

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA

SAFETY AND ENFORCEMENT DIVISION
UTILITIES SAFETY BRANCHRESOLUTION SU-40
Date: October 9, 1996R E S O L U T I O NRESOLUTION SU-40, ORDER AUTHORIZING RULE CHANGES TO
GENERAL ORDERS (G.O.s) 95 AND 128, RULES FOR
OVERHEAD AND UNDERGROUND ELECTRIC AND COMMUNICATIONS
LINE CONSTRUCTIONSUMMARY

1. The staff of the Safety and Enforcement Division's Utilities Safety Branch (USB) requests authorization for changes to G.O.s 95 and 128 contained in the enclosed Appendices A and B respectively.
2. The request follows submittal of proposed changes by the G.O.s 95/128 Rules Committee (Committee). The Committee is composed of representatives from operators of electric and communications lines in California including investor-owned utilities, municipalities, the California Cable Television Association, and the associated labor unions. After review by the USB staff, requests for comments were sent to subscribers of G.O.s 95 and 128. All comments have been addressed.
3. The changes update the G.O.s in order to keep pace with changing technology and practices in the electric and communications industry. Worker and public safety are always paramount considerations.

BACKGROUND

1. The changes are the result of the informal proposals by the Committee. The Committee represents most operators of overhead and underground lines and associated labor unions in California. The rules changes advance state-of-the-art materials and practices, and eliminate practices and rules that are no longer applicable. The Committee reviews the rules and suggests changes through unanimous agreement after careful scrutiny.
2. The USB received a copy of the proposed rule changes and reviewed them to insure that safety and good practices were adhered to. Any rule that did not pass USB review was rejected from the package. Next, the USB sent out the package for comments from interested parties. After the comments were received, the USB, the Committee's Executive Board and an interested party met to discuss and settle the various different opinions. The rule changes contained herein are those that were agreed upon among all parties.

DISCUSSION

1. The proposed changes are presented in the enclosed Appendix A for G.O. 95 and Appendix B for G.O. 128. A list of the rules is contained in the Table of Contents of Appendix A and Appendix B.

The following sections of the G.O.s are effected by the proposal:

G.O. No. 95 rules: 20.0, 20.1, 33.3, 34.0, 37 Table 1, 38 Table 2, 48.1, 49.1, 53.4, 54.4, 54.6, 54.7, 54.9, 54.10, 54.11, 54.12, 56.4, 56.9, 74.4, 84.4, 84.6, 84.8, 86.4, 86.8, 86.9, 87.1, 87.4, 87.7, 87.9, 92.1, 92.4.

G.O. NO. 128 rules: 12.1, 12.3, 20.1, 20.2, 20.5, 20.6, 20.7, 20.8, 20.9, 21.0, 21.2, 21.4, 21.5, 21.6, 21.8, 21.9, 22.1, 22.2, 22.5, 22.7, 23.6, 23.7, 32.9, 34.2, 44.1, 46.1.

FINDINGS

1. The proposed changes to G.O.s 95 and 128 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, and the changes in text shown in Appendix B shall be made in G.O. 128.

2. All rules changed shall be marked "Revised October 9, 1996 by Resolution SU-40".

3. This Resolution is effective today.

I hereby certify that this Resolution was adopted by the Public Utilities Commission at its regular meeting on October 9, 1996. The following Commissioners approved it:



Wesley A. Franklin
Executive Director

- GREGORY P. CONLON
President
DANIEL Wm. FESSLER
JESSIE J. KNIGHT, Jr.
HENRY M. DUQUE
JOSIAH L. NEEPER

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 change, 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 rule change.

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Rationale For Proposed GO 95 Rule Change
Rule 20.1 Backbone

This rule is being re-numbered to facilitate the new Rule 20.1 Bond and eliminate the need to re-number the entire section.

Existing Rule
GO 95 Rule 20.1
Backbone

20.1 Backbone means an auxiliary span support for pull-offs and cross-spans to trolley contact conductors to which it is approximately parallel.

Strikeout and Underline
GO 95 Rule 20.020.1
Backbone

20.020.1 Backbone means an auxiliary span support for pull-offs and cross-spans to trolley contact conductors to which it is approximately parallel.

Proposed Final Rule
GO 95 Rule 20.0
Backbone

20.0 Backbone means an auxiliary span support for pull-offs and cross-spans to trolley contact conductors to which it is approximately parallel.

Rationale For Proposed GO 95 Rule Change
New Rule 20.1 Bond

There is not a present definition for Bond in the General Order. Bond is referred to and used throughout the Order. This definition is consistent with Rule 20.1 of G.O. 128.

Strikeout and Underline
GO 95 Rule 20.1
Bond

20.1 BOND means an electrical connection from one metallic conductive element to another for the purpose of maintaining a common electric potential.

Proposed GO 95 Rule Change
New Rule 20.1
Bond

20.1 BOND means an electrical connection from one conductive element to another for the purpose of maintaining a common electric potential.

Associated change: Existing Rule 20.1 will be renumbered to Rule 20.0.

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Rationale for Proposed Change
Rule 33.3B
Independent Ground Connections

In 1987 an interpretation of Rule 33.3 was requested by Southern California Edison Company, dealing with the grounding of electronic recloser equipment. At that time problems existed with inappropriate grounding of electronic automatic reclosers, due to lightning impulses and transients on the primary system. An interpretation was made by Dave Brown, CPUC staff that the lightning arrester ground could solidly tie to the equipment case ground, and the secondary neutral of the potential transformer.

The rule as written appears not to allow the tying together of a secondary neutral ground from a potential (dedicated/isolated) transformer, primary lightning arrester ground, and equipment case ground.

The potential transformer is a dedicated transformer used solely for the purpose of supplying power to operate the electronic equipment, and therefore poses no safety hazard to customer facilities or equipment.

EXISTING

33.3 Ground Connections

A. EFFECTIVE GROUNDS

Supply equipment of the following types, when grounded to conform to requirements of this Order or for any other reasons, shall be effectively grounded:

- Neutral conductors of low voltage supply circuits (0-750 volts, see Rule 58.3-C1);
- Neutral conductors of supply circuits exceeding 750 volts;
- Bond wires;
- Lightning arresters;
- Transformer cases grounded in accordance with Rule 58.3-C3.

B. INDEPENDENT GROUND CONNECTIONS

Ground connections for equipment of any one of the types listed in Rule 33.3-A shall not be interconnected with ground connections for equipment of any other type listed therein, EXCEPT:

In common neutral systems the neutral conductors of 750 volt supply circuits and of supply circuits of 750-22,500 volts may be interconnected and grounded in accordance with the provisions of Rule 59; and

A ground connection for a set of lightning arresters may be interconnected with:

A ground connection for the neutral conductor of the circuit protected by the set of lightning arresters,

The cable sheath or body of the cable pothead where the cable conductors are connected to the circuit protected by the set of lightning arresters,

Metallic conduit enclosing conductors of the circuit protected by the set of lightning arresters,

Transformer cases grounded in accordance with Rule 58.3-C3 where the transformers are connected to the circuit protected by the set of lightning arresters, and

The ground connection of another set of lightning arresters, provided the circuits protected are of the same voltage classification.

Where more than two sets of lightning arresters on supply circuits of the same voltage classification are installed on a pole or structure, and their ground terminals are interconnected at the top of the ground connections, two complete and effective ground connections will be considered sufficient for the purpose of this rule. Connection to an effectively grounded cable sheath or conduit of a circuit protected by the lightning arresters will be considered as one of these two effective ground connections.

Note: Revised March 29, 1966 by Decision No. 70481 and August 9, 1966 by Decision No. 71094

PROPOSED

(Strike Out and Underline)

33.3 Ground Connections

A. EFFECTIVE GROUNDS

Supply equipment of the following types, when grounded to conform to requirements of this Order or for any other reasons, shall be effectively grounded:

Neutral conductors of low voltage supply circuits (0-750 volts, see Rule 58.3-C1);

Neutral conductors of supply circuits exceeding 750 volts;

Bond wires;

Lightning arresters;

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In common neutral systems the neutral conductors of 750 volt supply circuits and of supply circuits of 750-22,500 volts may be interconnected and grounded in accordance with the provisions of Rule 59; and

A ground connection for a set of lightning arresters may be interconnected with:

A ground connection for the neutral conductor of the circuit protected by the set of lightning arresters,

~~A ground connection for the neutral conductor of a dedicated transformer, and associated equipment cases, solely for the purpose of providing power to operate electric utility supply equipment,~~

The cable sheath or body of the cable pothead where the cable conductors are connected to the circuit protected by the set of lightning arresters,

Metallic conduit enclosing conductors of the circuit protected by the set of lightning arresters,

Transformer cases grounded in accordance with Rule 58.3-C3 where the transformers are connected to the circuit protected by the set of lightning arresters, and

The ground connection of another set of lightning arresters, provided the circuits protected are of the same voltage classification.

Where more than two sets of lightning arresters on supply circuits of the same voltage classification are installed on a pole or structure, and their ground terminals are interconnected at the top of the ground connections, two complete and effective ground connections will be considered sufficient for the purpose of this rule. Connection to an effectively grounded cable sheath or conduit of a circuit protected by the lightning arresters will be considered as one of these two effective ground connections.

Note: Revised March 29, 1966 by Decision No. 70489 and August 9, 1966 by Decision No. 71094

FINAL

33.3 Ground Connections

A. EFFECTIVE GROUNDS

Supply equipment of the following types, when grounded to conform to requirements of this Order or for any other reasons, shall be effectively grounded:

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A ground connection for a set of lightning arresters may be interconnected with:

A ground connection for the neutral conductor of the circuit protected by the set of lightning arresters,

A ground connection for the neutral conductor of a dedicated transformer and associated equipment cases solely for the purpose of providing power to operate ~~ELECTRIC~~ UTILITY SUPPLY EQUIPMENT,

The cable sheath or body of the cable pothead where the cable conductors are connected to the circuit protected by the set of lightning arresters,

Metallic conduit enclosing conductors of the circuit protected by the set of lightning arresters,

Transformer cases grounded in accordance with Rule 58.3-C3 where the transformers are connected to the circuit protected by the set of lightning arresters, and

The ground connection of another set of lightning arresters, provided the circuits protected are of the same voltage classification.

Where more than two sets of lightning arresters on supply circuits of the same voltage classification are installed on a pole or structure, and their ground terminals are interconnected at the top of the ground connections, two complete and effective ground connections will be considered sufficient for the purpose of this rule. Connection to an effectively grounded cable sheath or conduit of a circuit protected by the lightning arresters will be considered as one of these two effective ground connections.

Note: Revised March 29, 1966 by Decision No. 70489 and August 9, 1966 by Decision No. 71094

**34.0 Foreign Attachments
Proposed Rule Change
Rationale**

This proposed rule change will allow foreign use of 6" wide bands on poles, this rule to be consistent with other related rules in the Order.

**Rule 34.0 Foreign Attachments
Existing Rule**

34.0 FOREIGN ATTACHMENTS

Nothing in these rules shall be construed as permitting the unauthorized attachment, to supply, street light or communication poles or structures, of antennas, signs, posters, banners, decorations, wires, lighting fixtures, guys, ropes and any other such equipment foreign to the purposes of overhead electric line construction.

Nothing herein contained shall be construed as requiring utilities to grant permission for such use of their overhead facilities; or permitting any use of joint poles or facilities for such permanent or temporary construction without the consent of all parties having any ownership whatever in the poles or structures to which attachments may be made; or granting authority for the use of any poles, structures or facilities without the owner's or owners' consent.

All permanent attachments must be approved by the Commission (see Rule 15.1) and the owner(s) involved.

All temporary attachments shall be restricted to installations where the period is estimated to be one year or less.

The utilities, or other governmental entities may require construction standards which are more restrictive than the requirements of this Rule 34.

The following rules shall apply to approved temporary foreign attachments installed on climbable poles and structures and shall be maintained as required by Rule 12.2.

A. SUPPORTS

(1) **Messengers and Span Wires:** Messengers and Span Wires (when used under the definitions of Rules 21.11 and 22.9 respectively) may be used as supports when the following requirements are met.

(a) **Material and Size Requirements:** See Rule 49.7 Messengers and Span Wires.

(b) **Sectionalizing Requirements:** Insulators shall be installed in all messengers and span wires, when used within the scope of this rule, and shall be located at a distance of not less than 6 feet and not more than 9 feet, measured along the messenger or span wire, from the points of attachment to the poles or structures. Sectionalizing insulators shall meet the requirements of Rules 56.8 and 86.8.

(c) Attachments: Messengers and span wires shall be attached to poles with through bolts and shall be protected by the use of guy thimbles or their equivalent where attached to the through bolts. Steel pole bands or their equivalent shall be used for steel and concrete poles.

In no case shall any apparatus (decorations, banner, wire, cable, lights, etc.) be supported by the utilities' or licensees' conductors, cables, messengers, span wires or guys.

(2) Rope: Rope may be used as a support for banners and decorations for short periods of time (to be determined by the granting authority) when the following conditions are met:

(a) Only non-energized banners and decorations shall be supported with rope.

(b) The rope must be securely tied to the pole or structure with all excess rope removed and must not contact or obstruct any pole steps.

(c) The rope must supply a safe minimum working load strength of 200 pounds, which is equivalent to 3/8 inch manila rope.

(3) Apparatus Supported on Brackets Attached To Poles: All attachments supported on brackets with a supply voltage of 0-750 volts shall meet the requirements of Rules 58.2-B and 92.1-F5.

B. CLIMBING SPACE

All apparatus shall be installed outside of climbing space.

EXCEPTION: When temporary pole bands or ropes are used to support attachments, the bands or ropes shall be limited to 3 inches in width with no more than one band or width of rope allowed in any 24 inch section of climbing space.

**Rule 34.0 Foreign Attachments
Strikeout and Underline**

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(c) Attachments: Messengers and span wires shall be attached to poles with through bolts and shall be protected by the use of guy thimbles or their equivalent where attached to the through bolts. Steel pole bands or their equivalent shall be used for steel and concrete poles.

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(2) **Rope:** Rope may be used as a support for banners and decorations for short periods of time (to be determined by the granting authority) when the following conditions are met:

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EXCEPTION: When temporary pole bands or ropes are used to support attachments, the bands or ropes shall be limited to 3 6 inches in width with no more than one band or width of rope allowed in any 24 inch section of climbing space.

**Rule 34.0 Foreign Attachments
Final**

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(c) Attachments: Messengers and span wires shall be attached to poles with through bolts and shall be protected by the use of guy thimbles or their equivalent where attached to the through bolts. Steel pole bands or their equivalent shall be used for steel and concrete poles.

In no case shall any apparatus (decorations, banner, wire, cable, lights, etc.) be supported by the utilities' or licensees' conductors, cables, messengers, span wires or guys.

(2) Rope: Rope may be used as a support for banners and decorations for short periods of time (to be determined by the granting authority) when the following conditions are met:

(a) Only non-energized banners and decorations shall be supported with rope.

(b) The rope must be securely tied to the pole or structure with all excess rope removed and must not contact or obstruct any pole steps.

(c) The rope must supply a safe minimum working load strength of 200 pounds, which is equivalent to 3/8 inch manila rope.

(3) Apparatus Supported on Brackets Attached To Poles: All attachments supported on brackets with a supply voltage of 0-750 volts shall meet the requirements of Rules 58.2-B and 92.1-F5.

B. CLIMBING SPACE

All apparatus shall be installed outside of climbing space.

EXCEPTION: When temporary pole bands or ropes are used to support attachments, the bands or ropes shall be limited to 6 inches in width with no more than one band or width of rope allowed in any 24 inch section of climbing space.

**RATIONALE FOR PROPOSED G.O.95 RULE CHANGE
(TABLE 1, CASES 2, 3, 4, AND 5, COLUMN C)**

This proposed rule change will reduce the vertical clearance of 19 feet for the trolley contact, feeder and span wires of Table 1, Case 2 through Case 5, Column C, to 18 feet. Consequently, it will reduce the corresponding height of the trolley poles and other utility poles by one (1) foot.

This proposed rule change results in cost savings in trolley and utility overhead construction.

San Francisco Municipal Railway, operator of trolley cars and coaches in City and County of San Francisco, installed its trolley contact and span wires to ground clearance of 18 feet over certain areas described in Table 1, Cases 2, 3, 4, and 5, Column C, of General Order 95 as granted by CPUC Resolution No. E-1288.

It appears that safety to the general public and workers will not be adversely affected.

EXISTING RULE

Table 1, Case 2, Column C	19 ft. (h) (1)
Table 1, Case 3, Column C	19 ft. (hh)
Table 1, Case 4, Column C	19 ft.
Table 1, Case 5, Column C	19 ft.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINED)

Table 1, Case 2, Column C	19 ft. (h) (1) <u>(aaa)</u>
Table 1, Case 3, Column C	19 ft. (hh) <u>(aaa)</u>
Table 1, Case 4, Column C	19 ft. <u>(aaa)</u>
Table 1, Case 5, Column C	19 ft. <u>(aaa)</u>

Add the following to References to Rules modifying minimum clearances in Table 1.

(aaa) May be reduced to 18 feet if the voltage does not exceed 1000 volts and the clearance is not reduced to more than 5% below the reduced value of 18 feet because of temperature and loading as specified in Rules 37 and 43.

PROPOSED RULE CHANGE
(FINAL)

Table 1, Case 2, Column C	19 ft. (h) (1) (aaa)
Table 1, Case 3, Column C	19 ft. (hh) (aaa)
Table 1, Case 4, Column C	19 ft. (aaa)
Table 1, Case 5, Column C	19 ft. (aaa)

(aaa) May be reduced to 18 feet if the voltage does not exceed 1000 volts and the clearance is not reduced to more than 5% below the reduced value of 18 feet because of temperature and loading as specified in Rules 37 and 43.

RATIONALE FOR PROPOSED G.O. 95 RULE CHANGE
TABLE 2, CASE 18
Radial Separation Between Guys and Conductors
and
ASSOCIATED RULE CHANGE
RULE 56.4-C2
On Colinear Lines

This proposed rule change is to simplify and clarify existing language.

EXISTING RULE
Table 2

Case
No.

Radial separation between guys and conductors

18. Guys passing conductors supported on other poles (excluding poles of same circuit), and guys approximately parallel to conductors supported on the same poles.

STRIKE OUT AND UNDERLINED
Table 2

Case
No.

Radial separation between guys and conductors

18. Guys passing conductors supported on other poles ~~(excluding poles of same circuit)~~, and or guys approximately parallel to conductors supported on the same poles.

FINAL
Table 2

Case
No.

Radial separation between guys and conductors

18. Guys passing conductors supported on other poles, or guys approximately parallel to conductors supported on the same poles.

ASSOCIATED RULE CHANGE
EXISTING RULE

Rule 56.4-C2

(2) On Colinear Lines: The radial clearances between guys on a line and conductors on a colinear 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.

STRIKE OUT AND UNDERLINED

Rule 56.4-C2

(2) On Colinear Lines: The radial clearances between guys on a pole line and conductors on a colinear pole 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 pole line and conductors supported on other poles of a colinear pole line.

FINAL

Rule 56.4-C2

(2) On Colinear Lines: The radial clearances between guys on a pole line and conductors on a colinear pole 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 pole line and conductors supported on other poles of a colinear pole line.

Rationale For Proposed GO 95 Rule Change Rule 48.1 Wood - Table 5

The criteria of green wood is explicitly stated in the proposed change by footnote (a) being added to Table 5. It is an existing implicit fact that green wood is used as the basis for determining the Modulus of Rupture in Bending for round poles, and rectangular poles and crossarms. Green wood is defined as freshly sawed or undried (unseasoned) wood. This definition is based on the United States Department of Agriculture (USDA) Wood Handbook: Wood as an Engineering Material (Forest Service Agricultural Handbook 72). Since many other types of domestic and foreign woods (not mentioned in General Order 95, Table 5) are starting to be used in the utility industry, the basis for determining the Modulus of Rupture in Bending when using these woods must be clearly stated in General Order 95. By adding footnote (a) to Table 5, the basis for determining the Modulus of Rupture in Bending is ascertained.

Since sawed rectangular poles, crossarms, etc. must be densed due to the natural grain of the wood being cut, thereby reducing the strength of the wood, a statement was added to relettered footnote (b) to explain this process. Also, the definition of density rule was added to help in determining which woods are "dense" and which woods are "not dense." Moreover, typical values were given for densing factors for "dense" and "not dense" woods, but they are not to be universally used in a blind fashion. Each type of cut wood must have its own densing factors derived.

Finally, former footnote (b) was relettered footnote (c).

**Existing Rule
GO 95 Rule 48.1
Wood**

TABLE 5

Wood Strengths

Species	Modulus of rupture in bending	
	Sawed rectangular poles, crossarms, etc. (a)	Round Poles
Cedar, western red	4,700 lbs. per sq. in.	6,000 lbs. per sq. in.
Douglas fir, dense	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, 05.1-1979 for Douglas fir poles and Southern pine poles, this value may be increased to not more than 8,000 lbs. per square inch. Such poles shall be given suitable preservative treatment.

Note: Revised April 26, 1988 by Decision No. 08223.

**Strikeout and Underline
GO 95 Rule 48.1
Wood**

TABLE 5

Wood Strengths

Species	Modulus of rupture in bending (a)	
	Sawed rectangular poles, crossarms, etc. (a) (b)	Round Poles
Cedar, western red	4,700 lbs. per sq. in.	6,000 lbs. per sq. in.
Douglas fir, dense	6,300 lbs. per sq. in.	6,800 (b) (c) lbs. per sq. in.
Douglas fir, not dense	5,800 lbs. per sq. in.	6,800 (b) (c) 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) (c) lbs. per sq. in.
Pine, southern yellow, not dense	5,800 lbs. per sq. in.	6,800 (b) (c) 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) Modulus of Rupture in Bending is based on the values for green wood as determined by the criteria and referenced standards in the United States Department of Agriculture (USDA) Wood Handbook: Wood as an Engineering Material (Forest Service Agricultural Handbook 72). Green Wood is defined as freshly sawed or undried (unseasoned) wood. For woods not specifically listed in the table, other references, such as the USDA Tropical Timbers of the World (Forest Service Agriculture Handbook 607), may be used as long as the methods of testing meet or exceed the criteria and referenced standards specified in the USDA Handbook 72.

(b) 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). Also, sawed rectangular poles, crossarms, etc. must be derated by a factor based on how "dense" or "not dense" the wood is, and whether the wood comes from second growth. This is known as the density rule, which uses the percentage of latewood and number of growth rings per inch of radius (rate of growth). Typical factors are about 0.925 for "dense" wood and 0.85 for "not dense" wood. However, the appropriate factor must be determined for each species of wood used, taking into account the locations and the conditions in which the trees were grown.

(c) Where poles meet specifications of American National Standards Institute, Inc. Association, O5.1 1992 1999 for Wood Douglas fir poles and Southern pine poles, this value may be increased to not more than 8,000 lbs. per square inch. Such poles shall be given suitable preservative treatment.

Notes: Revised April 24, 1945 by Decision No. 66235.

**Proposed Final Rule
 40 CFR Part 48.1
 Wood**

TABLE 5

Species	Wood Strengths	
	Modulus of rupture in bending (a)	
	Sawn rectangular poles, crosscut, etc. (b)	Round Poles
Cedar, western red	4,700 lbs. per sq. in.	6,000 lbs. per sq. in.
Douglas fir, dense	6,300 lbs. per sq. in.	6,800 (c) lbs. per sq. in.
Douglas fir, not dense	5,800 lbs. per sq. in.	6,800 (c) 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 (c) lbs. per sq. in.
Pine, southern yellow, not dense	5,800 lbs. per sq. in.	6,800 (c) 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) Modulus of Rupture in Bending is based on the values for green wood as determined by the criteria and referenced standards in the United States Department of Agriculture (USDA) Wood Handbook: Wood as an Engineering Material (Forest Service Agricultural Handbook 72). Green Wood is defined as freshly sawed or undried (unseasoned) wood. For woods not specifically listed in the table, other references, such as the USDA Tropical Timbers of the World (Forest Service Agriculture Handbook 607), may be used as long as the methods of testing meet or exceed the criteria and referenced standards specified in the USDA Handbook 72.

(b) 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). Also, sawed rectangular poles, crossarms, etc. must be derated by a factor based on how "dense" or "not dense" the wood is, and whether the wood comes from second growth. This is known as the density rule, which uses the percentage of larwood and number of growth rings per inch of radius (rate of growth). Typical factors are about 0.925 for "dense" wood and 0.85 for "not dense" wood. However, the appropriate factor must be determined for each species of wood used, taking into account the locations and the conditions in which the trees were grown.

(c) Where poles meet specifications of American National Standards Institute, Inc., OS-1 1992 for Wood poles, this value may be increased to not more than 8,000 lbs. per square inch. Such poles shall be given suitable preservative treatment.

Notes: Revises April 28, 1983 by Docket No. 6820.

RATIONALE FOR PROPOSED
G.O. 95 RULE CHANGE
RULE 49.1-C

This proposed rule change omits the 6" reduction in depth setting for minimal sized communication square sawed poles, since they are no longer available.

EXISTING RULE

Rule 49, 1-C

C. SETTING OF POLES

The depths of pole setting given in Table 6 are applicable to wood poles set in firm soil or in solid rock. Where the soil is not firm, deeper settings or other special methods of pole setting should be used. Where unguyed poles are set subject to heavy strain, or at corners or curves, deeper settings or other special measures to prevent overturning or excessive movement of the pole at the ground line should be used.

For communication lines, sawed poles of a cross section of 36 square inches or less may be set to a depth of 6 inches less than the specifications shown in the following table.

