of the vertical plane of all transformers or regulator lead and bus wires on the same pole or structure, cables or other conductors may be installed at a minimum vertical distance of 12 inches below the transformer or regulator cases provided such cables or conductors do not extend laterally beyond the platform (see Fig. 92-1).



Transformers or Regulators (Rule 92.1-F4)

Figure 92-1