Metallic poles, prestressed concrete poles, or poles of other non-wood materials that are set directly in firm soil or rock shall be set at least as deep as specified in Table 6 for wood poles. Where the resultant bearing surface of these poles is not sufficient to prevent overturning or excessive movement of the pole at the ground line under maximum loading conditions, special measures such as heel and toe bracing, setting in concrete, bolting to a concrete foundation, or other special methods shall be used.

NOTE: Revised July 26, 1966 by Decision No. 71009 and February 13, 1974 by Decision No. 82466, and January 11, 1984 by Resolution SU-25.

PROPOSED RULE CHANGE
STRIKE OUT AND UNDERLINE

Rule 49, 1-C

C. SETTING OF POLES

The depths of pole setting given in Table 6 are applicable to wood poles set in firm soil or in solid rock. Where the soil is not firm, deeper settings or other special methods of pole setting should be used. Where unguayed poles are set subject to heavy strain, or at corners or curves, deeper settings or other special measures to prevent overturning or excessive movement of the pole at the ground line should be used.

~~TABLE 6
DEPTH OF POLE SETTING
FOR WOOD POLES
IN FIRM SOIL OR SOLID ROCK
POLE SIZE (INCHES)
DEPTH (FEET)
12
18
24
30
36
42
48
54
60
66
72
78
84
90
96
102
108
114
120
126
132
138
144
150
156
162
168
174
180
186
192
198
204
210
216
222
228
234
240
246
252
258
264
270
276
282
288
294
300
306
312
318
324
330
336
342
348
354
360
366
372
378
384
390
396
402
408
414
420
426
432
438
444
450
456
462
468
474
480
486
492
498
504
510
516
522
528
534
540
546
552
558
564
570
576
582
588
594
600
606
612
618
624
630
636
642
648
654
660
666
672
678
684
690
696
702
708
714
720
726
732
738
744
750
756
762
768
774
780
786
792
798
804
810
816
822
828
834
840
846
852
858
864
870
876
882
888
894
900
906
912
918
924
930
936
942
948
954
960
966
972
978
984
990
996
1000~~

Metallic poles, prestressed concrete poles, or poles of other non-wood materials that are set directly in firm soil or rock shall be set at least as deep as specified in Table 6 for wood poles. Where the resultant bearing surface of these poles is not sufficient to prevent overturning or excessive movement of the pole at the ground line under maximum loading conditions, special measures such as heel and toe bracing, setting in concrete, bolting to a concrete foundation, or other special methods shall be used.

NOTE: Revised July 26, 1966 by Decision No. 71009, February 13, 1974 by Decision No. 82466,
and January 19, 1994 by Resolution SR-25.

PROPOSED RULE CHANGE
(FINAL)

Rule 49, 1-C

C. SETTING OF POLES

The depths of pole setting given in Table 6 are applicable to wood poles set in firm soil or in solid rock. Where the soil is not firm, deeper settings or other special methods of pole setting should be used. Where unguyed poles are set subject to heavy strain, or at corners or curves, deeper settings or other special measures to prevent overturning or excessive movement of the pole at the ground line should be used.

Metallic poles, prestressed concrete poles, or poles of other non-wood materials that are set directly in firm soil or rock shall be set at least as deep as specified in Table 6 for wood poles. Where the resultant bearing surface of these poles is not sufficient to prevent overturning or excessive movement of the pole at the ground line under maximum loading conditions, special measures such as heel and toe bracing, setting in concrete, bolting to a concrete foundation, or other special methods shall be used.

NOTE: Revised July 26, 1966 by Decision No. 71009, February 13, 1974 by Decision No. 82466,
and January 19, 1994 by RESOLUTION 54-25.

**Rationale for Proposed Rule Change
(Rule 53.4) Bonding**

This proposed rule change is to eliminate the requirement for covering bond wire on the surface of all poles and on the face, back and underside of crossarms. The removal of this requirement will allow workers to safely ground the bond wire before working on or climbing above the circuit.

**EXISTING RULE
(Rule 53.4) Bonding**

A. CIRCUITS OF MORE THAN 7,500 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 underside 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 a 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 underside of crossarms or where bonds (wires or straps) are installed vertically between crossarms at 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 centerline of pole. Metal braces shall clear such bond wires by not less than 1-1/2 inches (see Rules 52.7-B1 and 52.7-C) and in order to clear braces, an uncovered bond wire carried on the underside of crossarm may be placed on the face or back of a limited portion of crossarms and need not be covered for this limited distance of its run.

NOTE: Revised September 18, 1967 by Decision No. 72984.

(3) 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 underside of crossarms or where bonds (wire 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 centerline of pole. Metal braces shall clear such bond wires by not less than 1-1/2 inches (see Rules 52.7-B1 and 52.7-C)

and in order to clear braces, an uncovered bond wire carried on the underside of crossarms may be placed on the face or back of a limited portion of crossarms and need not be covered for this limited distance of its run.

NOTE: Revised September 18, 1967 by Decision No. 72984.

(a) Separately Bonded Circuits: Where conductors of not more than two circuits are at the same level and separately bonded, such bond wires shall be separated on the crossarm and on the surface of the pole by not less than 6 inches.

NOTE: Revised September 18, 1967 by Decision No. 72984 and January 21, 1992, by Resolution SU-10.

(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-F2.

NOTE: Revised January 21, 1992, by Resolution SU-10.

B. CIRCUITS OF 7,500 VOLTS OR LESS

The bonding of circuits of 7,500 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 1-1/2 inches from metal braces and all other hardware except the metal pins and dead ends which are bonded; and

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

NOTE: Revised January 21, 1992, by Resolution SU-10.

**PROPOSED RULE CHANGE
(Rule 53.4) Bonding
(Strike Out and Underline)**

A. CIRCUITS OF MORE THAN 7,500 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 underside 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 a 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 underside of crossarms or where bonds (wires or straps) are installed vertically between crossarms at 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 centerline of pole.~~ in horizontal, triangular or vertical configuration may be installed on the face, back or underside of wood crossarms and on the surface of pole without a protective covering. Metal braces ~~shall clear such bond wires by not less than 1 1/2 inches (see Rules 52.7-B1 and 52.7-C), and in order to clear braces, an uncovered bond wire carried on the underside of crossarm may be placed on the face or back of a limited portion of crossarms and need not be covered for this limited distance of its run.~~ Unbonded metal pole line hardware shall clear such bond wires by not less than 1 1/2 inches (see Rules 52.7-B1 and 52.7-C).

NOTE: Revised September 18, 1967 by Decision No. 72984.

(3) 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 underside of crossarms or where bonds (wire 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 centerline of pole.~~ Metal braces shall clear such bond wires by not less than 1 1/2 inches (see Rules 52.7-B1 and 52.7-C) in horizontal, triangular or vertical configuration, bond wire may be installed on the face, back or underside of wood crossarms and on the surface of pole without a protective covering.

~~Unbonded metal pole line hardware shall clear such bond wires by not less than 4-1/2 1.5 inches (see Rules 52.7-B1 and 52.7-C). and in order to clear braces, an uncovered bond wire carried on the underside of crossarms may be placed on the face or back of a limited portion of crossarms and need not be covered for this limited distance of its run.~~

NOTE: Revised September 18, 1967 by Decision No. 72984.

(a) Separately Bonded Circuits: Where conductors of not more than two circuits are at the same level and separately bonded, such bond wires shall be separated on the crossarm and on the surface of the pole by not less than 6 inches.

NOTE: Revised September 18, 1967 by Decision No. 72984 and January 21, 1992, by Resolution SU-10.

(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-F2.

NOTE: Revised January 21, 1992, by Resolution SU-10.

B. CIRCUITS OF 7,500 VOLTS OR LESS

The bonding of circuits of 7,500 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 4-1/2 1.5 inches from metal braces and all other hardware except the metal pins and dead ends which are bonded; and

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

NOTE: Revised January 21, 1992, by Resolution SU-10.

**PROPOSED RULE CHANGE
(Rule 53.4) Bonding
(Final)**

A. CIRCUITS OF MORE THAN 7,500 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 underside of wood crossarms and on the surface of pole without a protective covering. 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 a 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 in horizontal, triangular or vertical configuration may be installed on the face, back or underside of wood crossarms and on the surface of pole without a protective covering. Unbonded metal pole line hardware shall clear such bond wires by not less than 1.5 inches (see Rules 52.7-B1 and 52.7-C).

NOTE: Revised September 18, 1967 by Decision No. 72984.

(3) Conductors of More Than One Circuit at Same Level: Where conductors of more than one circuit are at the same level in horizontal, triangular or vertical configuration, bond wire may be installed on the face, back or underside of wood crossarms and on the surface of pole without a protective covering. Unbonded metal pole line hardware shall clear such bond wires by not less than 1.5 inches (see Rules 52.7-B1 and 52.7-C).

(a) Separately Bonded Circuits: Where conductors of not more than two circuits are at the same level and separately bonded, such bond wires shall be separated on the crossarm and on the surface of the pole by not less than 6 inches.

NOTE: Revised September 18, 1967 by Decision No. 72984 and January 21, 1992, by Resolution SU-10.

(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-F2.

NOTE: Revised January 21, 1992, by Resolution SU-10.

B. CIRCUITS OF 7,500 VOLTS OR LESS

The bonding of circuits of 7,500 volts or less shall comply with the following:

Bond wires shall not be less than 1.5 inches from metal braces and all other hardware except the metal pins and dead ends which are bonded; and

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

NOTE: Revised January 21, 1992, by Resolution SU-10.

**RATIONALE FOR PROPOSED
G.O. 95 RULE CHANGE**

RULE 54.4-G

Conductor Clearance From Grounded Metal Boxes, Hardware and Equipment.

RULE 87.4-H NEW RULE

Cable and Messenger Clearance From Grounded Metal Boxes, Hardware and Equipment.

RULE 92.1-F 6 NEW RULE

Joint Pole Clearance Between Conductors, Cable, Messengers and Miscellaneous Equipment

The present rule allows supply to mount a grounded metal box, hardware or metal case for equipment 48 inches below communication line conductors of different ownership while not requiring a common bond between the two facilities. This condition presents a hazard to communication technicians, due to potential differences, if a pole mounted communication drop distribution terminal is located below the communication cable.

The present language addresses communication line conductors (open wire) but not cable and messenger which is the prevalent construction. This proposal will change communication line conductors to communication cable and messengers.

This proposal also modifies clearance between supply grounded metal boxes, hardware or metal cases for equipment placed below communication level, and communication owned cables and messengers.

This rule affects both supply and communication, yet appears only in Section V, Supply. This proposal includes new rules for Section VIII, Communications and Section IX, Poles Jointly Used.

**EXISTING G.O. 95 RULE
RULE 54.4-G**

54.0 CONDUCTORS

54.4 CLEARANCES

54.4-G FROM GROUNDED METAL BOXES, HARDWARE AND EQUIPMENT

All grounded metal boxes, hardware and grounded metal cases for equipment, on non-metallic poles or non-metallic structures shall be a minimum of 36" above and 30" below the next level of unprotected conductors. Such equipment shall have a minimum clearance of 48 inches above or below communication line conductors of different ownership. See Figure 54-4.

EXCEPTIONS:

- (1) 0-750 volt conductors (not including jumpers) - a 10" radial clearance is required.
- (2) Equipment (e.g. in Rule 58.6) operated at 0 - 750 volts and mounted not less than 15 inches from the surface of the pole. These clearances shall not be less than the radial clearances required for incidental pole wiring by Table 2, Cases 16 and 17.
- (3) Grounded portions of risers and their associated terminal fittings, brackets and hardware. These clearances shall not be less than the radial clearances required for incidental pole wiring by Table 2, Cases 16 and 17.
- (4) Lightning arrestors, grounded insulator pins and insulators with grounded bases and their associated supports. These clearances shall not be less than the radial clearances required for incidental pole wiring by Table 2, Cases 16 and 17.

Any item grounded in accordance with this rule shall be effectively grounded (see Rule 33.3).

Note: Revised January 19, 1994 by Resolution SU-25.

PROPOSED G.O. 95 RULE CHANGE
STRIKE OUT AND UNDERLINE
RULE 54.4-G

54.0 CONDUCTORS

54.4 CLEARANCES

54.4-G FROM GROUNDED METAL BOXES, HARDWARE AND EQUIPMENT

All grounded metal boxes, hardware and metal cases for equipment, on non-metallic poles or non-metallic structures shall be a minimum of 36 inches above and 30 inches below the next level of unprotected conductors. Such equipment shall have a minimum clearance of 48 inches above or 72 inches below communication line conductors, cables and messengers of different ownership. See Figure 54-4.

EXCEPTIONS:

(1) 0-750 volt line conductors (not including incidental pole wiring, e.g. jumpers) a 10 inch radial clearance is required.

(2) Equipment (e.g. in Rule 58.6) operated at 0-750 volts and mounted not less than 15 inches from the surface of the pole. These clearances shall not be less than the radial clearances required for incidental pole wiring by Table 2, Cases 16 and 17.

(3) Grounded portions of risers and their associated terminal fittings, brackets and hardware. These clearances shall not be less than the radial clearances required for incidental pole wiring by Table 2, Cases 16 and 17.

(4) Lightning arresters, grounded insulator pins, and insulators with grounded bases and their associated supports. These clearances shall not be less than the radial clearances required for incidental pole wiring by Table 2, Cases 16 and 17.

(5) The 72 inches may be reduced to not less than 48 inches where a communication cable does not have a pole mounted drop distribution terminal located above the grounded metal box, hardware or metal case for equipment, or where the grounded metal box, hardware or metal case for equipment is securely bonded to the communication cable and/or messenger.

(6) The 72 inches may also be reduced to 48 inches when the grounded metal box, hardware or metal case for equipment is on the opposite side of a pole from a pole mounted communication drop distribution terminal.

33.3). *Any item grounded in accordance with this rule shall be effectively grounded (see Rule*

Note: Revised January 19, 1994 by Resolution SU-25.

PROPOSED G.O. 95 RULE CHANGE
FINAL
RULE 54.4-G

54.0 CONDUCTORS

54.4 CLEARANCES

54.4-G FROM GROUNDED METAL BOXES, HARDWARE AND EQUIPMENT

All grounded metal boxes, hardware and metal cases for equipment, on non-metallic poles or non-metallic structures shall be a minimum of 36 inches above and 30 inches below the next level of unprotected conductors. Such equipment shall have a minimum clearance of 48 inches above or 72 inches below communication line conductors, cables and messengers of different ownership. See Figure 54-4.

EXCEPTIONS:

(1) 0-750 volt line conductors (not including incidental pole wiring, e.g. jumpers) a 10 inch radial clearance is required.

(2) Equipment (e.g. in Rule 58.6) operated at 0-750 volts and mounted not less than 15 inches from the surface of the pole. These clearances shall not be less than the radial clearances required for incidental pole wiring by Table 2, Cases 16 and 17.

(3) Grounded portions of risers and their associated terminal fittings, brackets and hardware. These clearances shall not be less than the radial clearances required for incidental pole wiring by Table 2, Cases 16 and 17.

(4) Lightning arresters, grounded insulator pins, and insulators with grounded bases and their associated supports. These clearances shall not be less than the radial clearances required for incidental pole wiring by Table 2, Cases 16 and 17.

(5) The 72 inches may be reduced to not less than 48 inches where a communication cable does not have a pole mounted drop distribution terminal located above the grounded metal box, hardware or metal case for equipment, or where the grounded metal box, hardware or metal case for equipment is securely bonded to the communication cable and/or messenger.

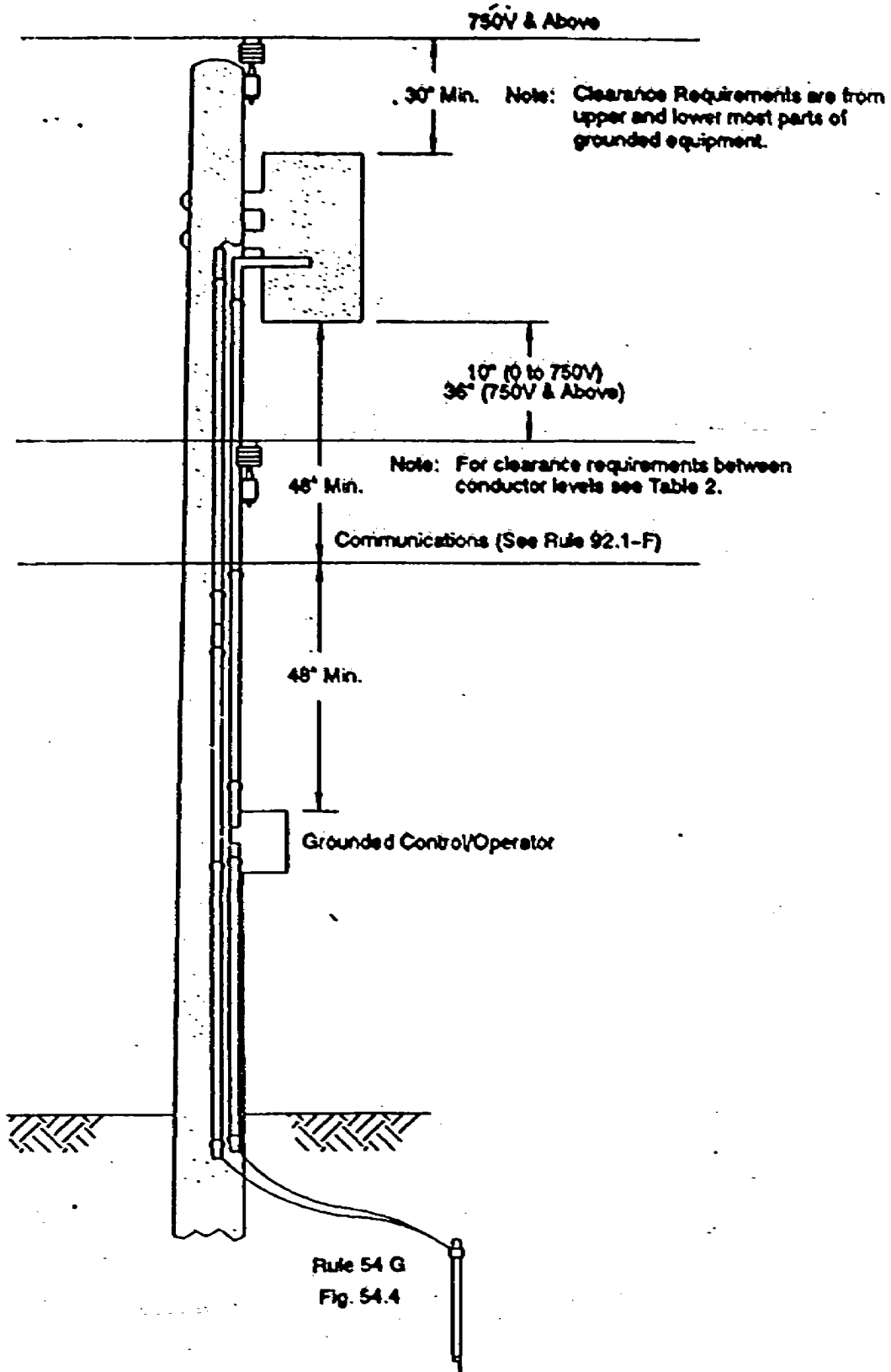
(6) The 72 inches may also be reduced to 48 inches when the grounded metal box, hardware or metal case for equipment is on the opposite side of a pole from a pole mounted communication drop distribution terminal.

33.3). *Any item grounded in accordance with this rule shall be effectively grounded (see Rule*

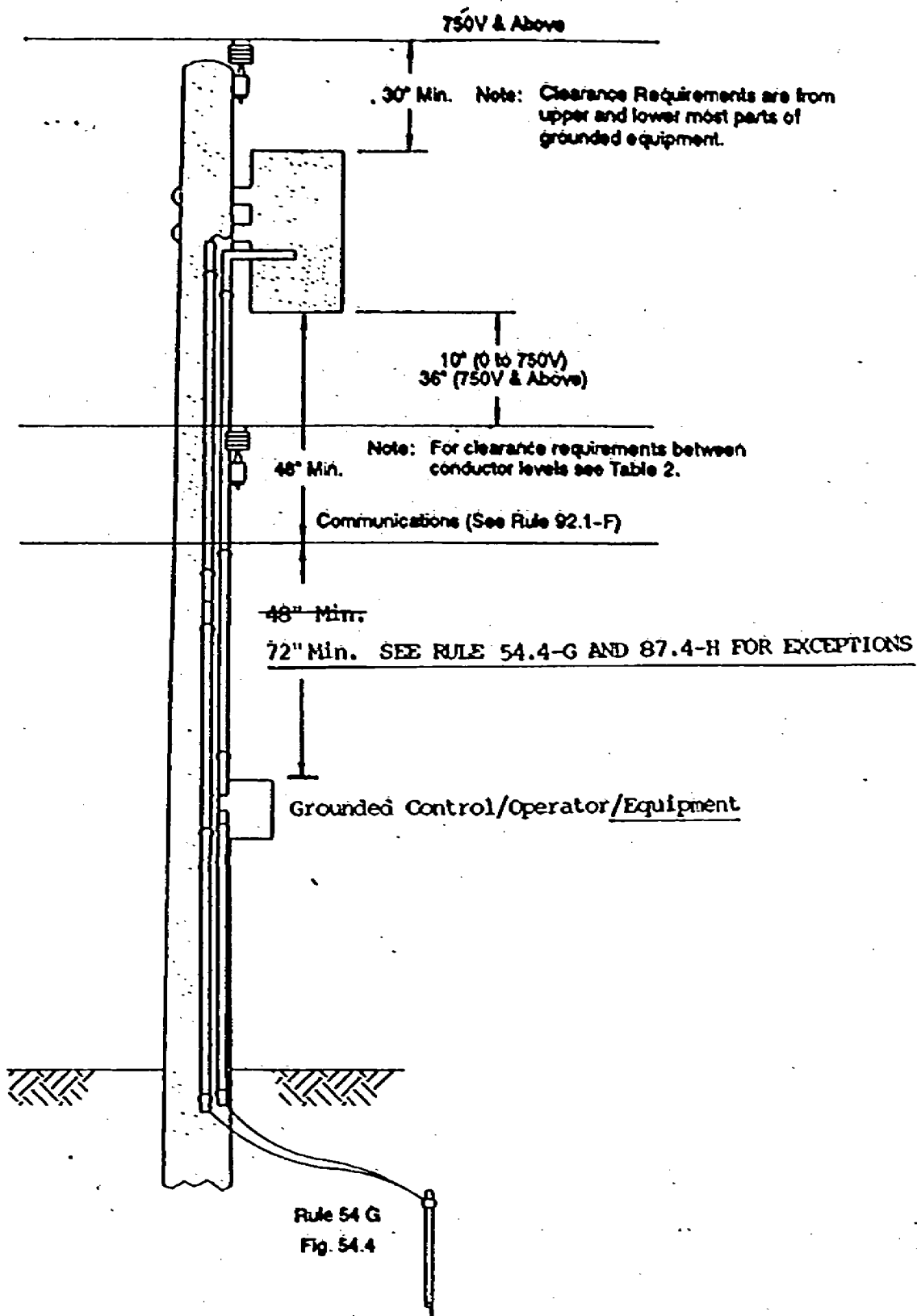
Note: Revised January 19, 1994 by Resolution SU-25.

(Existing)

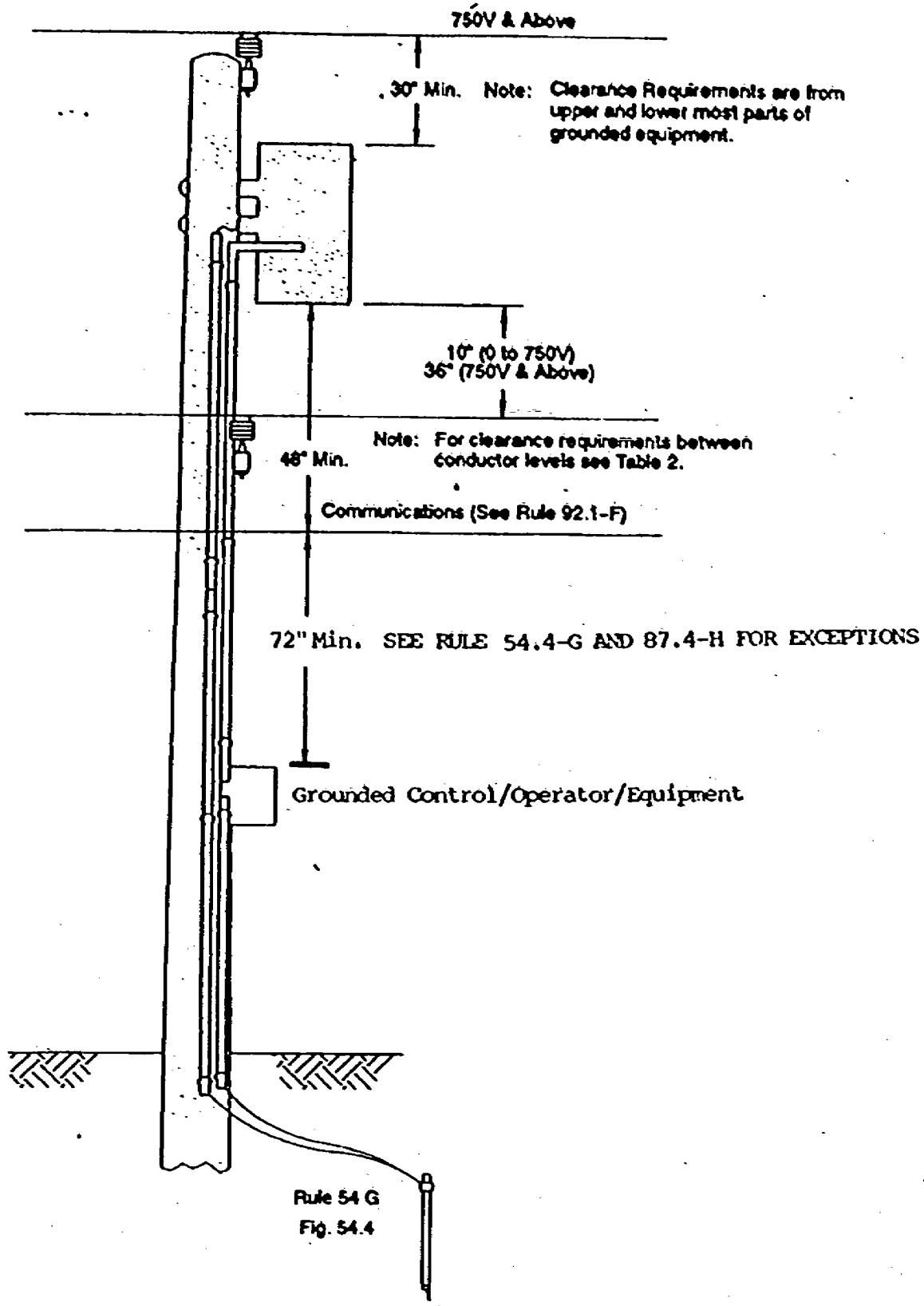
Requirements for Supply Lines



(Strike out and Underline)
Requirements for Supply Lines



(Final)
Requirements for Supply Lines



RATIONALE FOR PROPOSED
G.O. 95 RULE CHANGE
RULE 54.6-A

Clarifies rule pertaining to 12 foot support requirements and converts fractions to decimals.

**Rule 54.6-A
Vertical and Lateral Conductor
Existing Rule**

54.6 Vertical and Lateral Conductors

A UNPROTECTED CONDUCTORS (see Rule 20.8-E for definition)

Unprotected conductors may pass laterally on a pole or structure or vertically from one level on a pole or structure to another level, but shall not pass within the climbing space; shall not pass within the working space, except as permitted by Rule 54.7-B2; shall not pass between conductors of any other circuit, except between pole-pin conductor positions; and shall clear the conductors of other circuits by distances not less than the following:

Highest Voltage Classification of Conductors Concerned	Minimum Radial Distance Between Conductors
0-5,000 Volts	11 1/2 inches
5,000-7,500 Volts	17 1/2 inches
7,500-20,000 Volts	24 inches
20,000 Volts and above	36 inches

Where the distance between levels is in excess of 12 feet and unprotected conductors pass between the pole-pin conductor positions of any other circuit, additional supports shall be installed so that the maximum length of conductor between supports is not more than 12 feet.

The clearances in the above tabulation do not apply between taps in buckarm construction, the clearances specified in Table 2, Case 16, being directly applicable.

For clearances between street light drop wires and cables, other conductors and metal boxes, see Rules 58.2-B3 and 92.1-F5.

Unprotected conductors, installed as specified in this rule (54.6-A) and in Rule 54.4-D9 are not vertical or lateral runs as defined in Rule 22.6.

In lieu of the foregoing, vertical and lateral conductors may be installed as specified in Rules 54.6-C and 54.6-D.

NOTE: Revised January 6, 1968 by Decision No. 73455.

**Rule 54.6-A
Vertical and Lateral Conductor
Strike Out and Underline**

54.6 Vertical and Lateral Conductors

A UNPROTECTED CONDUCTORS (see Rule 20.8-E for definition)

Unprotected conductors may pass laterally on a pole or structure or vertically from one level on a pole or structure to another level, but shall not pass within the climbing space; shall not pass within the working space, except as permitted by Rule 54.7-B2; shall not pass between conductors of any other circuit, except between pole-pin conductor positions; and shall clear the conductors of other circuits by distances not less than the following:

Highest Voltage Classification of Conductors Concerned	Minimum Radial Distance Between Conductors
0-5,000 Volts	44-1/2 <u>11.5</u> inches
5,000-7,500 Volts	47-1/2 <u>17.5</u> inches
7,500-20,000 Volts	24 inches
20,000 Volts and above	36 inches

Where ~~unprotected vertical conductors~~ the distance between levels is ~~are~~ in excess of 12 feet in length, and ~~unprotected conductors pass between the pole-pin conductor positions of any other circuit~~ additional supports shall be installed so that the maximum length of conductor between supports is not more than 12 feet.

The clearances in the above tabulation do not apply between taps in buckarm construction, the clearances specified in Table 2, Case 16, being directly applicable.

For clearances between street light drop wires and cables, other conductors and metal boxes, see Rules ~~58.5-B3 68.2-B3~~ and 92.1-F5.

Unprotected conductors, installed as specified in this rule (54.6-A) and in Rule 54.4-D9 are not vertical or lateral runs as defined in Rule 22.6.

In lieu of the foregoing, vertical and lateral conductors may be installed as specified in Rules 54.6-C and 54.6-D.

NOTE: Revised January 6, 1968 by Decision No. 73455.

Rule 54.6-A
Vertical and Lateral Conductor
Final

54.6 Vertical and Lateral Conductors

A UNPROTECTED CONDUCTORS (see Rule 20.8-E for definition)

Unprotected conductors may pass laterally on a pole or structure or vertically from one level on a pole or structure to another level, but shall not pass within the climbing space; shall not pass within the working space, except as permitted by Rule 54.7-B2; shall not pass between conductors of any other circuit, except between pole-pin conductor positions; and shall clear the conductors of other circuits by distances not less than the following:

Highest Voltage Classification of Conductors Concerned	Minimum Radial Distance Between Conductors
0-5,000 Volts	11.5 inches
5,000-7,500 Volts	17.5 inches
7,500-20,000 Volts	24 inches
20,000 Volts and above	36 inches

Where unprotected vertical conductors are in excess of 12 feet in length, additional supports shall be installed so that the maximum length of conductor between supports is not more than 12 feet.

The clearances in the above tabulation do not apply between taps in buckarm construction, the clearances specified in Table 2, Case 16, being directly applicable.

For clearances between street light drop wires and cables, other conductors and metal boxes, see Rules 58.5-B3 and 92.1-F5.

Unprotected conductors, installed as specified in this rule (54.6-A) and in Rule 54.4-D9 are not vertical or lateral runs as defined in Rule 22.6.

In lieu of the foregoing, vertical and lateral conductors may be installed as specified in Rules 54.6-C and 54.6-D.

NOTE: Revised January 6, 1968 by Decision No 73455

RATIONALE FOR PROPOSED G.O. 95 RULE CHANGE
Rule 54.6-B Ground Wire

The proposed rule change will eliminate the requirement of covering ground wires installed on the underside of wood crossarms to be consistent with armless and bracket construction.

**Rule 54.6-B Ground Wires
(Existing Rule)**

B. GROUND WIRES

Ground wires shall have a conductivity and mechanical strength at least equal to that of No. 8 AWG medium-hard-drawn copper wire; they shall not be installed on the top surfaces of crossarms; and they shall have clearances of not less than 1 1/2 inches from hardware in accordance with the provisions of Rules 52.7-B and 52.7-C.

Ground wires attached to or run on the face, back or underside of wood crossarms or on the surface of wood poles and structures shall be covered throughout their length by a suitable protective covering (see Rule 22.2), excepting that ground wires of 0-750 volt circuits or equipment are not required to be covered where installed on the underside of crossarms or the portions of crossarms supporting 0-750 volt conductors.

Ground wires of common neutral systems are specially required to comply with the provisions of Rules 59.3-C and 59.4 in addition to the provisions of this Rule 54.6-B.

Ground wires installed on the surface of service and meter poles (see Rule 22.0-E for definition) which terminate in effectively grounded meter or equipment enclosures not more than eight feet above ground are not required to be covered by a suitable protective covering (see Rule 22.2 for definition), provided they are encased in rigid steel conduit or No. 8 AWG minimum armored copper ground wire is used.

NOTE: Last paragraph added July 26, 1966 by Decision No. 71009.

**Rule 54.6-B Ground Wires
(Strikeout and Underline)**

B. GROUND WIRES

Ground wires shall have a conductivity and mechanical strength at least equal to that of No. 8 AWG medium-hard-drawn copper wire; they shall not be installed on the top surfaces of crossarms; and they shall have clearances of not less than ~~4 1/2~~ 1.5 inches from hardware in accordance with the provisions of Rules 52.7-B and 52.7-C.

Ground wires attached to or run on the face or back ~~or underside~~ of wood crossarms or on the surface of wood poles and structures shall be covered throughout their length by a suitable protective covering (see Rule 22.2), excepting that ground wires of 0-750 volt circuits or equipment are not required to be covered where installed on ~~the underside of crossarms or the portions of crossarms~~ supporting 0-750 volt conductors.

Ground wires of common neutral systems are specially required to comply with the provisions of Rules 59.3-C and 59.4 in addition to the provisions of this Rule 54.6-B.

Ground wires installed on the surface of service and meter poles (see Rule 22.0-E for definition) which terminate in effectively grounded meter or equipment enclosures not more than eight feet above ground are not required to be covered by a suitable protective covering (see Rule 22.2 for definition), provided they are encased in rigid steel conduit or No. 8 AWG minimum armored copper ground wire is used.

NOTE: Last paragraph added July 26, 1966 by Decision No. 71009.

**Rule 54.6-B Ground Wires
(Final)**

B. GROUND WIRES

Ground wires shall have a conductivity and mechanical strength at least equal to that of No. 8 AWG medium-hard-drawn copper wire; they shall not be installed on the top surfaces of crossarms; and they shall have clearances of not less than 1.5 inches from hardware in accordance with the provisions of Rules 52.7-B and 52.7-C.

Ground wires attached to or run on the face or back of wood crossarms or on the surface of wood poles and structures shall be covered throughout their length by a suitable protective covering (see Rule 22.2), excepting that ground wires of 0-750 volt circuits or equipment are not required to be covered where installed on crossarms supporting 0-750 volt conductors.

Ground wires of common neutral systems are specially required to comply with the provisions of Rules 59.3-C and 59.4 in addition to the provisions of this Rule 54.6-B.

Ground wires installed on the surface of service and meter poles (see Rule 22.0-E for definition) which terminate in effectively grounded meter or equipment enclosures not more than eight feet above ground are not required to be covered by a suitable protective covering (see Rule 22.2 for definition), provided they are encased in rigid steel conduit or No. 8 AWG minimum armored copper ground wire is used.

NOTE: Last paragraph added July 26, 1966 by Decision No. 71009.

RATIONALE FOR PROPOSED O.O. 95 RULE CHANGE

Rule 54.7

Climbing and Working Space

and

ASSOCIATED RULE CHANGE

Rule 54.4-D8

Conductor - Clearance - At Top of Pole

This proposed rule change will help clarify the language of Rule 54.7. Minor changes in format have been made. Inserting all allowable climbing space obstructions allows this rule to stand alone, removing the need to refer to other rules in the Order. Lightning arresters have been added to allowable working space obstructions as they were inadvertently overlooked with the SU-5 change package. Removing the 6 foot clearance requirement and the exception in Rule 54.4-D8 removes an unnecessary requirement without affecting safety to workers or the general public.

EXISTING RULE
RULE 54.7-A

Rule 54.7 Climbing and Working Space

A. CLIMBING SPACE

Climbing space shall be maintained from the ground level. The climbing space shall be maintained in the same position for a distance of not less than 4 feet vertically both above and below each conductor level through which it passes. To comply with this requirement the position of the climbing space shall not be changed through conductor levels which are less than 4 feet apart. Where the vertical distance between consecutive conductor levels is 4 feet or more, and less than 8 feet, the position of the climbing space through such consecutive level may be shifted not more than one-quarter (90 degrees) of the distance around the pole.

Where a single level of circuitry is installed at the top of a pole, the climbing space shall extend up to the level of such pole-top circuitry and need not be provided through and above such level. Where a conductor is installed at the top of a pole under the provisions of Rule 54.4-D8, the climbing space shall extend up to the level of such pole-top conductor but need not be provided through and above such level.

This rule is not applicable to non-climbable poles. See Rule 22.0-D for definition.

Climbing space measured from center line of pole shall be provided on one side or in one quadrant of all poles or structures with dimensions as specified in the following:

	<u>Rules</u>
Wood Crossarm Construction	54.7-A 1 & 2
Without Wood Crossarms (More than 750 Volts) . .	54.11-F
Low Voltage Rack Construction	54.9-F
Low Voltage Multiconductor Cable w/Bare Neutral.	54.10-F
Poles Jointly Used	84.7 & 93
Allowable Obstructions of These Climbing Spaces.	54.7-A 3
	54.9-F
	54.11-G
	84.7-E

The climbing space required by this rule may be shifted laterally not more than 5 inches on the condition that the midpoint of the side of the climbing space coinciding with the center line of the pole shall not be more than 5 inches from the center line of the pole.

The dimensions specified in the above rules may be reduced not more than 2% because of line angles and minor field variations.

(Existing Rule 54.7-A cont.)

(1) Dimensions Where Line Arms Only Are Involved: The climbing space where line arms without related buck arms are involved on poles or structures shall be on one side or face of the pole, with the center line of pole approximately midway on one side of the climbing space (See Figure 54-5), and shall have the following dimensions:

Voltage of conductors	Dimensions of Square
0-7,500 Volts	30 inches
7,500-46,000 Volts	36 inches
More than 46,000 Volts	36 inches plus 1/2" per kV in excess of 46kV

CLIMBING SPACE
LINE ARMS ONLY
Rule 54.7-A1

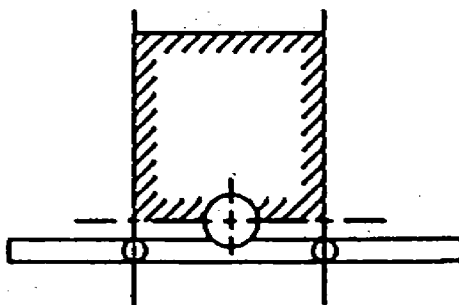


FIGURE 54-5

(Existing Rule 54.7-A cont.)

(2) Dimensions Where buck Arms Are Involved: The climbing space where line arms and related buck arms are involved on poles or structures shall be on one side or face of the pole, or in a quadrant as defined below:

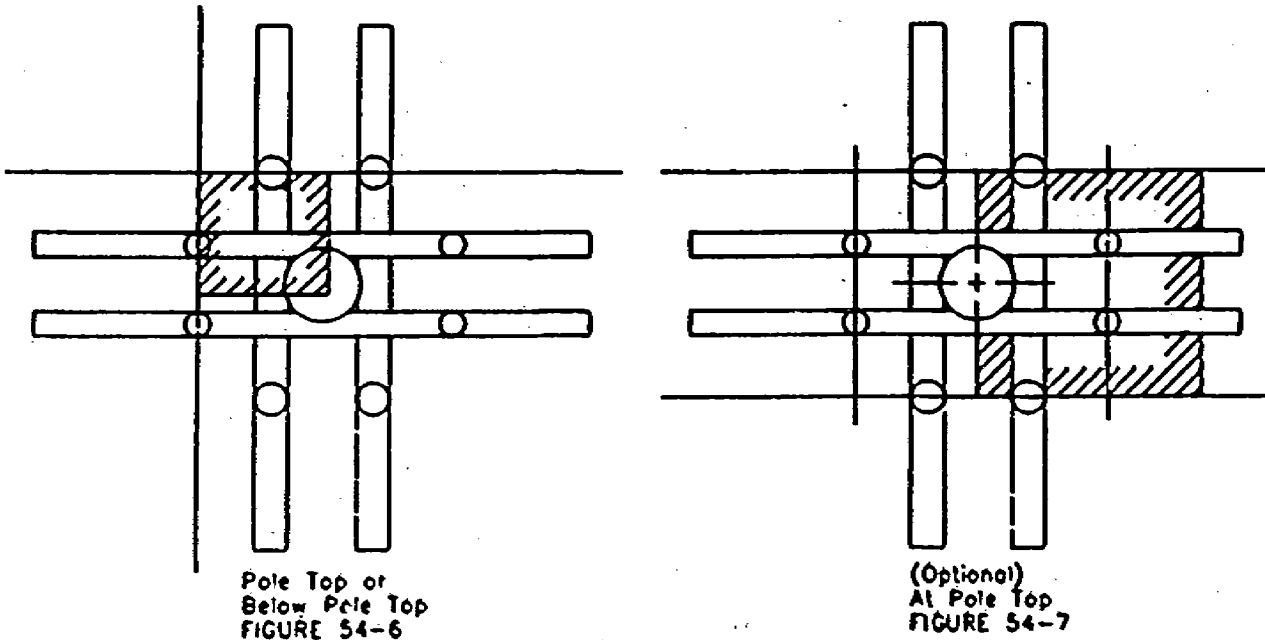
(a) Where the Vertical Clearance Between Conductors on Line and Buck Arms is Four Feet or More: The climbing space shall be provided on one side or face of the pole for each arm as specified in Rule 54.7-A1.

(b) Where the Vertical Clearance Between Conductors on Line and Buck Arms is Less Than Four Feet: The climbing space shall be provided through such levels and located in a quadrant and shall have at least the following dimensions (See Figure 54-6).

Voltage of Conductors	Dimensions of Square
0-7,500 Volts	30 inches
7,500-35,000 Volts	42 inches

For circuitry located at pole top, the climbing space specified in Rule 54.7-A1 may be applied to the lower arm and up to but not through the conductors on the top arm (See Fig. 54-7).

CLIMBING SPACE
LINE AND BUCK ARMS
LESS THAN 4-FOOT SEPARATION
Rule 54.7-A2b



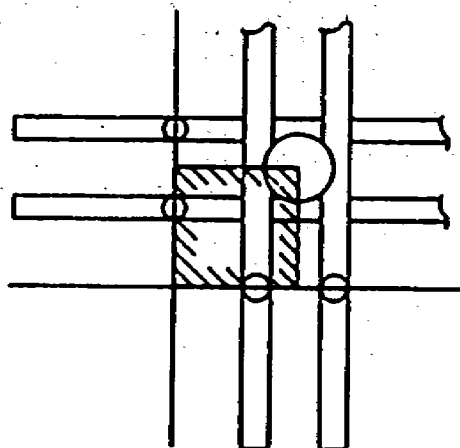
(Existing Rule 54.7-A2 cont.)

(c) For Combination Arm Construction with Line Arm and Buck Arms or Service Buck Arm (see Rule 54.8-2 for requirements where service drops are involved):

Where the vertical separation between conductor levels on line and buck arms is 4 feet or more, the climbing space shall be provided on one side or face of the pole for each level as specified in Rule 54.7-A1.

Where the vertical separation between conductor levels on line and buck arms is less than 4 feet such separation shall not be less than 2 feet, and the climbing space shall not be less than prescribed in Rule 54.7-A2b and the dimensions shall be in accordance with the highest voltage adjacent to the climbing quadrant (See Figure 54-8).

CLIMBING SPACE
COMBINATION ARM CONSTRUCTION
LESS THAN 4-FOOT SEPARATION
Rule 54.7-A2c



Dimensions of Square:	Volts	Inches
	0-7500	30
	7500-35000	42

Below Pole Top
FIGURE 54-8

(3) Allowable Climbing Space Obstructions: Crossarms and their supporting members are allowed in climbing spaces. Insulators and their attaching brackets which support line conductors may extend not more than one-half of their diameter into the climbing space.

Suitably protected vertical conductors attached to the surface of poles, and guys (except those guys contacting metal pins of deadend hardware as specified in Rule 52.7-D), are allowed in climbing spaces provided that not more than two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches), and one vertical riser, run, or ground wire are installed in any 4-foot vertical section of climbing space.

Bolts bonded to or used for the attachment of deadend hardware of a circuit of any voltage in horizontal (wood crossarm) configuration may project into the climbing space provided they are covered with non-conducting material as specified in Rule 22.2-C. If such bolts are bonded, a positive electrical contact shall be made.

The covering of bolts required by this rule shall not apply to:

- a. Bolts associated with circuits of 0 to 750 volts at any level on pole or structure.
- b. Bolts associated with circuits of more than 7500 volts when located at the top level of a pole.
- c. Bolts associated with brackets and non-wood crossarms.

Modifications of these requirements are specified in: Rule 54.9-F for rack construction; Rule 58.5-D for switches; and Rule 54.11-C for climbing space without wood crossarms.

B. WORKING SPACE

Working spaces, unobstructed by conductors or other equipment except as provided in Rule 54.7-B2, of the dimensions as specified in Rule 54.7-B1, shall be provided between supply conductor levels on all poles and in such positions that the working spaces include the climbing space.

(1) Dimensions of Working Space:

- a. The vertical dimensions of working space above and below supply conductor levels energized above 750 volts shall be equal to the entire vertical distance between the supply conductors involved (e.g. the entire vertical distance between a 750 -20,000 volt level and a 0-750 volt level).
- b. When there is no supply conductor level below a conductor level that is energized above 750 volts, the vertical dimension of working space shall be 6 feet.
- c. The vertical dimension of working space between supply conductor levels of 0-750 volts shall be equal to the vertical distance between such levels.

(Existing Rule 54.7-01 cont.)

d. The width of the working space where wood crossarms are involved shall extend from the climbing space to the outmost conductor position on the crossarm involved. The depth of the working space shall have the same dimension as the climbing space. This dimension shall be measured horizontally from the centerline of pole on the climbing side of pole. (See Figures 54-9A, B and C.)

e. The width of the working space of supply circuits above 750 volts where wood crossarms are not involved (e.g., vertical and triangular construction without wood crossarms) shall extend from the climbing space to the outmost conductor position on the conductor support involved. The depth of the working space shall have the same dimension as the climbing space and shall be measured from the centerline of pole (See Figure 54-9D and 54-9H). When conductors above 750 volts are located on one side of the pole only (e.g., vertical construction), the dimensions of working space shall be applied as illustrated in Figures 54-9E and 54-9F (dimension "A" is equal to the distance from the climbing space to the outmost conductor position). When climbing space is located in a quadrant, working space shall be applied as illustrated in Figure 54-9G.

f. The width and depth of the working space for supply circuits of 0-750 volts where wood crossarms are not involved shall be the same width and depth as the climbing space.

(2) Allowable Working Space Obstructions:

a. Taps from conductors on line arms or other supports, extending to conductors on related buck arms or other supports, may pass through the working space between such levels of conductors.

b. Service drops of 0-750 volts may pass through the working space of conductors supported on the same crossarm with the drop conductors and may pass through working space of 750-7,500 volt conductors provided not less than the clearance between service drop and line conductors specified in Rule 54.8-C6 are maintained.

c. Cutouts, disconnects, switches and their leads may be installed in the working space (but not in the climbing space).

d. Lead wires to transformers, capacitors, oil switches, vacuum switches, and other similar apparatus may pass through the working space adjacent to the line conductors to which such leads are attached.

e. Terminal fittings of risers and runs, and their taps, may extend into the working space provided these fittings are the only obstruction of the working space at their level on the same side of the climbing space.

f. Street lights and their associated hardware may extend into the working space.

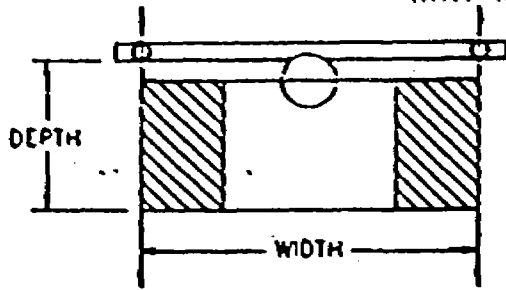
Note: Revised May 22, 1990 by Resolution No. SU-5 and November 6, 1992 by Resolution SU-15.

Requirements for Supply Lines

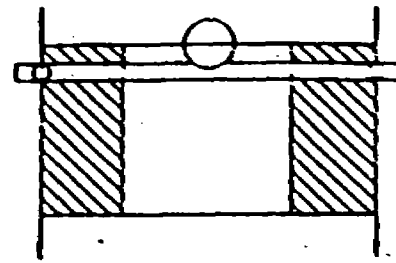
WORKING SPACE

Rule 54.7-8

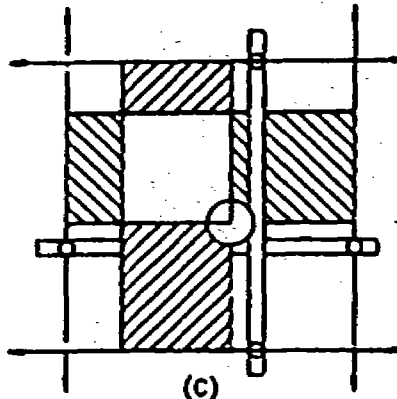
WITH WOOD CROSSARMS



(A)

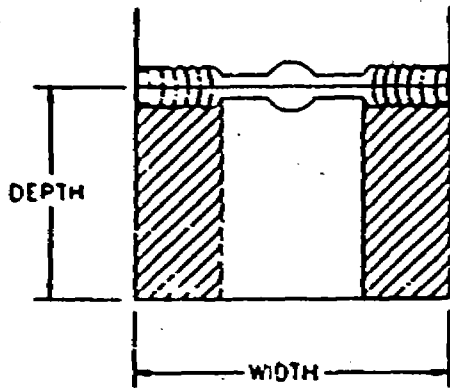


(B)

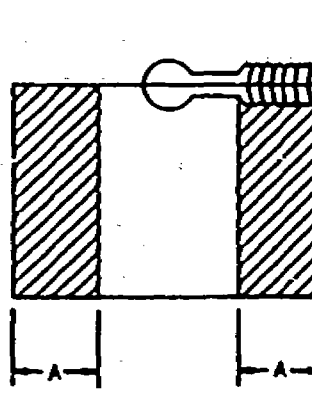


(C)

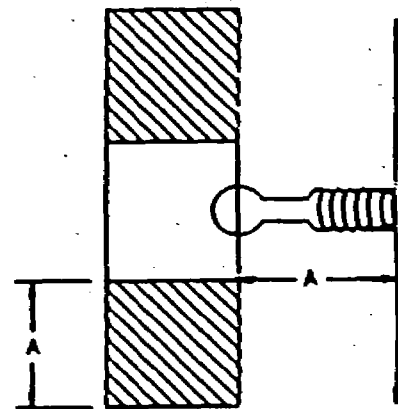
WITHOUT WOOD CROSSARMS
(e.g. Metallic Brackets, Arms, Supports, etc.)



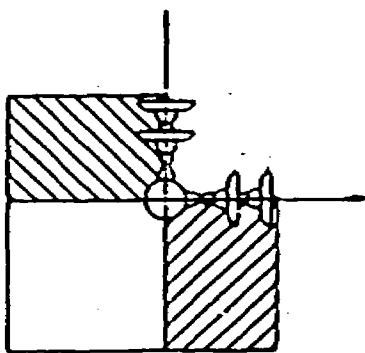
(D)



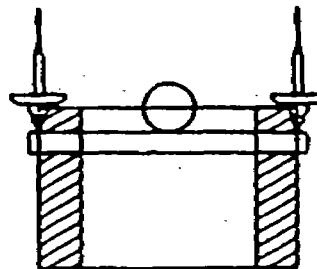
(E)



(F)



(G)



(H)

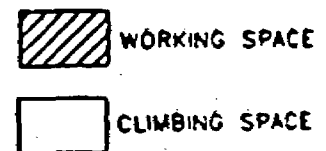


Figure 54-9

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINED)
RULE 54.7

54.7 Climbing and Working Space

This rule is not applicable to non-climbable poles. See Rule 22.0-D for definition.

Climbing space shall be maintained from the ground level. Climbing space, measured from center line of pole, shall be provided on one side or in one quadrant of all poles or structures with dimensions as specified in the following:

	<u>Rules</u>
Wood Crossarm Construction	54.7-A1 & A2
Without Wood Crossarms (More than 750 Volts) = <u>(Vertical and Triangular Construction)</u>	54.11-F
Low Voltage Rack Construction	54.9-F
<u>Low Voltage Extended Rack Construction</u>	54.12-F
Low Voltage Multiconductor Cable w/Bare With Bare - Neutral <u>Construction</u>	54.10-F
Poles Jointly Used	84.7 & 93
Allowable Obstructions of These Climbing Spaces.	54.7-A3
	54.9-F
	<u>54.12-F3</u>
	<u>54.10-F3</u>
	54.11-G
	84.7-E
<u>Working Space (All Types of Construction)</u>	<u>54.7-B</u>

The dimensions specified in the above rules may be reduced not more than 2% because of line angles and minor field variations.

The climbing space required by this rule Rules 54.7-A and 54.11-F may be shifted laterally not more than 5 inches, on-the-condition-that However, the midpoint of the side of the climbing space coinciding with the center line of the pole shall not be more than 5 inches from the center line of the pole, and the minimum distance of any unprotected conductor (or other energized unprotected part) from center line of pole shall be maintained (See Table 1, Case 8).

A. CLIMBING SPACE (Wood Crossarm Construction)

Climbing-space-shall-be-maintained-from-the-ground-level. The climbing space shall be maintained in the same position for a distance of not less than 4 feet vertically both above and below each conductor level through which it passes. To comply with this requirement the position of the climbing space shall not be changed through conductor levels which are less than 4 feet apart. Where the vertical distance between consecutive conductor levels is 4 feet or more, and less than 8 feet, the position of the climbing space through such consecutive level may be shifted not more than one-quarter (90 degrees) of the distance around the pole.

(Strike Out & Underlined Rule 54.7-A cont.)

Where a single level of circuitry is installed at the top of a pole, the climbing space shall extend up to the level of such pole-top circuitry and need not be provided through and above such level. Where a conductor is installed at the top of a pole under the provisions of Rule 54.4-D8, the climbing space shall extend up to the level of such pole-top conductor but need not be provided through and above such level.

(1) **Dimensions Where Line Arms Only Are Involved:** The climbing space where line arms without related buck arms are involved on poles or structures shall be on one side or face of the pole, with the center line of pole approximately midway on one side of the climbing space (See Figure 54-5), and shall have the following dimensions:

Voltage of conductors	Dimensions of Square
0-7,500 Volts	30 inches
7,500-46,000 Volts	36 inches
More than 46,000 Volts	36 inches plus 1/2" per kV in excess of 46kV

CLIMBING SPACE
LINE ARMS ONLY
Rule 54.7-A1

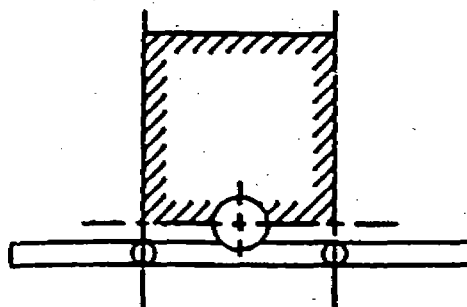


FIGURE 54-5

(Strike Out & Underlined Rule 54.7-A cont.)

(2) Dimensions Where buck Arms Are Involved: The climbing space where line arms and related buck arms are involved on poles or structures shall be on one side or face of the pole, or in a quadrant as defined below:

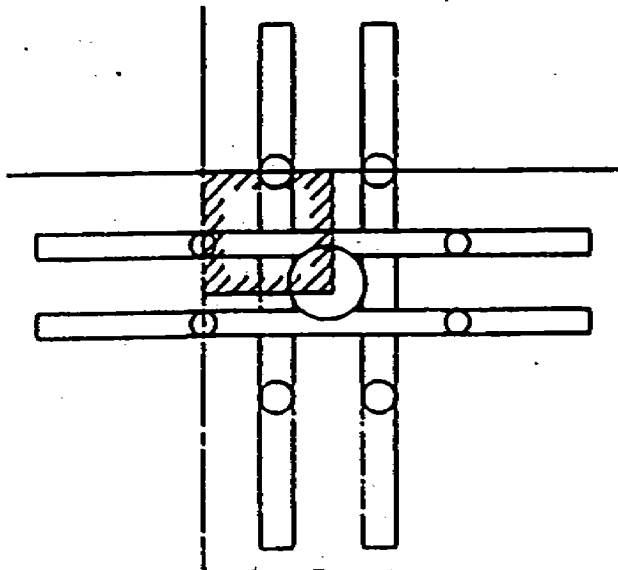
(a) Where the Vertical Clearance Between Conductors on Line and Buck Arms is Four Feet or More: The climbing space shall be provided on one side or face of the pole for each arm as specified in Rule 54.7-A1.

(b) Where the Vertical Clearance Between Conductors on Line and Buck Arms is Less Than Four Feet: The climbing space shall be provided through such levels and located in a quadrant and shall have at least the following dimensions (See Figure 54-6).

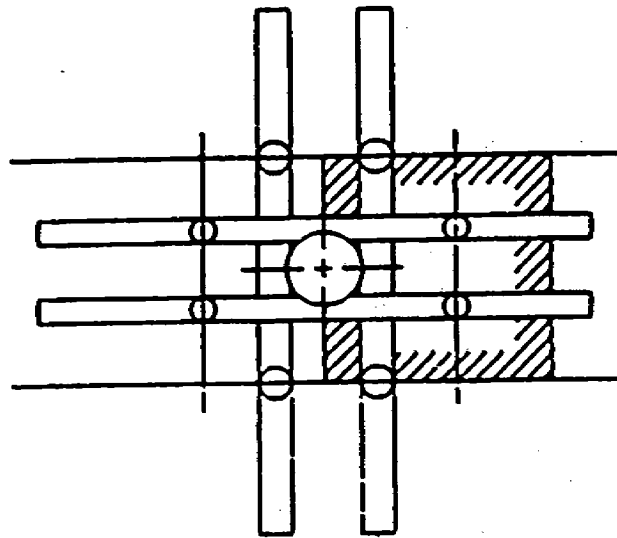
Voltage of Conductors	Dimensions of Square
0-7,500 Volts	30 inches
7,500-35,000 Volts	42 inches

For circuitry located at pole top, the climbing space specified in Rule 54.7-A1 may be applied to the lower arm and up to but not through the conductors on the top arm (See Fig. 54-7).

**CLIMBING SPACE
LINE AND BUCK ARMS
LESS THAN 4-FOOT SEPARATION
Rule 54.7-A2b**



Pole Top or
Below Pole Top
FIGURE 54-6



(Optional)
At Pole Top
FIGURE 54-7

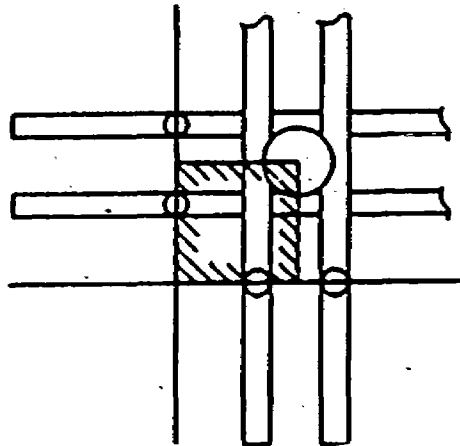
(Strike Out & Underlined Rule 54.7-A2 cont.)

(c) For Combination Arm Construction with Line Arm and Buck Arms or Service Buck Arm (see Rule 54.8-E for requirements where service drops are involved):

Where the vertical separation between conductor levels on line and buck arms is 4 feet or more, the climbing space shall be provided on one side or face of the pole for each level as specified in Rule 54.7-A1.

Where the vertical separation between conductor levels on line and buck arms is less than 4 feet such separation shall not be less than 2 feet, and the climbing space shall not be less than prescribed in Rule 54.7-A2b and the dimensions shall be in accordance with the highest voltage adjacent to the climbing quadrant (See Figure 54-8).

**CLIMBING SPACE
COMBINATION ARM CONSTRUCTION
LESS THAN 4-FOOT SEPARATION
Rule 54.7-A2c**



<u>Dimensions of Square</u> ----- <u>Volts</u> ----- <u>inches</u>	<u>Dimensions of Square</u>
<u>Voltage of Conductors</u>	
0-7,500 <u>Volts</u>	30 <u>inches</u>
7,500-35,000 <u>Volts</u>	42 <u>inches</u>

Below Pole Top
FIGURE 54-8

- (3) Allowable Climbing Space Obstructions: Allowable climbing space obstructions are:
- (a) Crossarms and their supporting members are allowed in climbing spaces.
 - (b) Insulators and their attaching brackets which support line conductors may extend not more than one-half of their diameter into the climbing space.
 - (c) Conductors may extend one-half of their diameter into the climbing space.
 - (d) Suitably protected (covered only by wood, see Rule 22.2):
 - 1) Vertical risers; or
 - 2) Vertical runs; or
 - 3) Ground wires.

Such risers, runs, and grounds are allowable provided that not more than one is installed in any 4-foot section of climbing space.

conductors attached to the surface of poles and guys

(e) Guys (except those guys metallically contacting metal pins of or deadend hardware as specified in Rule 52.7-D). However, not more than two guys having a vertical separation of 18 inches or less can be installed in any 4-foot section of climbing space.

are allowed in climbing spaces provided that not more than two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches) and one vertical riser, run, or ground wire are installed in any 4-foot vertical section of climbing space.

(f) Street light brackets may extend one-half their diameter into climbing space. Associated street light bracket struts are allowed in climbing space.

(g) Operating rods (e.g. switch rods) may extend one-half their diameter into climbing space.

(h) Bands, limited to 6 inches in width with no more than one band allowed in any 24-inch section of climbing space (these limitations are excluded for pole stubbing and pole splicing bands when pole step provisions are installed).

(i) Bolts and their washers. However, bolts bonded to or used for the attachment of deadend hardware of circuits above 750 volts a circuit of any voltage in horizontal (wood crossarm) configuration may that project into the climbing space provided they are shall be covered with a non-conducting material as specified in Rule 22.2-C. If such bolts are bonded, a positive electrical contact shall be made.

Exceptions: The covering of bolts required by this rule shall not apply to:

a) Bolts associated with circuits of 0 to 750 volts at any level on pole or structure;

b) 1) Bolts associated with circuits of more than 7500 volts when located at the top level of a pole.

(Strike Out & Underlined Rule 54.7-A3 cont.)

or 21 Bolts associated with brackets and non-wood crossarms.

Modification of these requirements in Rule 54.7-A3 are specified in: Rule 54.9-F for rack construction; Rule 54.10-F3 for multiconductor cable with bare neutral construction; Rule 54.11-G for triangular and vertical construction climbing-space without wood crossarms; Rule 54.12-F3 for extended rack construction; and Rule 58.5-D for switches.

B. WORKING SPACE (All Types of Construction)

Working spaces, unobstructed by conductors or other equipment except as provided in Rule 54.7-B2, of the dimensions as specified in Rule 54.7-B1, shall be provided between supply conductor levels on all poles and in such positions that the working spaces include the climbing space.

(1) Dimensions of Working Space:

- a. The vertical dimensions of working space above and below supply conductor levels energized above 750 volts shall be equal to the entire vertical distance between the supply conductors involved (e.g. the entire vertical distance between a 750 -20,000 volt level and a 0-750 volt level).
- b. When there is no supply conductor level below a conductor level that is energized above 750 volts, the vertical dimension of working space shall be 6 feet.
- c. The vertical dimension of working space between supply conductor levels of 0-750 volts shall be equal to the vertical distance between such levels.
- d. The width of the working space where wood crossarms are involved shall extend from the climbing space to the outmost conductor position on the crossarm involved. The depth of the working space shall have the same dimension as the climbing space. This dimension shall be measured horizontally from the centerline of pole on the climbing side of pole. (See Figures 54-9 A, B and C.)
- e. The width of the working space of supply circuits above 750 volts where wood crossarms are not involved (e.g., vertical and triangular construction without wood crossarms) shall extend from the climbing space to the outmost conductor position on the conductor support involved. The depth of the working space shall have the same dimension as the climbing space and shall be measured from the centerline of pole (See Figure 54-9D and 54-9H). When conductors above 750 volts are located on one side of the pole only (e.g., vertical construction), the dimensions of working space shall be applied as illustrated in Figures 54-9E and 54-9F (dimension "A" is equal to the distance from the climbing space to the outmost conductor position). When climbing space is located in a quadrant, working space shall be applied as illustrated in Figure 54-9G.

(Strike Out & Underlined Rule 54.7-8 cont.)

f. The width and depth of the working space for supply circuits of 0-750 volts where wood crossarms are not involved shall be the same width and depth as the climbing space.

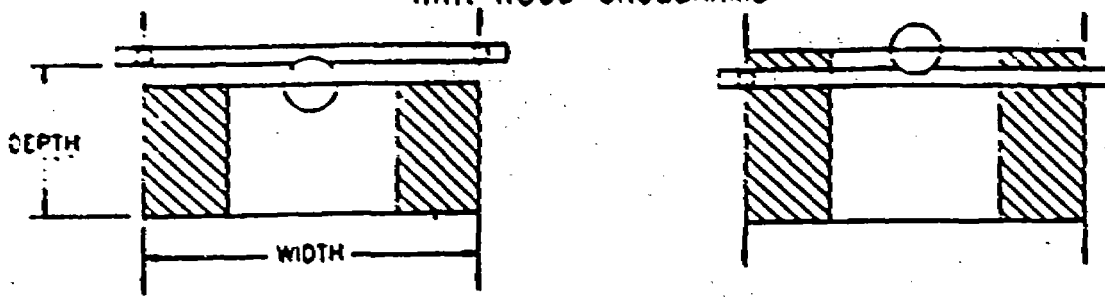
(2) Allowable Working space Obstructions:

- a. Taps from conductors on line arms or other supports, extending to conductors on related buck arms or other supports, may pass through the working space between such levels of conductors.
- b. Service drops of 0-750 volts may pass through the working space of conductors supported on the same crossarm with the drop conductors and may pass through working space of 750-7,500 volt conductors provided not less than the clearance between service drop and line conductors specified in Rule 54.8-C6 are maintained.
- c. Cutouts, disconnects, switches, lightning arresters and their leads may be installed in the working space (but not in the climbing space).
- d. Lead wires to transformers, capacitors, oil switches, vacuum switches, and other similar apparatus may pass through the working space adjacent to the line conductors to which such leads are attached.
- e. Terminal fittings of risers and runs, and their taps, may extend into the working space provided these fittings are the only obstruction of the working space at their level on the same side of the climbing space.
- f. Street lights and their associated hardware may extend into the working space.

Note: Revised May 22, 1990 by Resolution No. SU-5 and November 6, 1992 by Resolution SU-15.

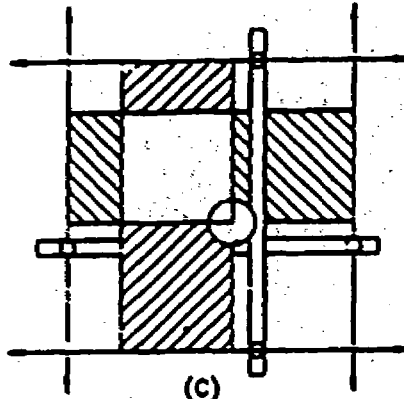
Requirements for Supply Lines

WORKING SPACE
Rule 54.7-B
WITH WOOD CROSSARMS



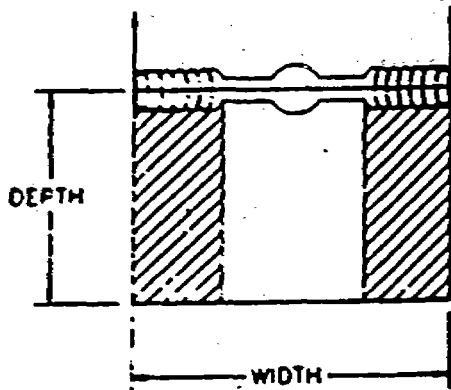
(A)

(B)

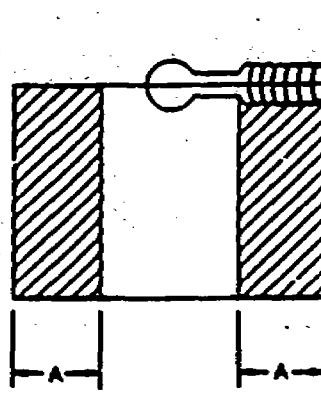


(C)

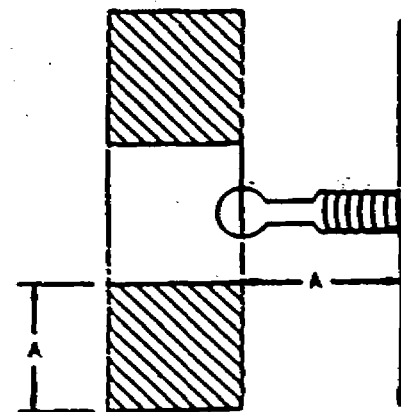
WITHOUT WOOD CROSSARMS
(e.g. Metallic Brackets, Arms, Supports, etc.)



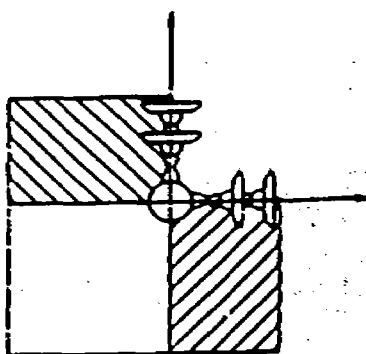
(D)



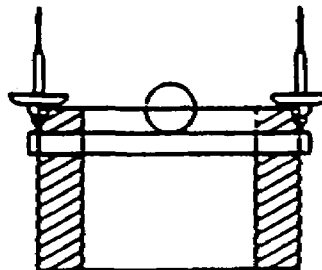
(E)



(F)



(G)



(H)

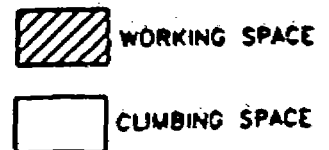


Figure 54-9

**PROPOSED RULE CHANGE
(FINAL)
RULE 54.7**

54.7 Climbing and Working Space

This rule is not applicable to non-climbable poles. See Rule 22.0-D for definition.

Climbing space shall be maintained from the ground level. Climbing space, measured from center line of pole, shall be provided on one side or in one quadrant of all poles or structures with dimensions as specified in the following:

	Rules
Wood Crossarm Construction	54.7-A1 & A2
Without Wood Crossarms More than 750 Volts - (Vertical and Triangular Construction)	54.11-F
Low Voltage Rack Construction	54.9-F
Low Voltage Extended Rack Construction	54.12-F
Low Voltage Multiconductor Cable With Bare - Neutral Construction	54.10-F
Poles Jointly Used	84.7 & 93
Allowable Obstructions of These Climbing Spaces.	54.7-A3
	54.9-F
	54.12-F3
	54.10-F3
	54.11-G
	84.7-E
	54.7-B
Working Space (All Types of Construction)	

The dimensions specified in the above rules may be reduced not more than 24 because of line angles and minor field variations.

The climbing space required by Rules 54.7-A and 54.11-F may be shifted laterally not more than 5 inches. However, the midpoint of the side of the climbing space coinciding with the center line of the pole shall not be more than 5 inches from the center line of the pole, and the minimum distance of any unprotected conductor (or other energized unprotected part) from center line of pole shall be maintained (See Table 1, Case 8).

A. CLIMBING SPACE (Wood Crossarm Construction)

The climbing space shall be maintained in the same position for a distance of not less than 4 feet vertically both above and below each conductor level through which it passes. To comply with this requirement the position of the climbing space shall not be changed through conductor levels which are less than 4 feet apart. Where the vertical distance between consecutive conductor levels is 4 feet or more, and less than 8 feet, the position of the climbing space through such consecutive level may be shifted not more than one-quarter (90 degrees) of the distance around the pole.

Where a single level of circuitry is installed at the top of a pole, the climbing space shall extend up to the level of such pole-top circuitry and need not be provided through and above such level. Where a conductor is installed at the top of a pole under the provisions of Rule 54.4-D8, the climbing space shall extend up to the level of such pole-top conductor but need not be provided through and above such level.

(1) **Dimensions Where Line Arms Only Are Involved:** The climbing space where line arms without related buck arms are involved on poles or structures shall be on one side or face of the pole, with the center line of pole approximately midway on one side of the climbing space (See Figure 54-5), and shall have the following dimensions:

Voltage of conductors	Dimensions of Square
0-7,500 Volts	30 inches
7,500-46,000 Volts	36 inches
More than 46,000 Volts	36 inches plus 1/2" per kV in excess of 46kV

CLIMBING SPACE
LINE ARMS ONLY
Rule 54.7-A1

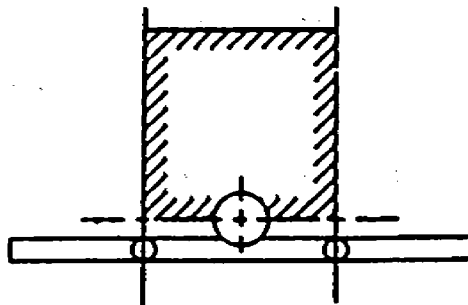


FIGURE 54-5

(2) Dimensions Where buck Arms Are Involved: The climbing space where line arms and related buck arms are involved on poles or structures shall be on one side or face of the pole, or in a quadrant as defined below:

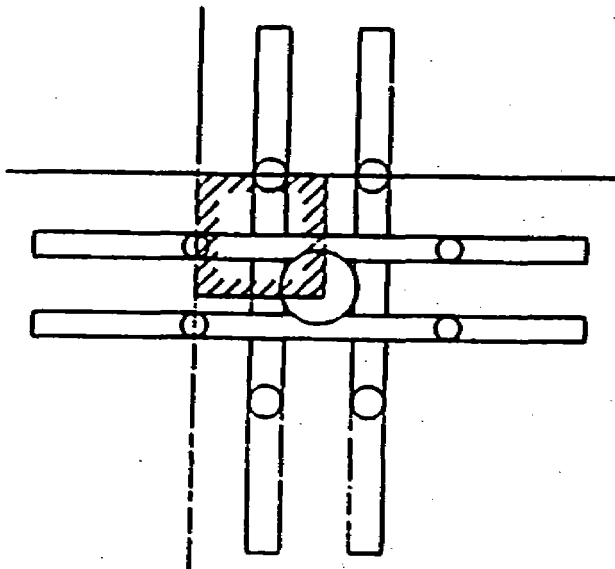
(a) Where the Vertical Clearance Between Conductors on Line and Buck Arms is Four Feet or More: The climbing space shall be provided on one side or face of the pole for each arm as specified in Rule 54.7-A1.

(b) Where the Vertical Clearance Between Conductors on Line and Buck Arms is Less Than Four Feet: The climbing space shall be provided through such levels and located in a quadrant and shall have at least the following dimensions (See Figure 54-6).

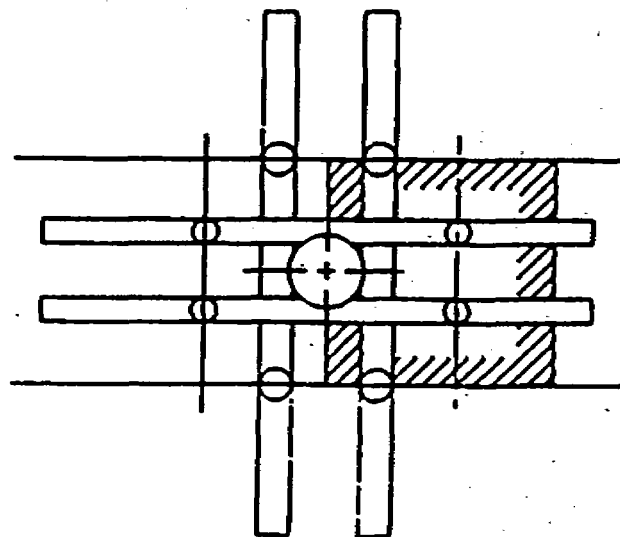
Voltage of Conductors	Dimensions of Square
0-7,500 Volts	30 inches
7,500-35,000 Volts	42 inches

For circuitry located at pole top, the climbing space specified in Rule 54.7-A1 may be applied to the lower arm and up to but not through the conductors on the top arm (See Fig. 54-7).

**CLIMBING SPACE
LINE AND BUCK ARMS
LESS THAN 4-FOOT SEPARATION
Rule 54.7-A2b**



Pole Top or
Below Pole Top
FIGURE 54-6



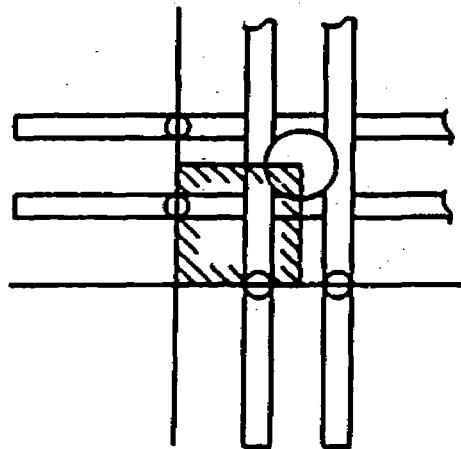
(Optional)
At Pole Top
FIGURE 54-7

(c) For Combination Arm Construction with Line Arm and Buck Arms or Service Buck Arm (see Rule 54.8-E for requirements where service drops are involved):

Where the vertical separation between conductor levels on line and buck arms is 4 feet or more, the climbing space shall be provided on one side or face of the pole for each level as specified in Rule 54.7-A1.

Where the vertical separation between conductor levels on line and buck arms is less than 4 feet such separation shall not be less than 2 feet, and the climbing space shall not be less than prescribed in Rule 54.7-A2b and the dimensions shall be in accordance with the highest voltage adjacent to the climbing quadrant (See Figure 54-8).

CLIMBING SPACE
COMBINATION ARM CONSTRUCTION
LESS THAN 4-FOOT SEPARATION
Rule 54.7-A2c



Voltage of Conductors

Dimensions of Square

0-7,500 Volts	30 inches
7,500-35,000 Volts	42 inches

Below Pole Top
FIGURE 54-8

- (3) Allowable Climbing Space Obstructions: Allowable climbing space obstructions are:
- (a) Crossarms and their supporting members.
 - (b) Insulators and their attaching brackets which support line conductors may extend one-half of their diameter into the climbing space.
 - (c) Conductors may extend one-half of their diameter into the climbing space.
 - (d) Suitably protected (covered only by wood, see Rule 22.2):
 - 1) Vertical risers; or
 - 2) Vertical runs; or
 - 3) Ground wires.

Such risers, runs, and grounds are allowable provided that not more than one is installed in any 4-foot section of climbing space.

(e) Guys (except those guys metallically contacting metal pins or deadend hardware as specified in Rule 52.7-D). However, not more than two guys having a vertical separation of 18 inches or less can be installed in any 4-foot section of climbing space.

(f) Street light brackets may extend one-half their diameter into climbing space. Associated street light bracket struts are allowed in climbing space.

(g) Operating rods (e.g. switch rods) may extend one-half their diameter into climbing space.

(h) Bands, limited to 6 inches in width with no more than one band allowed in any 24-inch section of climbing space (these limitations are excluded for pole stubbing and pole splicing bands when pole step provisions are installed).

(i) Bolts and their washers. However, bolts bonded to or used for the attachment of deadend hardware of circuits above 750 volts in wood crossarm configuration that project into the climbing space shall be covered with a non-conducting material as specified in Rule 22.2-C. If such bolts are bonded, a positive electrical contact shall be made.

Exceptions: The covering of bolts required by this rule shall not apply to:

- 1) Bolts associated with circuits of more than 7500 volts when located at the top level of a pole.
- 2) Bolts associated with brackets and non-wood crossarms.

Modification of these requirements in Rule 54.7-A3 are specified in: Rule 54.9-F for rack construction; Rule 54.10-F3 for multiconductor cable with bare neutral construction; Rule 54.11-G for triangular and vertical construction without wood crossarms; Rule 54.12-F3 for extended rack construction; and Rule 58.5-D for switches.

B. WORKING SPACE (All Types of Construction)

Working spaces, unobstructed by conductors or other equipment except as provided in Rule 54.7-B2, of the dimensions as specified in Rule 54.7-B1, shall be provided between supply conductor levels on all poles and in such positions that the working spaces include the climbing space.

(1) Dimensions of Working Space:

- a. The vertical dimensions of working space above and below supply conductor levels energized above 750 volts shall be equal to the entire vertical distance between the supply conductors involved (e.g. the entire vertical distance between a 750 -20,000 volt level and a 0-750 volt level).
- b. When there is no supply conductor level below a conductor level that is energized above 750 volts, the vertical dimension of working space shall be 6 feet.
- c. The vertical dimension of working space between supply conductor levels of 0-750 volts shall be equal to the vertical distance between such levels.
- d. The width of the working space where wood crossarms are involved shall extend from the climbing space to the outmost conductor position on the crossarm involved. The depth of the working space shall have the same dimension as the climbing space. This dimension shall be measured horizontally from the centerline of pole on the climbing side of pole. (See Figures 54-9A, B and C.)
- e. The width of the working space of supply circuits above 750 volts where wood crossarms are not involved (e.g., vertical and triangular construction without wood crossarms) shall extend from the climbing space to the outmost conductor position on the conductor support involved. The depth of the working space shall have the same dimension as the climbing space and shall be measured from the centerline of pole (See Figure 54-9D and 54-9H). When conductors above 750 volts are located on one side of the pole only (e.g., vertical construction), the dimensions of working space shall be applied as illustrated in Figures 54-9E and 54-9F (dimension "A" is equal to the distance from the climbing space to the outmost conductor position). When climbing space is located in a quadrant, working space shall be applied as illustrated in Figure 54-9G.
- f. The width and depth of the working space for supply circuits of 0-750 volts where wood crossarms are not involved shall be the same width and depth as the climbing space.

(2) Allowable Working Space Obstructions:

- a. Taps from conductors on line arms or other supports, extending to conductors on related buck arms or other supports, may pass through the working space between such levels of conductors.
- b. Service drops of 0-750 volts may pass through the working space of conductors supported on the same crossarm with the drop conductors and may pass through working space of 750-7,500 volt conductors provided not less than the clearance between service drop and line conductors specified in Rule 54.8-C6 are maintained.
- c. Cutouts, disconnects, switches, lightning arresters and their leads may be installed in the working space (but not in the climbing space).
- d. Lead wires to transformers, capacitors, oil switches, vacuum switches, and other similar apparatus may pass through the working space adjacent to the line conductors to which such leads are attached.
- e. Terminal fittings of risers and runs, and their taps, may extend into the working space provided these fittings are the only obstruction of the working space at their level on the same side of the climbing space.
- f. Street lights and their associated hardware may extend into the working space.

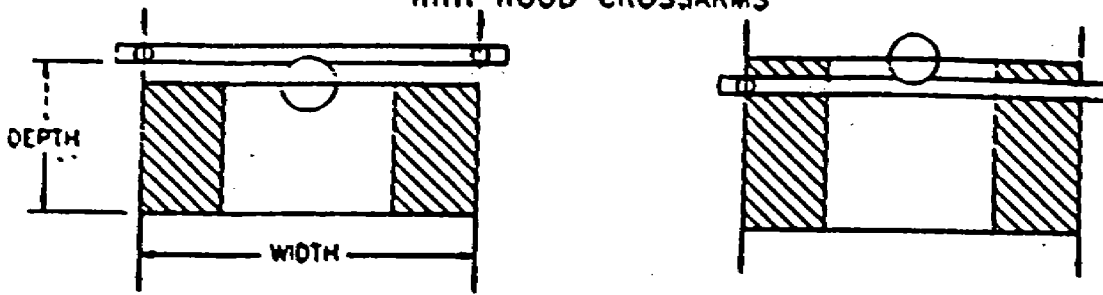
Note: Revised May 22, 1990 by Resolution No. SU-5 and November 6, 1992 by Resolution SU-15.

Requirements for Supply Lines

WORKING SPACE

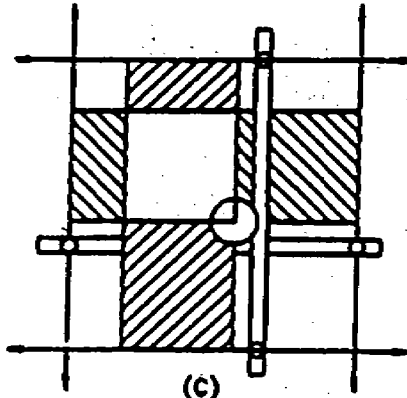
Rule 54.7-B

WITH WOOD CROSSARMS



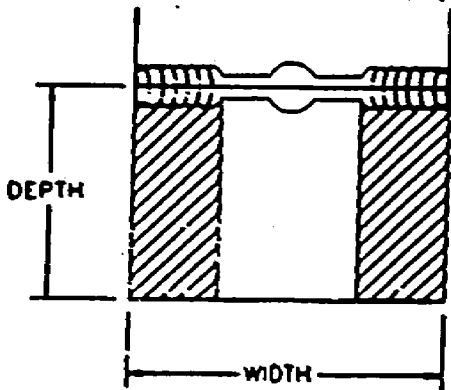
(A)

(B)

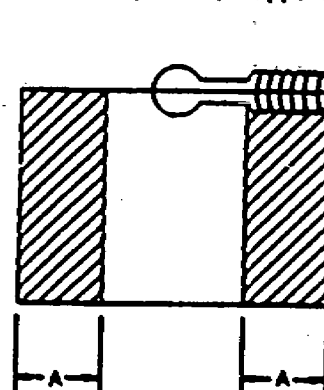


(C)

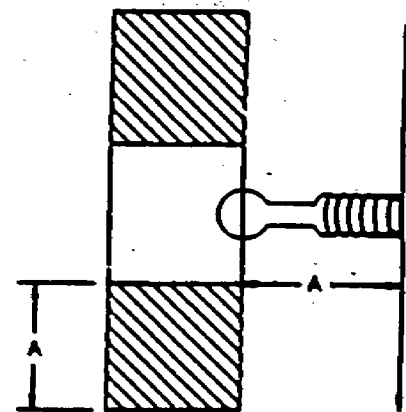
WITHOUT WOOD CROSSARMS (e.g. Metallic Brackets, Arms, Supports, etc.)



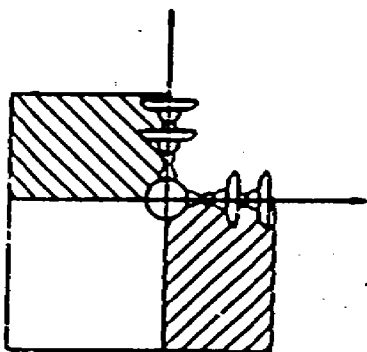
(D)



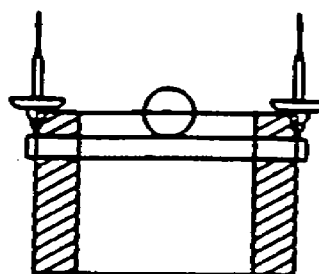
(E)



(F)



(G)



(H)

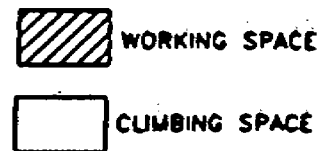


Figure 54-9

(Final Rule 54.7 cont.)

ASSOCIATED RULE CHANGE
(WITH RULE 54.7-A)
EXISTING RULE
RULE 54.4-DB

Rule 54.4-D, Conductor - Clearances - From Poles

Rule 54.4-DB, Clearance - At Top of Pole

(8) At Top of Pole:

Clearance Between a Single Conductor and Center Line of Pole:
A single conductor of a circuit may be attached directly to the top of a pole or to a crossarm at the top of a pole at a distance less than as specified in Table 1, Case 8. Where a transformer(s) or similar apparatus is connected to a circuit so arranged, a vertical clearance of not less than 30 inches shall be maintained between its unenergized metal parts and the primary conductor directly above.

Where this construction is used, no conductors of other circuits on the pole shall be less than 6 feet below the pole-top conductor.

EXCEPTION: In rural districts this clearance may be reduced to 4 feet when the primary circuit supplies a 0-750 volt circuit below.

For pole-top triangular and vertical construction without the use of wood crossarms see Rule 54.11.

NOTE: Revised March 28, 1966 by Decision No. 70489; August 9, 1966 by Decision No. 71094; March 9, 1988 by Resolution E-3075 and May 22, 1990 by Resolution SU-5.

ASSOCIATED RULE CHANGE
(WITH RULE 54.7-A)
(STRIKE OUT AND UNDERLINED)
RULE 54.4-D8

Rule 54.4-D, Conductor - Clearances - From Poles

Rule 54.4-D8, Clearance - At Top of Pole

(8) At Top of Pole:

Clearance Between a Single Conductor and Center Line of Pole:
A single conductor of a circuit may be attached directly to the top of a pole or to a crossarm at the top of a pole at a distance less than as specified in Table 1, Case 8. Where a transformer(s) or similar apparatus is connected to a circuit so arranged, a vertical clearance of not less than 30 inches shall be maintained between its unenergized metal parts and the lowest primary line conductor of the circuit directly above.

~~Where this construction is used, no conductors of other circuits on the pole shall be less than 6 feet below the pole-top conductor.~~

~~EXCEPTION--in rural districts this clearance may be reduced to 4 feet when the primary circuit supplies a 0-750-volt circuit below.~~

For pole-top triangular and vertical construction without the use of wood crossarms see Rule 54.11.

NOTE: Revised March 29, 1966 by Decision No. 70489, August 9, 1966 by Decision No. 71094, March 9, 1969 by Resolution E-3078 and May 22, 1990 by Resolution SU-5.

ASSOCIATED RULE CHANGE
(WITH RULE 54.7-A)
(FINAL)
RULE 54.4-D8

Rule 54.4-D, Conductor - Clearances - From Poles

Rule 54.4-D8, Clearance - At Top of Pole

(8) At Top of Pole:

Clearance Between a Single Conductor and Center Line of Pole:
A single conductor of a circuit may be attached directly to the top of a pole or to a crossarm at the top of a pole at a distance less than as specified in Table 1, Case 8. Where a transformer(s) or similar apparatus is connected to a circuit so arranged, a vertical clearance of not less than 30 inches shall be maintained between its unenergized metal parts and the lowest primary line conductor of the circuit directly above.

For pole-top triangular and vertical construction without the use of wood crossarms see Rule 54.11.

NOTE: Revised March 29, 1988 by Decision No. 70489, August 9, 1988 by Decision No. 71094, March 9, 1988 by Resolution E-3076 and May 22, 1990 by Resolution SU-5.

**RATIONALE FOR PROPOSED
G.O. 95 RULE CHANGE
RULE 54.9**

The proposed changes are to simplify and clarify the language in Rule 54.9, and clarify its use in conjunction with Low Voltage Multiconductor Cable with a Bare Neutral, 0-750 volts.
Remove an unnecessary note from Rule 54.9-C2.
Remove an unnecessary portion of Rule 54.9-E1.

**Existing Rule
Low Voltage Racks
(54.9)**

Rule 54.9-A

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.

NOTE: Revised January 21, 1992, by Resolution SU-10.

B. POLE ARRANGEMENT AND CLEARANCE

(1) **Clearance From Poles:** Conductors of 0-750 volts in rack construction may have clearances less than 15 inches from centerline and 3 inches from surface of pole, as specified in Table 1, Column D, Cases 8 and 9, respectively, but shall have a clearance of not less than 2 1/2 inches from the surface of pole (for interpretation of this 2 1/2-inch clearance see App. G, Fig. 60).

(2) **Conductor Arrangement:** Not more than 7 conductors of not more than 2 circuits shall be attached to any pole in a continuous rack group. In a rack group the conductors shall be of one ownership and the vertical separations between line conductor attachments shall be uniform.

Conductors, both line and service drop, in rack configuration shall not be attached to more than 2 sides (there being 4 sides) of any pole at the level of any one rack group. Climbing space in conjunction with these attachments shall be maintained as specified in Rule 54.9-F.

C. CONDUCTOR MATERIAL

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

(1) **Urban Districts:** Conductors in rack construction in urban districts shall have a covering not less than the equivalent of double braid weather-resistant covering.

(2) Rural Districts: Line conductors in rack construction in rural districts may be bare conductors provided the vertical separation between conductors is not less than 12 inches and conforms to the requirements of Rule 54.9-D where greater separation is specified.

NOTE: Resolution No. E-949 effective February 11, 1957 authorized that the provisions of Rule 54.9-C1, 54.9-C2 and 54.9-D shall not be held to apply to the use of 0-750 volt duplex service drop cable consisting of one suitably insulated conductor with a bare neutral conductor as the line conductor between a pole supporting street light circuits and metal and/or concrete electroliers or wood or steel poles where the latter supports street light fixtures.

D. CONDUCTOR SPACING AND SPAN LENGTH

The vertical separation between conductors supported as a group in rack construction shall be not less than the following for span lengths as indicated:

Length of Span (feet)	Minimum Vertical Separation (inches)
150 or less	6
200 or less, but more than 150	8
330 or less, but more than 200	12
More than 330	16

E. VERTICAL CLEARANCE BETWEEN CONDUCTOR LEVELS

A vertical clearance of not less than 6 feet shall be maintained between the top conductor supported in rack construction at one level and conductors supported on the same pole at the next level above except as provided in Rule 54.4-C6 for lead wires and as modified below:

(1) With Guard Arm Below Conductors of 750-22,500 Volts: The vertical clearance between the top conductor in a rack group and conductors of 750-22,500 volts at the next conductor level above, may be less than 6 feet but shall be not less than 4 feet. If a clearance of less than 6 feet is used, all of the following requirements shall be met:

A wood guard arm not less than 48 inches long shall be installed directly above and approximately parallel to the top line conductor of such a rack group; or where the conductor of a rack group dead-ends, the guard arm may be placed above the rack at a right angle to the line conductor, provided that no service drop conductor attached to a rack so guarded makes a horizontal angle greater than 90 degrees with the vertical plane of the line conductors;

Conductors in such a rack group, which are so guarded shall not be attached to more than one side (there being four sides) of any pole; and

No service drop conductors supported on a rack with the guard arm installed directly above and approximately parallel to the top line conductor of a rack group shall pass between the surface of pole and the vertical plane of the line conductors.

Any service drop conductors attached to and supported by the line conductors shall have a clearance of not less than 15 inches from surface of pole (see App. G, Fig. 43).

Each guard arm and its pole attachments are required by Rule 46 to withstand a vertical load of 200 pounds at either end.

NOTE: Revised March 29, 1966 by Decision No. 70489; August 9, 1966 by Decision No. 71094 and September 18, 1967 by Decision No. 72984.

(2) **With Guard Arm Below Conductors of 0-750 Volts:** The vertical clearance between the top conductor in a rack group and conductors of 0-750 volts at the next conductor level above may be less than 6 feet but shall be not less than 4 feet. If a clearance of less than 6 feet is used, a wood guard arm not less than 48 inches long shall be installed directly above and parallel to the top line conductor of such a rack group.

(3) **Under a Transformer:** No guard arm will be required over line or service drop conductors attached in rack construction to the surface of a pole directly below a transformer installation provided that at that level all attachments to the pole shall be approximately in the vertical plane through the center lines of pole and transformer installation and no conductor so attached makes an angle greater than 60 degrees with that plane. The top conductor so supported shall have a vertical clearance of not less than 48 inches below the level of conductors on the hanger arm; a vertical clearance not less than as specified in Rule 54.4-C6 below the lowest point of the drip loop of primary leads to the transformer; and a vertical clearance of not less than 10 inches below the lowest part of the transformer case or hangers (see App. G, Fig. 33).

(4) **In Rural Districts:** In rural districts (see definition, Rule 21.0-B) where one circuit only of 7,500-22,500 volts is supported on the poles above conductors in rack construction, the vertical clearance between the top conductor in rack construction and the nearest 7,500-22,500 volt conductor level may be less than 6 feet but not less than 4 feet and no guard arm is required.

NOTE: Revised March 29, 1966 by Decision No. 70489 and August 9, 1966 by Decision No. 71094.

(5) **Related Rack and Crossarm:** Where conductors supported in rack construction are connected to conductors supported on a crossarm on the same pole, the vertical clearance between the level of conductors of 0-750 volts on the crossarm and the nearest conductor in rack construction shall be not less than 2 feet and climbing space shall be maintained in the same quadrant or on the same side of pole through both conductor levels in accordance with climbing space requirements in

Rules 54.7 and 54.9-F. This provision is not applicable where the crossarm is a combination arm.

F. CLIMBING SPACE IN RACK CONSTRUCTION (see App. G, Fig. 32)

A climbing space shall be maintained through the levels of conductors supported in rack construction and for a vertical distance of not less than 4 feet above the top conductor and not less than 4 feet below the bottom conductor so supported.

The width of the climbing space measured horizontally through the centerline of pole shall be not less than 5 inches plus the diameter of the pole and the extremities of such width shall be equidistant from the centerline of pole. The depth of the climbing space shall be not less than 30 inches measured perpendicularly to this climbing space boundary through the centerline of pole. The width of the climbing space, perpendicular to and at the extremity of this 30-inch depth dimension, shall be not less than 38 inches and neither of the other two side boundaries shall make an angle of less than 90 degrees with the boundary through the centerline of pole (see App. G, Fig. 32).

The position of the climbing space through the levels of conductors in rack construction shall be related to climbing spaces through the levels of conductors on crossarms in accordance with the requirements of Rule 54.7-A. The climbing spaces through the levels of conductors of two or more rack groups which are separated less than 6 feet shall be maintained in the same quadrant or on the same side of pole.

Guys, vertical conductors attached to the surfaces of poles, and terminals, which are listed in Rule 54.7-A4 as allowable climbing space obstructions, are not permitted in climbing spaces through conductors in rack construction.

Strike Out and Underline
Rule 54.9
Low Voltage Racks

Requirements for Supply Lines
Rule 54.9-A

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.

NOTE: Revised January 21, 1992, by Resolution SU-10.

B. POLE ARRANGEMENT AND CLEARANCE

(1) **Clearance From Poles:** Conductors of 0-750 volts in rack construction may have clearances less than 15 inches from centerline and 3 inches from surface of pole, as specified in Table 1, Column D, Cases 8 and 9, respectively, but shall have a clearance of not less than ~~2-1/2~~ 2.5 inches from the surface of pole (for interpretation of this ~~2-1/2~~ 2.5 inch clearance see App. G, Fig. 60 Figure 54-20).

(2) **Conductor Arrangement:** Not more than 7 conductors of not more than 2 circuits shall be attached to any pole in a continuous rack group. In a rack group the conductors shall be of one ownership and the vertical separations between line conductor attachments shall be uniform.

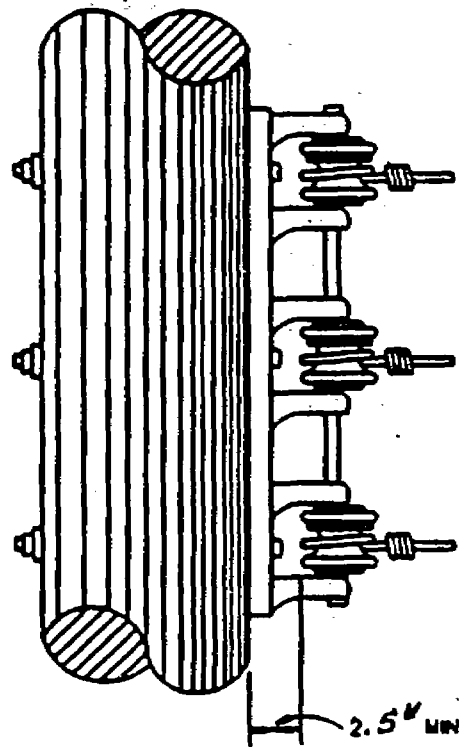
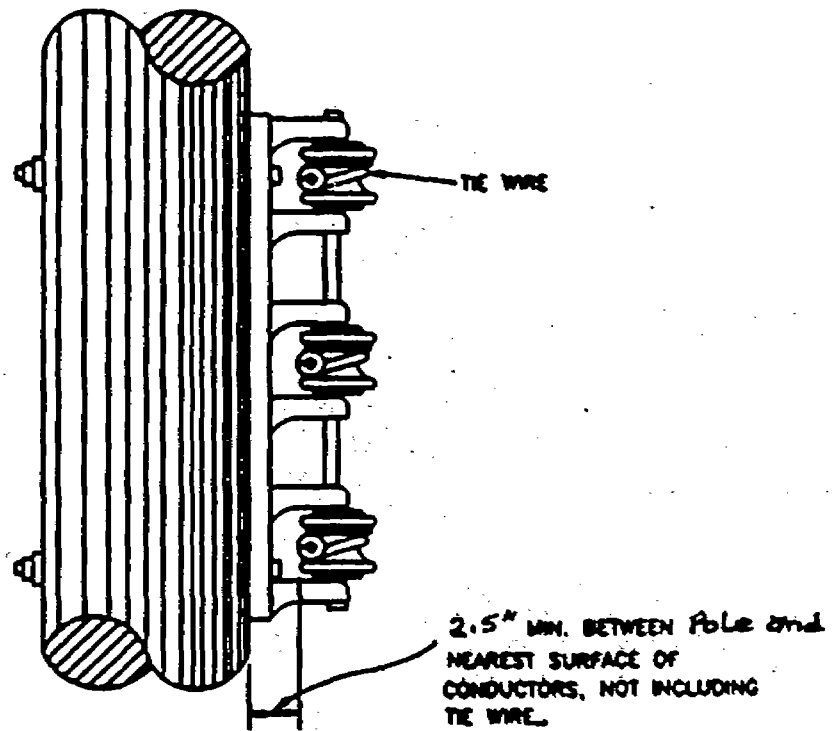
Conductors, both line and service drop, in rack configuration shall not be attached to more than ~~2~~ 3 sides (~~there being 4 sides~~) of any pole at the level of any one rack group. Climbing space in conjunction with these attachments shall be maintained as specified in Rule 54.9-F.

C. CONDUCTOR MATERIAL

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

(1) **Urban Districts:** Conductors in rack construction in urban districts shall have a covering not less than the equivalent of ~~double braid~~ weather-resistant covering.

Requirements for Supply Lines



Rule 54.9

Fig. 54-20

(2) Rural Districts: Line conductors in rack construction in rural districts may be bare conductors provided the vertical separation between conductors is not less than 12 inches and conforms to the requirements of Rule 54.9-D where greater separation is specified.

~~NOTE: Resolution No. E 949 effective February 11, 1957 authorized that the provisions of Rule 54.9 C1, 54.9 C2 and 54.9 D shall not be held to apply to the use of 0-750 volt duplex service drop cable consisting of one suitably insulated conductor with a bare neutral conductor as the line conductor between a pole supporting street light circuits and metal and/or concrete electroliers or wood or steel poles where the latter supports street light fixtures.~~

D. CONDUCTOR SPACING AND SPAN LENGTH

The vertical separation between conductors supported as a group in rack construction shall be not less than the following for span lengths as indicated:

Length of Span (feet)	Minimum Vertical Separation (inches)
150 or less	6
200 or less, but more than 150	8
330 or less, but more than 200	12
More than 330.....	16

E. VERTICAL CLEARANCE BETWEEN CONDUCTOR LEVELS

A vertical clearance of not less than 6 feet shall be maintained between the top conductor supported in rack construction at one level and conductors supported on the same pole at the next level above except as provided in Rule 54.4-C6 for lead wires and as modified below:

- (1) With Guard Arm Below Conductors of 750-22,500 Volts: The vertical clearance between the top conductor in a rack group and conductors of 750-22,500 volts at the next conductor level above, may be less than 6 feet but shall be not be less than 4 feet. If a clearance of less than 6 feet is used, all of the following requirements shall be met:

~~A wood guard arm not less than 48 inches long shall be installed directly above and approximately parallel to the top line conductor of such a rack group; or where the conductor of a rack group dead ends, the guard arm may be placed above the rack at a right angle to the line conductor, provided that no service drop conductor attached to a rack so guarded makes a horizontal angle greater than 90 degrees with the vertical plane of the line conductors;~~

Conductors in such a rack group, which are so guarded shall not be attached to more than one side (there being four sides) of any pole; and

No service drop conductors supported on a rack with the guard arm installed directly above and approximately parallel to the top line conductor of a rack group shall pass between the surface of pole and the vertical plane of the line conductors.

Any service drop conductors attached to and supported by the line conductors shall have a clearance of not less than 15 inches from surface of pole (see App. G, Fig. 43).

Each guard arm and its pole attachments are required by Rule 46 to withstand a vertical load of 200 pounds at either end.

NOTE: Revised March 29, 1966 by Decision No. 70489; August 9, 1966 by Decision No. 71094 and September 18, 1967 by Decision No. 72984.

(a) In tangent construction a guard arm shall be installed directly above and approximately parallel to the top line conductor of such a rack group. Service drop conductors supported on a rack with the guard arm installed directly above and approximately parallel to the top line conductor of a rack group shall not pass between the surface of pole and the vertical plane of the line conductors.

(b) In deadend construction, the guard arm shall be placed above the rack at a right angle to the line conductor, provided that no service drop conductor attached to a rack so guarded makes a horizontal angle greater than 90 degrees with the vertical plane of the line conductors.

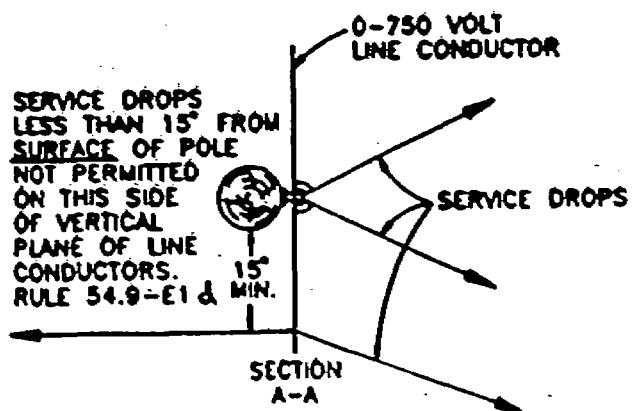
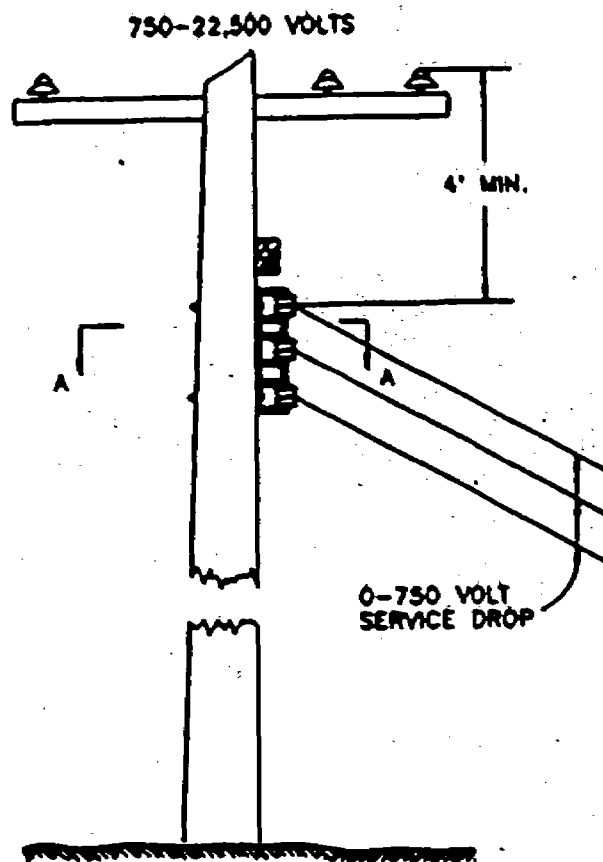
(c) Conductors in such a rack group, which are so guarded shall not be attached to more than one side of any pole.

(d) Any service drop conductors attached to and supported by the line conductors shall have a clearance of not less than 15 inches from surface of pole (See Figure 54-21).

NOTE: Revised March 29, 1966 by Decision No. 70489; August 9, 1966 by Decision No. 71094 and September 18, 1967 by Decision No. 72984.

~~(2) With Guard Arm Below Conductors of 0-750 Volts: The vertical clearance between the top conductor in a rack group and conductors of 0-750 volts at the next conductor level above may be less than 6 feet but shall be not less than 4 feet. If a clearance of less than 6 feet is used, a wood guard arm not less than 48 inches long shall be installed directly above and parallel to the top line conductor of such a rack group.~~

Requirements for Supply Lines



Rule 54.9

Fig. 54-21

~~(3-2) Conductors Deadended Under a Equipment: Transformer: No guard arm will be required over line or service drop conductors attached in rack configuration construction deadended to on the surface of a pole directly below equipment (e.g., transformer, capacitor and other similar apparatus). Such conductors shall have a vertical clearance of not less than: a transformer installation provided that at that level all attachments to the pole shall be approximately in the vertical plane through the center lines of pole and transformer installation and no conductor so attached makes an angle greater than 60 degrees with that plane. The top conductor so supported shall have a vertical clearance of not less than 48 inches below the level of conductors on the hanger arm; a vertical clearance not less than as specified in Rule 54.4 C6 below the lowest point of the drip loop of primary leads to the transformer; and a vertical clearance of not less than 10 inches below the lowest part of the transformer case or hangers (see App. G, Fig. 33).~~

- ~~(a) 4 feet below unprotected line conductors; and~~
- ~~(b) As specified in Rule 54.4-C 6 below the lowest point of the drip loop of the primary leads to the transformer(s); and~~
- ~~(c) 10 inches below the lowest part of the equipment case(s) or hanger(s).~~

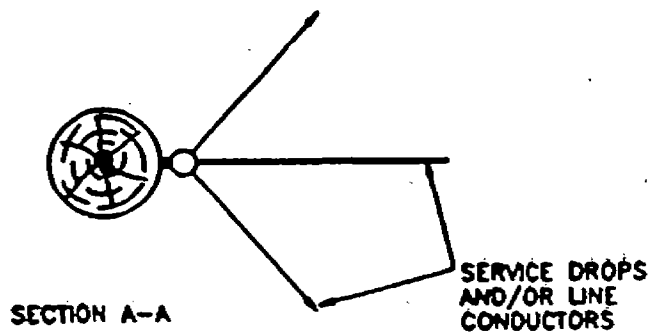
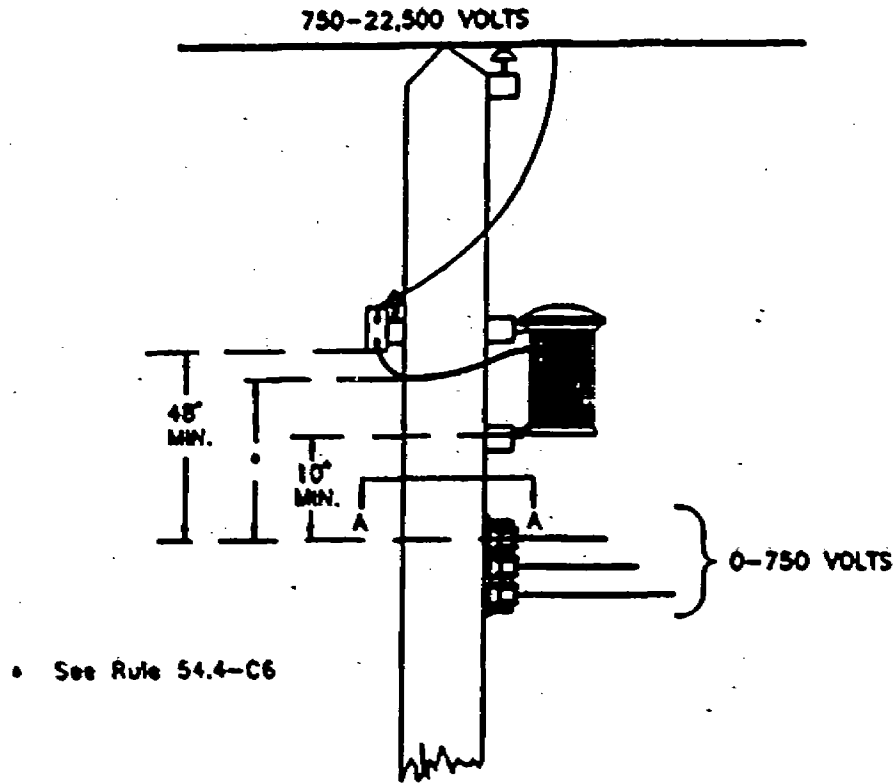
~~(See Figure 54-22)~~

~~(4) — In Rural Districts: In rural districts (see definition, Rule 21.0 B) w Where rack construction is installed in rural districts below conductors one circuit only of 7,500-22,500 volts, the vertical separation may be is supported on the poles above conductors in rack construction, the vertical reduce to clearance between the top conductor in rack construction and the nearest 7,500-22,500 volt conductor level may be less than 6 feet but not less than 4 feet and no guard arm is required.~~

~~NOTE: Revised March 29, 1966 by Decision No. 70489 and August 9, 1966 by Decision No. 71094.~~

~~(5-3) Related Rack and Crossarm or Extended Rack: Where conductors supported in rack construction are connected to conductors supported on a crossarm or extended rack on the same pole, the vertical clearance between the level of conductors of 0-750 volts on the crossarm or extended rack and the nearest conductor in rack construction shall be not not be less than 2 feet and climbing space shall be maintained in the same quadrant or on the same side of pole through both conductor levels in accordance with climbing space requirements in Rules 54.7, 54.9-F and 54.12-F. This provision is not applicable where the crossarm is a combination arm.~~

Requirements for Supply Lines



Rule 54.9

Fig. 54-22

(4) Multiconductor Cable with a Bare Neutral: Multiconductor Cable with a Bare Neutral, 0-750 volts (Rule 54.10), may be installed with a minimum vertical separation above or below conductors in rack configuration of 10 inches for spans not to exceed 200 feet and 12 inches for spans in excess of 200 feet. EXCEPTION: When rack construction is present, the most stringent climbing space requirements of Rule 54.9-F shall be maintained through both levels.

F. CLIMBING SPACE IN RACK CONSTRUCTION (See App. G, Fig. 32 see Figure 54-23)

A e-Climbing space shall be maintained through the levels of conductors supported in rack construction, and for a vertical distance of not less than 4 feet above the top conductor and not less than 4 feet below the bottom conductor so supported. Where conductors in rack construction are installed at pole top, the climbing space shall extend up to the level of the lowest conductor of the rack group, and need not be provided through and above such levels.

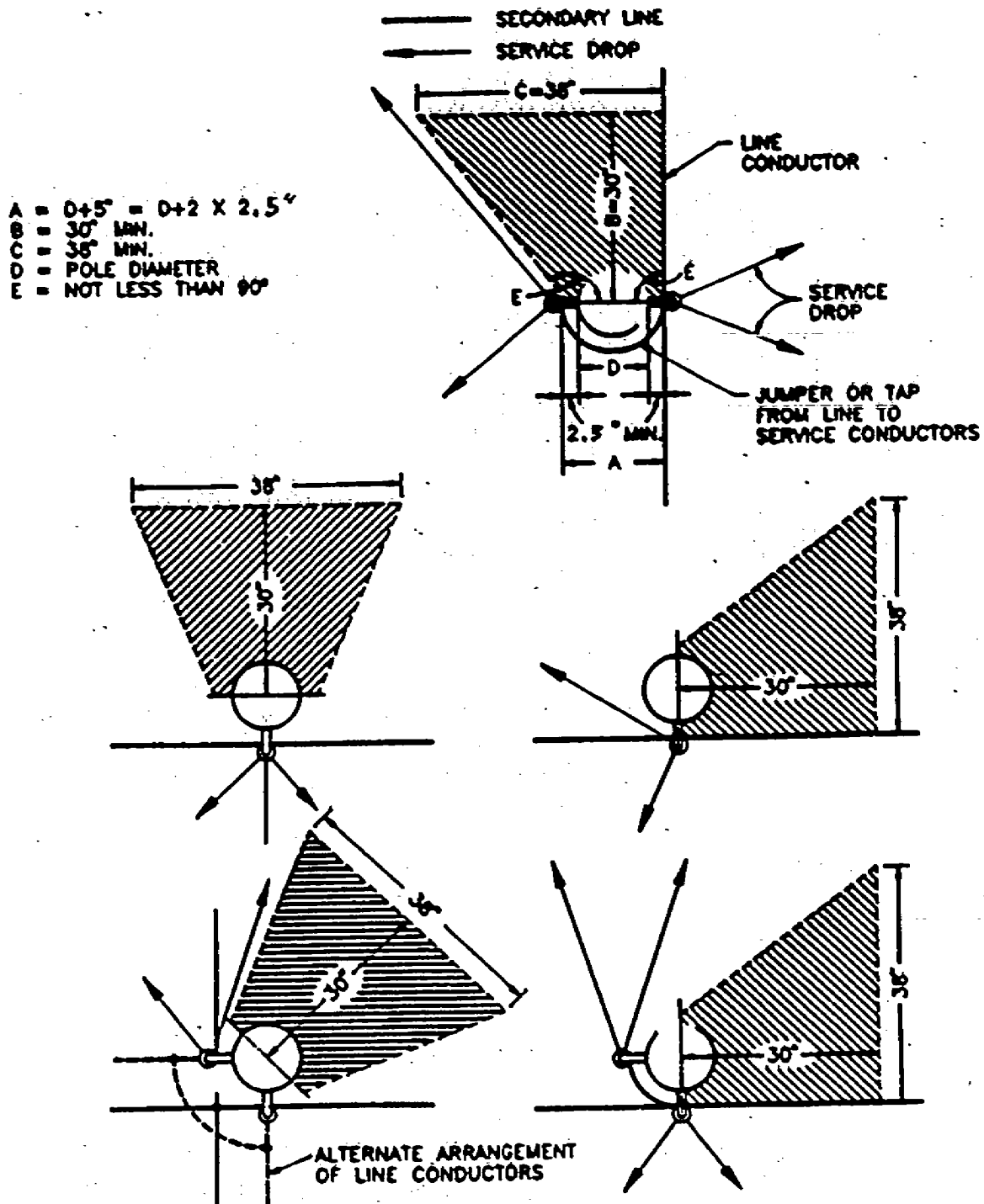
The width of the climbing space measured horizontally through the centerline of the pole shall be not be less than 5 inches plus the diameter of the pole and the extremities of such width shall be equidistant from the centerline of pole. The depth of the climbing space shall be not be less than 30 inches measured perpendicularly to this climbing space boundary through the centerline of pole. The width of the climbing space, perpendicular to and at the extremity of this 30-inch depth dimension, shall be not be less than 38 inches and neither of the other two side boundaries shall make an angle of less than 90 degrees with the boundary through the centerline of pole (see App. G, Fig. 32 (See Figure 54-23)).

The position of the climbing space through the levels of conductors in rack construction shall be related to climbing spaces through the levels of conductors on crossarms in accordance with the requirements of Rule 54.7-A, Extended Rack Rule 54.12-F and Multiconductor Cable with Bare Neutral Rule 54.10-F. The climbing spaces through the levels of conductors of two or more rack groups which are separated less than 6 feet shall be maintained in the same quadrant or on the same side of pole.

Guys, vertical conductors attached to the surfaces of poles, and terminals, which are listed in Rule 54.7 A4 as allowable climbing space obstructions, are not permitted in climbing spaces through conductors in rack construction.

Requirements for Supply Lines

CLIMBING SPACE
LOW VOLTAGE RACKS
0-750 VOLTS
RULE 54.9-F



Rule 54.9

Fig. 54-23

**Final
Low Voltage Racks
(54.9)**

**Requirements for Supply Lines
Rule 54.9-A**

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.

NOTE: Revised January 21, 1992, by Resolution SU-10.

B. POLE ARRANGEMENT AND CLEARANCE

(1) **Clearance From Poles:** Conductors of 0-750 volts in rack construction may have clearances less than 15 inches from centerline and 3 inches from surface of pole, as specified in Table 1, Column D, Cases 8 and 9, respectively, but shall have a clearance of not less than 2.5 inches from the surface of pole (for interpretation of this 2.5 inch clearance see Figure 54-20).

(2) **Conductor Arrangement:** Not more than 7 conductors of not more than 2 circuits shall be attached to any pole in a continuous rack group. In a rack group the conductors shall be of one ownership and the vertical separations between line conductor attachments shall be uniform.

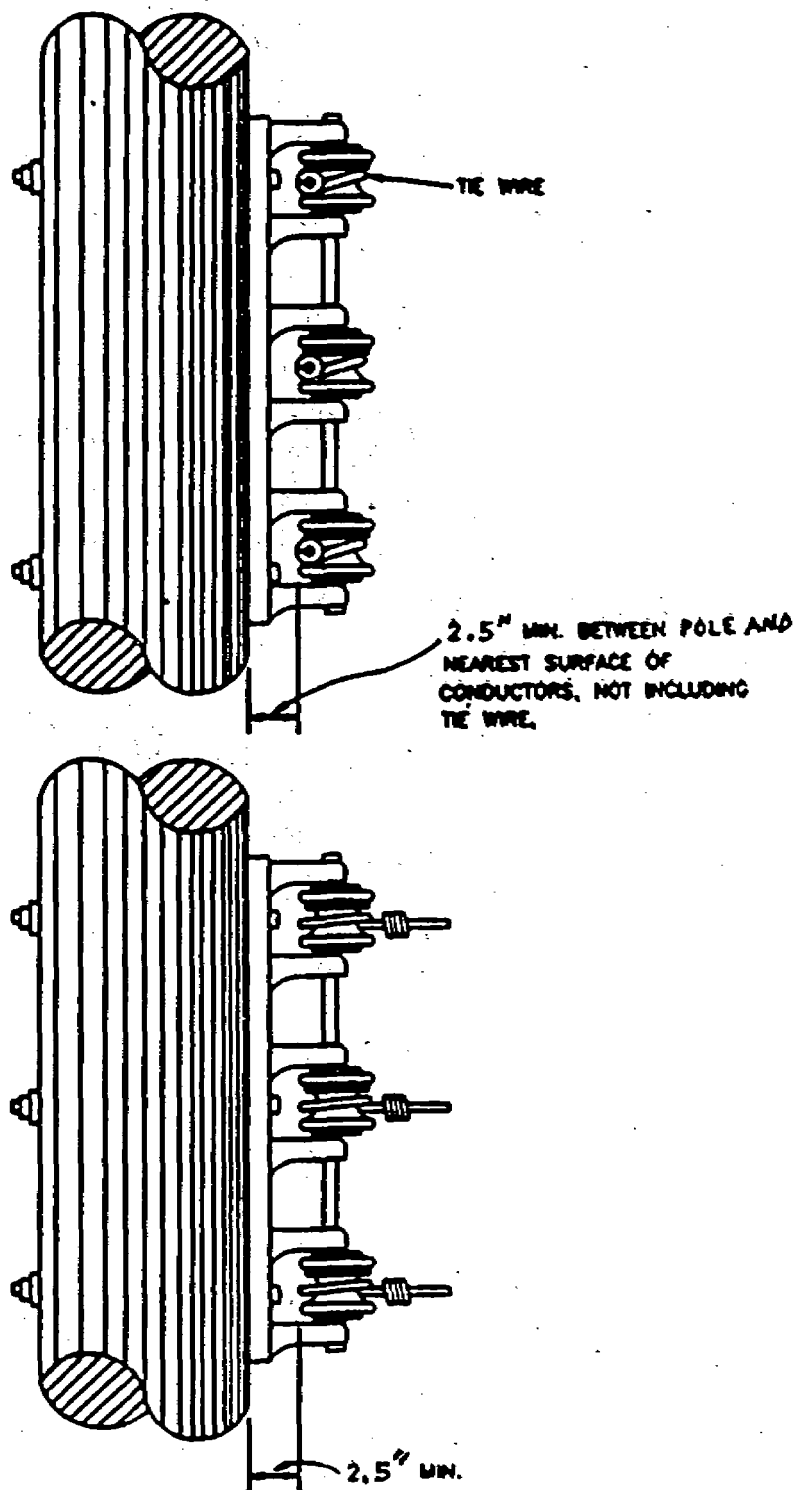
Conductors, both line and service drop, in rack configuration shall not be attached to more than 3 sides of any pole at the level of any one rack group. Climbing space in conjunction with these attachments shall be maintained as specified in Rule 54.9-F.

C. CONDUCTOR MATERIAL

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

(1) **Urban Districts:** Conductors in rack construction in urban districts shall have a covering not less than the equivalent of weather resistant covering.

Requirements for Supply Lines



Rule 54.9

Fig. 54-20

(2) Rural Districts: Line conductors in rack construction in rural districts may be bare conductors provided the vertical separation between conductors is not less than 12 inches and conforms to the requirements of Rule 54.9-D where greater separation is specified.

D. CONDUCTOR SPACING AND SPAN LENGTH

The vertical separation between conductors supported as a group in rack construction shall be not less than the following for span lengths as indicated:

Length of Span (feet)	Minimum Vertical Separation (inches)
150 or less	6
200 or less, but more than 150.....	8
330 or less, but more than 200	12
More than 330.....	16

E. VERTICAL CLEARANCE BETWEEN CONDUCTOR LEVELS

A vertical clearance of not less than 6 feet shall be maintained between the top conductor supported in rack construction at one level and conductors supported on the same pole at the next level above except as provided in Rule 54.4-C6 for lead wires and as modified below:

(1) With Guard Arm Below Conductors of 750-22,500 Volts: The vertical clearance between the top conductor in a rack group and conductors of 750-22,500 volts at the next conductor level above, may be less than 6 feet but shall not be less than 4 feet. If a clearance of less than 6 feet is used, all of the following requirements shall be met:

(a) In tangent construction a guard arm shall be installed directly above and approximately parallel to the top line conductor of such a rack group. Service drop conductors supported on a rack with the guard arm installed directly above and approximately parallel to the top line conductor of a rack group shall not pass between the surface of pole and the vertical plane of the line conductors.

(b) In deadend construction the guard arm shall be placed above the rack at a right angle to the line conductor, provided that no service drop conductor attached to a rack so guarded makes a horizontal angle greater than 90 degrees with the vertical plane of the line conductors.

(c) Conductors in such a rack group, which are so guarded shall not be attached to more than one side of any pole.

(d) Any service drop conductors attached to and supported by the line conductors shall have a clearance of not less than 15 inches from surface of pole (See Figure 54-21).

NOTE: Revised March 29, 1966 by Decision No. 70489; August 9, 1966 by Decision No. 71094 and September 18, 1967 by Decision No. 72984.

(2) **Conductors Deadended Under Equipment:** No guard arm will be required over conductors in rack configuration deadended on the surface of a pole directly below equipment (e.g., transformer, capacitor and other similar apparatus). Such conductors shall have a vertical clearance of not less than:

- (a) 4 feet below unprotected line conductors; and
- (b) As specified in Rule 54.4-C 6 below the lowest point of the drip loop of the primary leads to the transformer(s); and
- (c) 10 inches below the lowest part of the equipment case(s) or hanger(s).

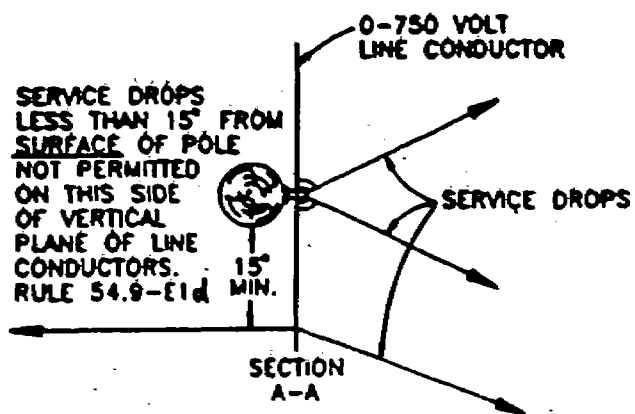
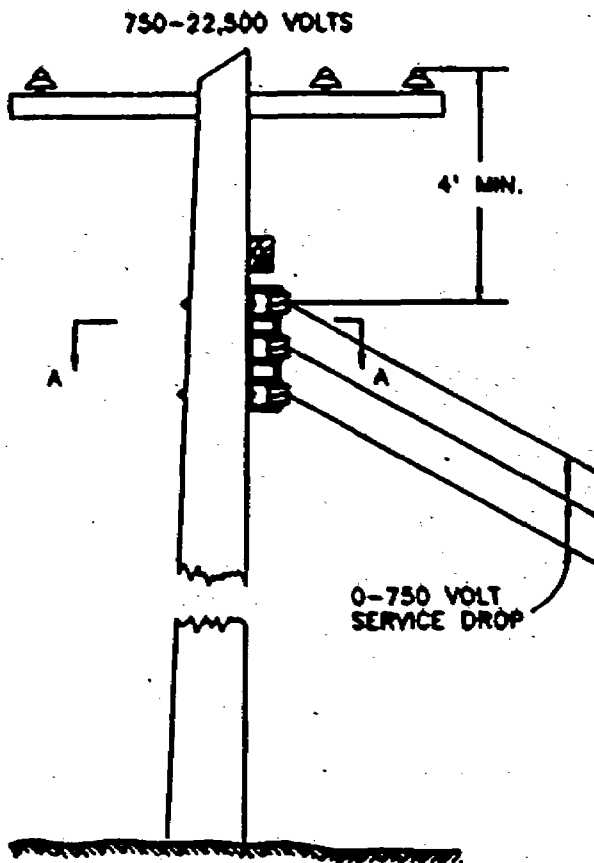
(See Figure 54-22)

NOTE: Revised March 29, 1966 by Decision No. 70489 and August 9, 1966 by Decision No. 71094.

(3) **Related Rack and Crossarm or Extended Rack:** Where conductors supported in rack construction are connected to conductors supported on a crossarm or extended rack on the same pole, the vertical clearance between the level of conductors of 0-750 volts on the crossarm or extended rack and the nearest conductor in rack construction shall not be less than 2 feet and climbing space shall be maintained in the same quadrant or on the same side of pole through both conductor levels in accordance with climbing space requirements in Rules 54.7, 54.9-F and 54.12-F. This provision is not applicable where the crossarm is a combination arm.

(4) **Multiconductor Cable with a Bare Neutral:** Multiconductor Cable with a Bare Neutral, 0-750 volts (Rule 54.10), may be installed with a minimum vertical separation above or below conductors in rack configuration of 10 inches for spans not to exceed 200 feet and 12 inches for spans in excess of 200 feet. **EXCEPTION:** When rack construction is present, the most stringent climbing space requirements of Rule 54.9-F shall be maintained through both levels.

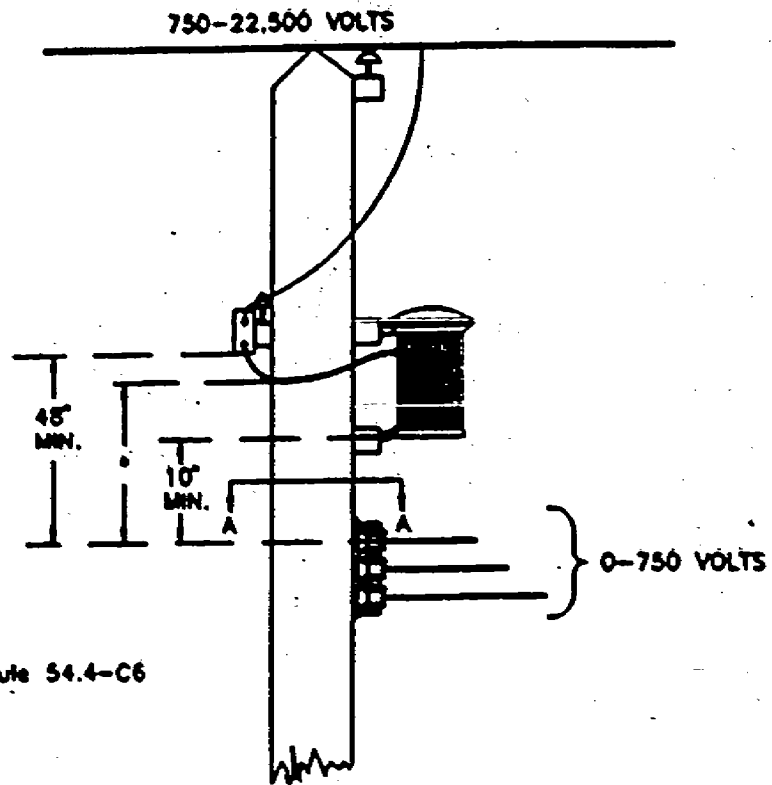
Requirements for Supply Lines



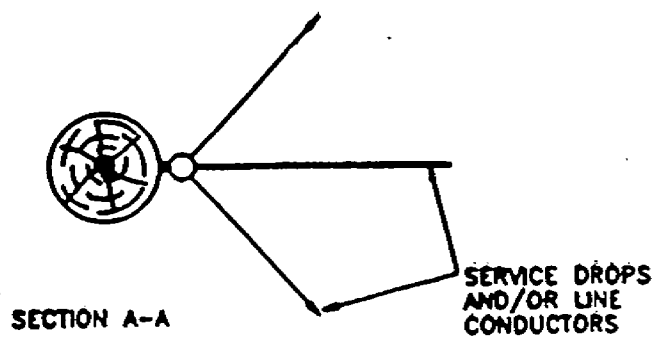
Rule 54.9

Fig. 54-21

Requirements for Supply Lines



• See Rule 54.4-C6



Rule 54.9

Fig. 54-22

F. CLIMBING SPACE IN RACK CONSTRUCTION (See Figure 54-23)

Climbing space shall be maintained through the levels of conductors supported in rack construction, for a vertical distance of not less than 4 feet above the top conductor and not less than 4 feet below the bottom conductor so supported. Where conductors in rack construction are installed at pole top, the climbing space shall extend up to the level of lowest conductor of the rack group, and need not be provided through and above such levels.

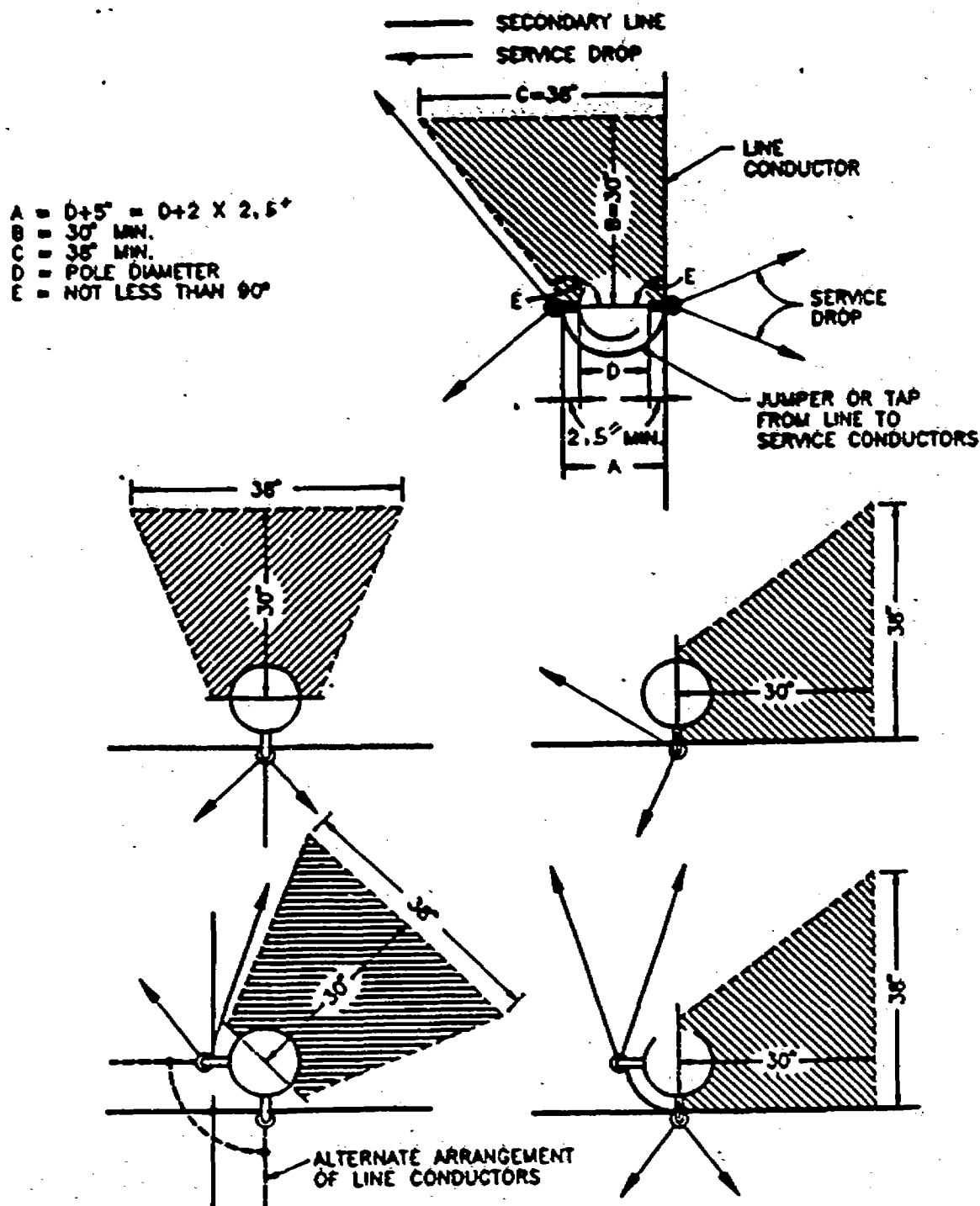
The width of the climbing space measured horizontally through the centerline of the pole shall not be less than 5 inches plus the diameter of the pole and the extremities of such width shall be equidistant from the centerline of pole. The depth of the climbing space shall not be less than 30 inches measured perpendicularly to this climbing space boundary through the centerline of pole. The width of the climbing space, perpendicular to and at the extremity of this 30-inch depth dimension, shall not be less than 38 inches and neither of the other two side boundaries shall make an angle of less than 90 degrees with the boundary through the centerline of pole (See Figure 54-23).

The position of the climbing space through the levels of conductors in rack construction shall be related to climbing spaces through the levels of conductors on Crossarms in accordance with the requirements of Rule 54.7-A, Extended Rack Rule 54.12-F and Multiconductor Cable with Bare Neutral Rule 54.10-F. The climbing spaces through the levels of conductors of two or more rack groups which are separated less than 6 feet shall be maintained in the same quadrant or on the same side of pole.

Guys, vertical conductors attached to the surfaces of poles, and terminals, are not permitted in climbing spaces through conductors in rack construction.

Requirements for Supply Lines

CLIMBING SPACE
LOW VOLTAGE RACKS
0-750 VOLTS
RULE 54.8-F



Rule 54.9

Fig. 54-23

**Rationale For Proposed GO 95 Rule Change
Rule 54.10**

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

The proposed changes are to simplify and clarify the present language in Rule 54.10. In addition, changes approved by the Commission for Rule 54.10-B by Resolution E-3076, March 9, 1988 are not reflected accurately in the existing rule. These changes are shown in the "Existing Rule" portion of this proposal and approval of this change recommendation will correct this problem.

EXISTING RULE
(Rule 54.10-A)

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

A. GENERAL

The following rules cover requirements for 0-750 volt multiconductor cable having a bare neutral and are supplemental to the other rules of this order.

The term "messenger" as defined in Rule 21.11 of this order when used in Rule 54.10 of this order includes the bare neutral conductor whenever such conductor serves both as a conductor and also as a principal supporting member of the cable.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)

A. GENERAL

The following rules cover requirements for 0-750 volt bare neutral multiconductor cable (when used as line conductor) having a bare neutral and are supplemental to the other rules of this order.

The term "messenger", as defined in Rule 21.11 of this order when used in Rule 54.10, of this order includes the bare neutral conductor whenever such conductor serves both as a conductor and also as a principal supporting member of the cable.

The term "unprotected conductors", used in Rule 54.10, means conductors as defined in Rule 20.8-E.

The vertical clearances from primary lead wires and drip loops to bare neutral multiconductor cable shall be maintained as specified in Rule 54.4-C6.

PROPOSED RULE CHANGE
(FINAL)

A. GENERAL

The following rules cover requirements for 0-750 volt bare neutral multiconductor cable (when used as line conductor) and are supplemental to the other rules of this order.

The term "messenger", as defined in Rule 21.11 when used in Rule 54.10, includes the bare neutral conductor whenever such conductor serves both as a conductor and also as a principal supporting member of the cable.

The term "unprotected conductors", used in Rule 54.10, means conductors as defined in Rule 20.8-E.

The vertical clearances from primary lead wires and drip loops to bare neutral multiconductor cable shall be maintained as specified in Rule 54.4-C6.

**EXISTING RULE
(Rule 54.10-B)**

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

B. POLE ARRANGEMENT AND CLEARANCES

(1) **Clearance From Poles:** Multiconductor cables having a bare neutral may have clearances less than 15 inches from centerline and three inches from surface of pole, as specified in Table 1, Column D, Cases 8 and 9, respectively, but shall have a clearance of not less than 2 1/2 inches from the surface of pole and shall be supported on an insulator. Modifications of these basic clearances for conductors passing unattached are specified in Rule 54.10-B6.

NOTE: Revised January 8, 1980 by Decision No. 91186.

(2) **Clearance Between Conductors in Cables:** No specified clearance is required between the insulated phase conductors and the bare neutral (see Rule 57.4-C).

(3) **Conductor Arrangement:** In parallel construction, cables shall not be attached to more than one side of a pole (there being four sides).

(4) **At Cable Terminations:** The clearances required by Rule 54.10-E of this order between a cable and unprotected line conductors shall not be held to apply between a cable (and its grounded messenger) and unprotected conductors of the same circuit on poles where unprotected conductors enter (or leave) a cable. On such poles no grounded messenger shall be less than 15 inches from centerline of pole.

(5) **Deadend Construction:** On poles with the messenger dead ended in more than one direction, the grounded messenger or insulated phase conductors of the cable shall not be attached to more than two sides of the pole and shall be not less than 2 1/2 inches from the surface of the pole. On the climbing space side, service drops shall not be supported within 15 inches of the surface of the pole. The climbing space shall be determined by Rule 54.10-F3 of this order.

(6) **From Nonclimbable Street Lighting or Traffic Signal Poles or Standards:** Multi-conductor cables passing (unattached) nonclimbable street lighting and traffic signal poles or standards, including mastarms, brackets, and lighting fixtures may have a clearance less than the 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 centerline of pole, standard, attaching mastarms, or fixture; 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 changing lamps or maintaining equipment.

NOTE: Added January 8, 1980 by Decision No. 91186 and revised March 9, 1988 by Resolution E-3076.

STRIKE OUT AND UNDERLINE
(Rule 54.10-B)

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

B. CONDUCTOR ~~POLE~~ ARRANGEMENT AND CLEARANCES

(1) Clearance From Poles: Bare Neutral ~~†~~ multiconductor cables ~~having a bare neutral~~ may have clearances less than 15 inches from centerline and ~~three~~ 3 inches from surface of pole, as specified in Table 1, Column D, Cases 8 and 9, respectively, but shall have a clearance of not less than 2.5 ~~1/2~~ inches from the surface of pole and shall be supported on an insulator. ~~Modifications of these basic clearances for conductors passing unattached are specified in Rule 54.10-B6.~~

NOTE: Revised January 8, 1980 by Decision No. 91186.

(2) For new B(2) strike out and underline, see B(6).

~~(2)~~ (3) Clearance Between Conductors in Bare Neutral Multiconductor Cables: No specified clearance is required between the insulated phase conductors and the bare neutral (see Rule 57.4-C). The multiconductor cable shall be treated as a single conductor in the application of other clearance requirements.

~~(3) Conductor Arrangement: In parallel construction, cables shall not be attached to more than one side of a pole (there being four sides).~~

(4) Arrangement at Transitions from Bare Neutral Multiconductor Cable to Other Types of Construction (e.g., Extended Rack, Rack or Crossarm): At Cable Terminations: The clearances required by Rule 54.10-E of this order between a cable and unprotected line conductors shall not be held to apply between a cable (and its grounded messenger) and unprotected conductors of the same circuit on poles where unprotected conductors enter (or leave) a cable. On such poles no grounded messenger shall be less than 15 inches from centerline of the pole. The vertical clearance of 2 feet required by Rule 54.10-C4, between a cable and other unprotected line conductors, shall not be held to apply at locations where multiconductor cable terminates (ends), and the cable transitions to other types of construction of the same voltage classification (0-750 Volts). The following vertical clearance requirements shall apply:

(a) Where those other conductors are terminated (end) in another direction, no specified vertical clearance is required (See Fig. 54-13).

(b) Where those other conductors are in tangent configuration (not terminated) and the type of construction is:

(1) Extended Rack Construction: The minimum vertical clearance above or below unprotected conductors shall be 8 inches and the multiconductor cable shall have a minimum clearance of 15 inches from the centerline of

pole. The multiconductor cable may be either terminated directly on an extended rack neutral position insulator or on its own individual insulator.

(2) Rack Construction: The minimum vertical clearance above or below unprotected conductors shall be 10 inches. The multiconductor cable may be either terminated directly on a rack neutral position insulator or on its own individual insulator.

(3) Crossarm Construction: The minimum vertical clearance above or below unprotected conductors shall be 2 feet. The multiconductor cable may be terminated on the end of a crossarm and no specified vertical clearance is required (See Fig 54-18).

The climbing space shall be determined and maintained in the same quadrant or on the same side of the pole in accordance with climbing space requirements in Rules 54.7, 54.9-F, 54.10-F or 54.12-F, whichever is related to the climbing space selected.

(5) Arrangement for Deadend Construction: On poles with the messenger dead ended in more than one direction, the grounded messenger or insulated phase conductors of the multiconductor cable shall not be attached to more than two three sides of the pole and shall be not be less than 2.5 1/2 inches from the surface of the pole. ~~On the climbing space side, service drops shall not be supported within 15 inches of the surface of the pole.~~ The climbing space shall be determined by Rule 54.10-F ~~2 of this order~~ (See Fig. 54-17).

(6) (2) Clearance (Unattached) From Nonclimbable Street Lighting or Traffic Signal Poles or Standards: Multi-conductor cables passing (unattached) nonclimbable street lighting and traffic signal poles or standards, including mastarms, brackets, and lighting fixtures may have a clearance less than the 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 centerline of pole, standard, attaching mastarms, or fixture; 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 changing lamps or maintaining equipment.

NOTE: Added January 8, 1980 by Decision No. 91186 and revised March 9, 1988 by Resolution E-3076.

FINAL
(Rule 54.10-B)

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

B. CONDUCTOR ARRANGEMENT AND CLEARANCES

(1) Clearance From Poles: Bare Neutral multiconductor cables may have clearances less than 15 inches from centerline and 3 inches from surface of pole, as specified in Table 1, Column D, Cases 8 and 9, respectively, but shall have a clearance of not less than 2.5 inches from the surface of pole and shall be supported on an insulator.

NOTE: Revised January 8, 1980 by Decision No. 91186.

(2) Clearance (Unattached) From Nonclimbable Street Lighting or Traffic Signal Poles or Standards: Multiconductor cables passing (unattached) nonclimbable street lighting and traffic signal poles or standards, including mastarms, brackets, and lighting fixtures may have a clearance less than the 36 inches specified in Table 1, Case 10, Column D, 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 centerline of pole, standard, attaching mastarms, or fixture; 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 changing lamps or maintaining equipment.

NOTE: Added January 8, 1980 by Decision No. 91186 and revised March 9, 1988 by Resolution E-3076.

(3) Clearance Between Conductors in Bare Neutral Multiconductor Cables: No specified clearance is required between the insulated phase conductors and the bare neutral (see Rule 57.4-C). The multiconductor cable shall be treated as a single conductor in the application of other clearance requirements.

(4) Arrangement at Transitions from Bare Neutral Multiconductor Cable to Other Types of Construction (e.g., Extended Rack, Rack or Crossarm): The vertical clearance of 2 feet required by Rule 54.10-C4, between a cable and other unprotected line conductors, shall not be held to apply at locations where multiconductor cable terminates (ends), and the cable transitions to other types of construction of the same voltage classification (0-750 Volts). The following vertical clearance requirements shall apply:

(a) Where those other conductors are terminated (end) in another direction, no specified vertical clearance is required (See Fig. 54-13).

(b) Where those other conductors are in tangent configuration (not terminated) and the type of construction is:

- (1) Extended Rack Construction: The minimum vertical clearance above or below unprotected conductors shall be 8 inches and the multiconductor cable shall have a minimum clearance of 15 inches from the centerline of pole. The multiconductor cable may be either terminated directly on an extended rack neutral position insulator or on its own individual insulator.
- (2) Rack Construction: The minimum vertical clearance above or below unprotected conductors shall be 10 inches. The multiconductor cable may be either terminated directly on a rack neutral position insulator or on its own individual insulator.
- (3) Crossarm Construction: The minimum vertical clearance above or below unprotected conductors shall be 2 feet. The multiconductor cable may be terminated on the end of a crossarm and no specified vertical clearance is required (See Fig 54-18).

The climbing space shall be determined and maintained in the same quadrant or on the same side of the pole in accordance with climbing space requirements in Rules 54.7, 54.9-F, 54.10-F or 54.12-F, whichever is related to the climbing space selected.

- (5) Arrangement for Deadend Construction: On poles with the messenger dead ended in more than one direction, the grounded messenger or insulated phase conductors of the multiconductor cable shall not be attached to more than three sides of the pole and shall not be less than 2.5 inches from the surface of the pole. The climbing space shall be determined by Rule 54.10-F3 of this order (See Fig. 54-17).

**EXISTING RULE
(Rule 54.10-C)**

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

C. CONDUCTOR MATERIAL AND STRENGTH

(1) **Insulation:** The phase conductors including jumper connections shall be covered with an insulation suitable for the voltage involved and shall conform with the standards established by the Insulated Power Cable Engineers Association, in Part 7, Section 7.3 of "Thermoplastic Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy", Insulated Power Cable Engineers Association Standard S-61-402, approved January 12, 1961, and National Electrical Manufacturers Association Standard WC5-1961, approved May 15, 1961.

(2) **Messenger:** Where cables are not maintained from a cable chair, the addition of the 200 pounds of vertical load specified in Rule 49.7-C may be reduced to 50 pounds to allow for the load imposed by workmen on ladders.

* (Note: EXISTING RULE 54.10-C HAS BEEN MOVED. REFER TO RULE 54.10-E FOR STRIKE OUT/UNDERLINED and FINAL)

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINED)
(New Rule 54.10-C)
(Existing Rule 54.10-E)

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

B Q. VERTICAL CLEARANCE BETWEEN CONDUCTOR LEVELS

When attached to poles, ~~or~~ wood crossarms, ~~or other supports~~ at less than 15 inches from the centerline of pole, bare neutral multiconductor cable shall be not ~~be~~ less than 6 feet vertically above or 6 feet vertically below unprotected conductors, ~~except as modified below:~~

(1) ~~With Guard Arm Below-Conductors-of-0-750-Volts Placed Above Cable:~~ Where a guard arm is placed above bare neutral multiconductor cable in accordance with the provisions of Rule 57.7, the vertical clearance of 6 feet may be reduced to not less than 4 feet below unprotected conductors of 0-750 ~~750-22,500~~ volts.

~~(2) Cable Attached 15 Inches or More From Center Line of Pole: When bare neutral multiconductor cable is attached (or supported) 15 inches or more from the centerline of pole, the vertical clearance of 6 feet may be reduced to not less than 4 feet below unprotected conductors of 750-22,500 volts. When the vertical clearance is reduced to less than 6 feet, all portions of service drops attached at that level shall be 15 inches or more from the centerline of pole.~~

~~(2)--Above-Conductors-of-0-750-Volts-More-than-15-Inches-From-Center-Line-of-Pole--The-vertical-clearance-between-unprotected-conductors-of-0-750-volts-attached-at-more-than-15-inches-from-the-centerline-of-pole-and-bare-neutral-multiconductor-cable-above-may-be-less-than-6-feet-but-not-less-than-4-feet-and-no-guard-arm-is-required.~~

(3) ~~Cable Deadended Under a Transformer:~~ No guard arm will be required over bare neutral multiconductor cable attached to ~~deadended~~ on the surface of a pole directly below a transformer installation, ~~provided-that-at-that-level-all-attachments-to-the-pole-shall-be~~ approximately in the vertical plane through the center lines of pole and transformer installation and no cable so attached makes an angle greater than 60 degrees with that plane. ~~The~~ Such cable so supported shall have a vertical clearance of not less than:

~~(a) 48-inches~~ 4 feet below the level of unprotected line conductors on the hanger arm; and

~~(b) a-vertical-clearance-not-less-than~~ As specified in Rule 54.4-C6 below the lowest point of the drip loop of primary leads to the transformer(s); and

~~(c) a-vertical-clearance-not-less-than~~ 10 inches below the lowest part of the transformer case(s) or hanger(s).

(STRIKE OUT AND UNDERLINED)

(4) Related-Bare-Neutral-Multiconductor Cable and-Crossarm Above or Below Other Types of Construction of the Same 0-750 Voltage Classification: Where a bare neutral multiconductor cable is connected to-conductors supported on the same pole above or below another conductor level of the same voltage classification that is supported on

(a) Crossarms or Extended Racks; on-the-same-pole; The vertical clearance between the these levels of conductors of-0-750-volts on-the-crossarm-and-the-bare-neutral-multiconductor-cable shall be not be less than 2 feet and no guard arm is required (See Figs. 54-14 through 54-17); or on

(b) Racks (Rule 54.9): The vertical clearance between these levels of conductors shall not be less than 10 inches for spans not exceeding 200 feet and 12 inches for spans in excess of 200 feet and no guard arm is required.

The climbing space shall be determined and maintained in the same quadrant or on the same side of pole through both conductor levels in accordance with climbing space requirements in Rules 54.7, and 54.10-F, or 54.12-F, whichever rule is related to the climbing space selected (See Figs. 54-19 through 54-18).

EXCEPTION: When rack construction is present, the more stringent climbing space requirements of Rule 54.9-F shall always be maintained through both levels.

This provision (Rule 54.10-C4) is not applicable where the crossarm is a combination arm.

(5) Multiple Related Bare Neutral Multiconductor Cables: Where multiple bare neutral multiconductor cables having the same secondary voltage source (related) are supported on the same pole, no specified vertical clearance between such cables is required.

The climbing space shall be maintained in accordance with climbing space requirements in Rule 54.10-F.

(6) Multiple Unrelated Bare Neutral Multiconductor Cables: Where multiple bare neutral multiconductor cables not having the same secondary voltage source (unrelated) but are of the same voltage classification of 0-750 volts, and are supported on the same pole, no specified vertical clearance between such levels is required. However, each multiconductor cable shall be supported on a separate attachment (rack, spool, deadend clevis, etc.).

The climbing space shall be maintained in accordance with climbing space requirements in Rule 54.10-F.

**PROPOSED RULE CHANGE
(FINAL)
(Rule 54.10-C)**

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

C. VERTICAL CLEARANCE BETWEEN CONDUCTOR LEVELS

When attached to poles, crossarms, or other supports at less than 15 inches from the centerline of pole, bare neutral multiconductor cable shall not be less than 6 feet vertically above or 6 feet vertically below unprotected conductors, except as modified below:

(1) **With Guard Arm Placed Above Cable:** Where a guard arm is placed above bare neutral multiconductor cable in accordance with the provisions of Rule 57.7, the vertical clearance of 6 feet may be reduced to not less than 4 feet below unprotected conductors of 750-22,500 volts.

(2) **Cable Attached 15 Inches or More From Center Line of Pole:** When bare neutral multiconductor cable is attached (or supported) 15 inches or more from the centerline of pole, the vertical clearance of 6 feet may be reduced to not less than 4 feet below unprotected conductors of 750-22,500 volts. When the vertical clearance is reduced to less than 6 feet, all portions of service drops attached at that level shall be 15 inches or more from the centerline of pole.

(3) **Cable Deadended Under a Transformer:** No guard arm will be required over bare neutral multiconductor cable deadended on the surface of a pole directly below a transformer installation. Such cable shall have a vertical clearance of not less than:

- (a) 4 feet below unprotected line conductors; and
- (b) As specified in Rule 54.4-C6 below the lowest point of the drip loop of primary leads to the transformer(s); and
- (c) 10 inches below the lowest part of the transformer case(s) or hanger(s).

(4) **Cable Above or Below Other Types of Construction of the Same 0-750 Voltage Classification:** Where a bare neutral multiconductor cable is supported on the same pole above or below another conductor level of the same voltage classification that is supported on:

(a) **Crossarms or Extended Racks;** The vertical clearance between these levels of conductors shall not be less than 2 feet and no guard arm is required (See Figs. 54-14 through 54-17); or on

(b) **Racks (Rule 54.9);** The vertical clearance between these levels of conductors shall not be less than 10 inches for spans not exceeding 200 feet and 12 inches for spans in excess of 200 feet and no guard arm is required.

The climbing space shall be determined and maintained in the same quadrant or on the same side of pole through both conductor levels in accordance with climbing space requirements in Rules 54.7, 54.10-F, or 54.12-F, whichever rule is related to the climbing space selected (See Figs. 54-13 through 54-18).

EXCEPTION: When rack construction is present, the more stringent climbing space requirements of Rule 54.9-F shall always be maintained through both levels.

This provision (Rule 54.10-C4) is not applicable where the crossarm is a combination arm.

(5) **Multiple Related Bare Neutral Multiconductor Cables:** Where multiple bare neutral multiconductor cables having the same secondary voltage source (related) are supported on the same pole, no specified vertical clearance between such cables is required.

The climbing space shall be maintained in accordance with climbing space requirements in Rule 54.10-F.

(6) **Multiple Unrelated Bare Neutral Multiconductor Cables:** Where multiple bare neutral multiconductor cables not having the same secondary voltage source (unrelated) but are of the same voltage classification of 0-750 volts, and are supported on the same pole, no specified vertical clearance between such levels is required.

However, each multiconductor cable shall be supported on a separate attachment (rack, spool, deadend clevis, etc.).

The climbing space shall be maintained in accordance with climbing space requirements in Rule 54.10-F.

EXISTING RULE
(Rule 54.10-D)

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

D. CONDUCTOR SPACING

NOTE: Eliminated January 21, 1992, by Resolution SU-10.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
(Rule 54.10-D)

~~D. CONDUCTOR SPACING~~

~~NOTE: Eliminated January 21, 1992, by Resolution SU-10.~~

Note: The existing language for "SERVICE DROPS" can be located in this package under its original rule number (Rule 54.10-G).

© D. SERVICE DROPS

Phase conductors of all service drops taken from bare neutral multiconductor cables shall have insulation equivalent to that specified in Rule 54.10-G ~~54.10-E1~~.

Where service drops are supported on ACSR or aluminum a multiconductor cable's bare neutral messenger, the attachment to the messenger shall be protected against an abrasion resistant connection. ~~Services supported on the messenger shall be attached not less than 15 inches from the surface of the pole.~~

PROPOSED RULE CHANGE
(FINAL)
(Rule 54.10-D)

D. SERVICE DROPS

Phase conductors of all service drops taken from bare neutral multiconductor cables shall have insulation equivalent to that specified in Rule 54.10-E1.

Where service drops are supported on a multiconductor cable's bare neutral messenger, the attachment to the messenger shall be an abrasion resistant connection.

**EXISTING RULE
(Rule 54.10-E)**

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

E. VERTICAL CLEARANCE BETWEEN CONDUCTOR LEVELS

When attached to poles or wood crossarms at less than 15 inches from the centerline of pole, bare neutral multiconductor cable shall be not less than 6 feet vertically above or 6 feet vertically below unprotected conductors except as modified below:

(1) **With Guard Arm Below Conductors of 0-750 Volts:** Where a guard arm is placed above bare neutral multiconductor cable in accordance with the provisions of Rule 57.7, the clearance of 6 feet may be reduced to not less than 4 feet below unprotected conductors of 0-750 volts.

(2) **Above Conductors of 0-750 Volts More than 15 Inches From Center Line of Pole:** The vertical clearance between unprotected conductors of 0-750 volts attached at more than 15 inches from the centerline of pole and bare neutral multiconductor cable above may be less than 6 feet but not less than 4 feet and no guard arm is required.

(3) **Under a Transformer:** No guard arm will be required over bare neutral multiconductor cable attached to the surface of a pole directly below a transformer installation provided that at that level all attachments to the pole shall be approximately in the vertical plane through the center lines of pole and transformer installation and no cable so attached makes an angle greater than 60 degrees with that plane. The cable so supported shall have a vertical clearance of not less than 48 inches below the level of conductors on the hanger arm; a vertical clearance not less than as specified in Rule 54.4-C6 below the lowest point of the drip loop of primary leads to the transformer; and a vertical clearance of not less than 10 inches below the lowest part of the transformer case or hangers.

(4) **Related Bare Neutral Multiconductor Cable and Crossarm:** Where bare neutral multiconductor cable is connected to conductors supported on a crossarm on the same pole, the vertical clearance between the level of conductors of 0-750 volts on the crossarm and the bare neutral multiconductor cable shall be not less than 2 feet and climbing space shall be maintained in the same quadrant or on the same side of pole through both conductor levels in accordance with climbing space requirements in Rules 54.7 and 54.10-F. This provision is not applicable where the crossarm is a combination arm.

* (Note: EXISTING RULE 54.10-E HAS BEEN MOVED. REFER TO RULE 54.10-C FOR STRIKE OUT/UNDERLINED and FINAL)

* (EXISTING RULE 54.10-C HAS BEEN MOVED TO THIS RULE 54.10-E)

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
(New Rule 54.10-E)
(Existing Rule 54.10-C)

~~GE.~~ CONDUCTOR MATERIAL AND STRENGTH

(1) Insulation: The phase conductors including jumper connections shall be covered with an insulation suitable for the voltage involved and shall conform with the requirements of Rule 20.8-G. ~~standards established by the Insulated Power Cable Engineers Association, in Part 7, Section 7.2 of "Thermoplastic Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy", Insulated Power Cable Engineers Association Standard S-61-402, approved January 12, 1961, and National Electrical Manufacturers Association Standard WC5 1961, approved May 16, 1961.~~

(2) Messenger: Where multiconductor cables are not maintained by workers ~~from using~~ a cable chair, the additional allowance of the 200 pounds of vertical load specified in Rule ~~49.7-EB~~ may be reduced to 50 pounds to allow for the load imposed by ~~workmen~~ workers on ladders.

PROPOSED RULE CHANGE
(FINAL)
(Rule 54.10-E)

E. CONDUCTOR MATERIAL AND STRENGTH

(1) Insulation: The phase conductors including jumper connections shall be covered with an insulation suitable for the voltage involved and shall conform with the requirements of Rule 20.8-G.

(2) Messenger: Where multiconductor cables are not maintained by workers using a cable chair, the additional allowance of the 200 pounds of vertical load specified in Rule 49.7-B may be reduced to 50 pounds to allow for the load imposed by workers on ladders.

EXISTING RULE
(Rule 54.10-F)

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

F. CLIMBING SPACE

(1) **Through Bare Neutral Multiconductor Cable Level:** A climbing space shall be maintained through the level of conductors supported in bare neutral multiconductor cable construction and for a vertical distance of not less than 4 feet above and below such cable. The position of the climbing space through the levels of conductors in such cable construction shall be related to climbing space for conductor levels above and below the cable in accordance with Rules 54.7-A and 93. The depth of the climbing space shall be measured from the centerline of the pole.

(2) **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 center line of the pole. On poles on which transformers or similar apparatus are pole bolted in line with primary conductors, a 30-inch square climbing space shall be provided in one quadrant or on one side of the pole.

(3) **With Messenger Deadended and On Corner Poles:** On poles with the messenger deadended and on corner poles, a 30-inch climbing space shall be provided in one quadrant or on one side of the pole. Suitably protected vertical runs or risers and ground wires attached to the surface of 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 are 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.

NOTE: Revised March 9, 1988 by Resolution E-3076.

PROPOSED RULE CHANGE
(STRIKEOUT AND UNDERLINED)
(Rule 54.10-F)

F. CLIMBING SPACE

(1) Through Bare Neutral Multiconductor Cable Levels: A climbing space shall be maintained through the level of conductors supported in bare neutral multiconductor cable construction, and Said climbing space shall be maintained for a vertical distance of not less than 4 feet above and below such cable. The position of the climbing space through the levels of conductors in such cable construction shall be related to the climbing space for conductor levels above and below the cable in accordance with Rules 54.7-A and 93. The depth of the climbing space shall be measured from the centerline of the pole

Where multiconductor cable is installed at pole top, the climbing space shall extend up to the level of such cable and need not be provided through and above such level.

(2) Dimensions: The dimensions of the climbing space shall be 30 inches square, and shall be provided in one quadrant or on one side of the pole. The depth of the climbing space shall be measured from the centerline of the pole (See Figs. 54-13 through 54-18), with the extremities of such width equidistant from the center line of the pole--On poles on which transformers or similar apparatus are pole bolted in line with primary conductors, a 30-inch square climbing space shall be provided in one quadrant or on one side of the pole

(3) Allowable Climbing Space Obstructions With Messenger Deadended and On Corner Poles: On poles with the messenger deadended and on corner poles, a 30-inch climbing space shall be provided in one quadrant or on one side of the pole. Suitably protected vertical runs or risers, and ground wires, attached to the surface of 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 are 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.

Allowable climbing space obstructions are:

(a) Guys. However, not more than two guys having a vertical separation of 18 inches or less can be installed in any 4-foot section of climbing space.

(b) Suitably protected (covered only by wood, see Rule 22.2):

1) Vertical risers; or

2) Vertical runs; or

3) Ground wires.

Such risers, runs, and grounds are allowable provided that not more than one is installed in any 4-foot section of climbing space.

(c) Insulators and their attaching brackets may extend one-half their diameter into the climbing space.

(d) Conductors may extend one-half their diameter into the climbing space.

(e) Street light brackets may extend one-half their diameter into climbing space. Associated street light bracket struts are allowed in climbing space.

(f) Operating rods (e.g. switch rods) and their associated hardware may extend one-half their diameter into climbing space.

(g) Bands, limited to 6 inches in width with no more than one band allowed in any 24-inch section of climbing space (these limitations are excluded for pole stubbing and pole splicing bands when pole step provisions are installed).

(h) Bolts and their washers.

The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

NOTE: Revised March 9, 1988 by Resolution E-3076.

**PROPOSED RULE CHANGE
(FINAL)
(Rule 54.10-F)**

F. CLIMBING SPACE

(1) **Through Bare Neutral Multiconductor Cable Level:** A climbing space shall be maintained through the level of conductors supported in bare neutral multiconductor cable construction. Said climbing space shall be maintained for a vertical distance of not less than 4 feet above and below such cable. The position of the climbing space through the levels of conductors in such cable construction shall be related to the climbing space for conductor levels above and below the cable in accordance with Rules 54.7 and 93.

Where multiconductor cable is installed at pole top, the climbing space shall extend up to the level of such cable and need not be provided through and above such level.

(2) **Dimensions:** The dimensions of the climbing space shall be 30 inches square and shall be provided in one quadrant or on one side of the pole. The depth of the climbing space shall be measured from the centerline of the pole (See Figs. 54-13 through 54-18).

(3) **Allowable Climbing Space Obstructions:** Allowable climbing space obstructions are:

(a) Guys. However, not more than two guys having a vertical separation of 18 inches or less can be installed in any 4-foot section of climbing space.

(b) Suitably protected (covered only by wood, see Rule 22.2):

- 1) Vertical risers; or
- 2) Vertical runs; or
- 3) Ground wires.

Such risers, runs, and grounds are allowable provided that not more than one is installed in any 4-foot section of climbing space.

(c) Insulators and their attaching brackets may extend one-half their diameter into the climbing space.

(d) Conductors may extend one-half their diameter into the climbing space.

(e) Street light brackets may extend one-half their diameter into climbing space. Associated street light bracket struts are allowed in climbing space.

(f) Operating rods (e.g. switch rods) and their associated hardware may extend one-half their diameter into climbing space.

(g) Bands, limited to 6 inches in width with no more than one band allowed in any 24-inch section of climbing space (these limitations are excluded for pole stubbing and pole splicing bands when pole step provisions are installed).

(h) Bolts and their washers.

The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

NOTE: Revised March 9, 1988 by Resolution E-3076.

EXISTING RULE
(Rule 54.10-G)

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

G. SERVICE DROPS

Phase conductors of service drops taken from bare neutral multiconductor cables shall have insulation equivalent to that specified in Rule 54.10-C1. Where service drops are supported on ACSR or aluminum messenger, the messenger shall be protected against abrasion. Services supported on the messenger shall be attached not less than 15 inches from the surface of the pole.

PROPOSED RULE CHANGE
(STRIKEOUT AND UNDERLINED)
(Rule 54.10-G)

Note: The existing Rule 54.10-G "SERVICE DROPS" has been moved to Rule 54.10-D
Refer to Rule 54.10-D of this package for the "Strikeout and Underlined" portion of "SERVICE DROPS"
Refer to Rule 54.10-D of this package for the "Final" portion of "SERVICE DROPS"

The existing language for "SAGS" can be located in this package under its original rule number
(Rule 54.10-J, SAGS)

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
(Rule 54.10-G)

~~5G.~~ SAGS

The sags of messengers which support multiconductor cable shall be such that under the maximum loading conditions, the tensions in the messengers shall not exceed the safe working stresses specified in Rule 49.7-B. ~~In the application of Rule 54.9 Where the multiconductor cables are not maintained by workers using a cable chair, the 200-pound additional allowance for vertical loading specified in Rule 49.7-B for a man and cable chair may be reduced to 50 pounds to allow for the load imposed by workers on ladders, where the cable is not maintained from a cable chair.~~

NOTE: Rule 54.10 added January 2, 1962 by Resolution No. E-1109

PROPOSED RULE CHANGE
(FINAL)
(Rule 54.10-G)

G. SAGS

The sags of messengers which support multiconductor cable shall be such that under the maximum loading conditions, the tensions in the messengers shall not exceed the safe working stresses specified in Rule 49.7-B. Where the multiconductor cables are not maintained by workers using a cable chair, the 200-pound additional allowance for vertical loading specified in Rule 49.7-B may be reduced to 50 pounds to allow for the load imposed by workers on ladders.

NOTE: Rule 54.10 added January 2, 1962 by Resolution No. E-1109.

EXISTING RULE
(Rule 54.10-H).

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral,
0-750 Volts.

H. FASTENINGS

In the application of Rule 57.5, where cables are not maintained from a cable chair, the addition of 200 pounds vertical load, specified in Rule 49.7-C may be reduced to 50 pounds to allow for the load imposed by workmen workers on ladders.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
(Rule 54.10-H)

H. FASTENINGS

Hardware used in connection with messengers shall meet the strength requirement of Rule 49.7-C. Deadend attachments used on messengers shall have a strength not less than that of the messenger. ~~In the application of Rule 57.5, where cables are not maintained by workers using from a cable chair, the additional allowance of 200 pounds vertical load, specified in Rule 49.7-C may be reduced to 50 pounds to allow for the load imposed by workmen workers on ladders.~~

PROPOSED RULE CHANGE
(FINAL)
(Rule 54.10-H)

H. FASTENINGS

Hardware used in connection with messengers shall meet the strength requirement of Rule 49.7-C. Deadend attachments used on messengers shall have a strength not less than that of the messenger. Where cables are not maintained by workers using a cable chair, the additional allowance of 200 pounds vertical load specified in Rule 49.7-C may be reduced to 50 pounds to allow for the load imposed by workers on ladders.

EXISTING RULE
(Rule 54.10-1)

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

I. EXTENDED MESSENGER

Messengers may be extended in bare neutral multiconductor cable construction provided the messenger is sectionalized as a guy.

PROPOSED RULE CHANGE
(STRIKEOUT AND UNDERLINED)
(Rule 54.10-1)

~~iv---EXTENDED-MESSENGER~~

~~Messengers may be extended in bare neutral multiconductor cable construction provided the messenger is sectionalized as a guy.~~

PROPOSED RULE CHANGE
(FINAL)
(Rule 54.10-1)

Rule 54.10-1 Deleted

**EXISTING RULE
(Rule 54.10-J)**

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

J. SAGS

In the application of Rule 57.9 the 200-pound additional vertical loading specified for a man and cable chair may be reduced to 50 pounds where the cable is not maintained from a cable chair.

NOTE: Rule 54.10 added January 2, 1962 by Resolution No. E-1109.

**PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
(Rule 54.10-J)
(New Rule 54.10-G)**

Note: The text from the original Rule 54.10-J "SAGS" has been moved to Rule 54.10-G
Refer to Rule 54.10-G of this package for the "Striked out and Underlined" portion of "SAGS"
Refer to Rule 54.10-G of this package for the "final" portion of "SAGS"

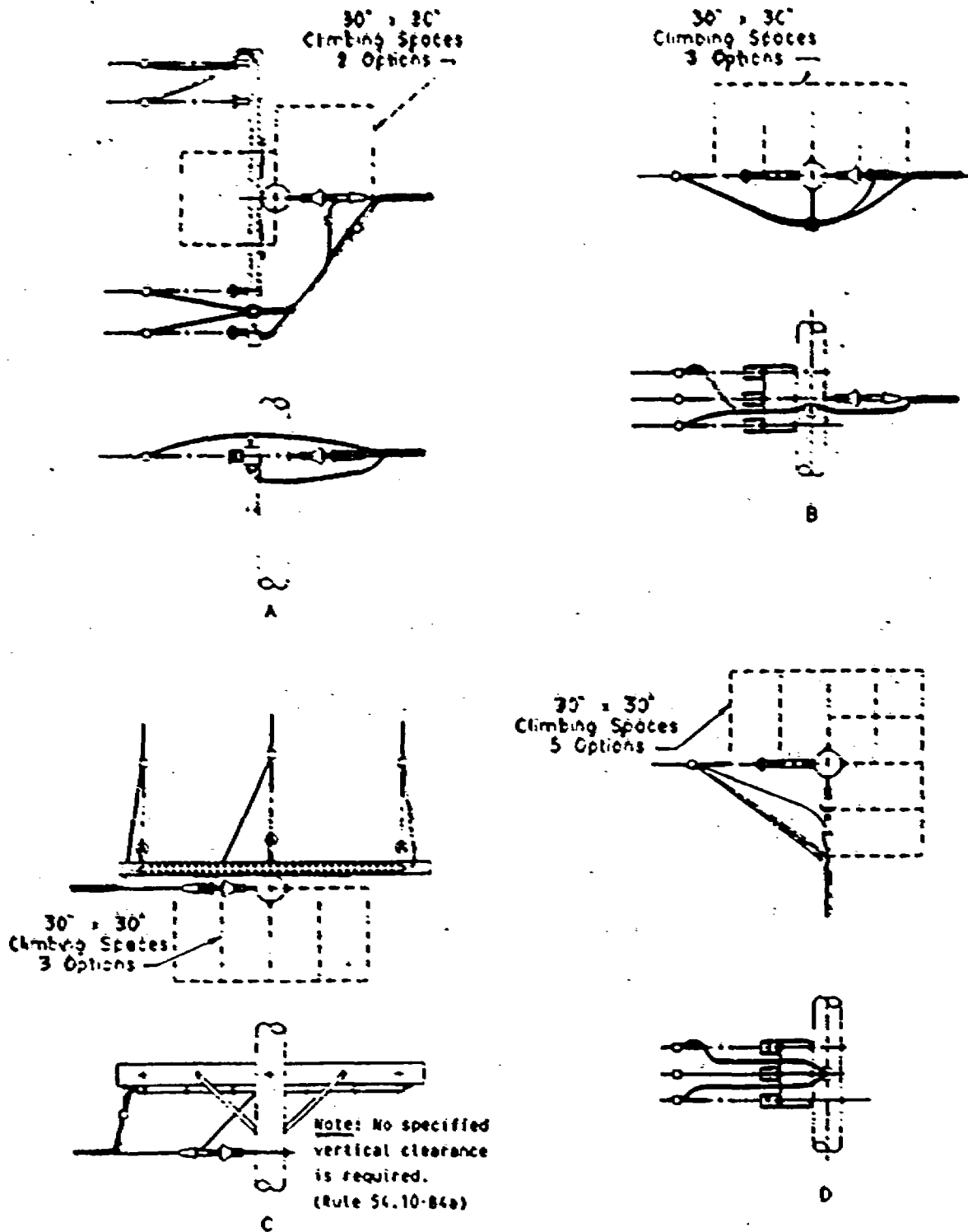
Rule Number 54.10-J has been deleted.

**PROPOSED RULE CHANGE
(FINAL)
(Rule 54.10-J)**

(The text of Rule 54.10-J has been moved to Rule 54.10-G)

Rule 54.10-J Deleted.

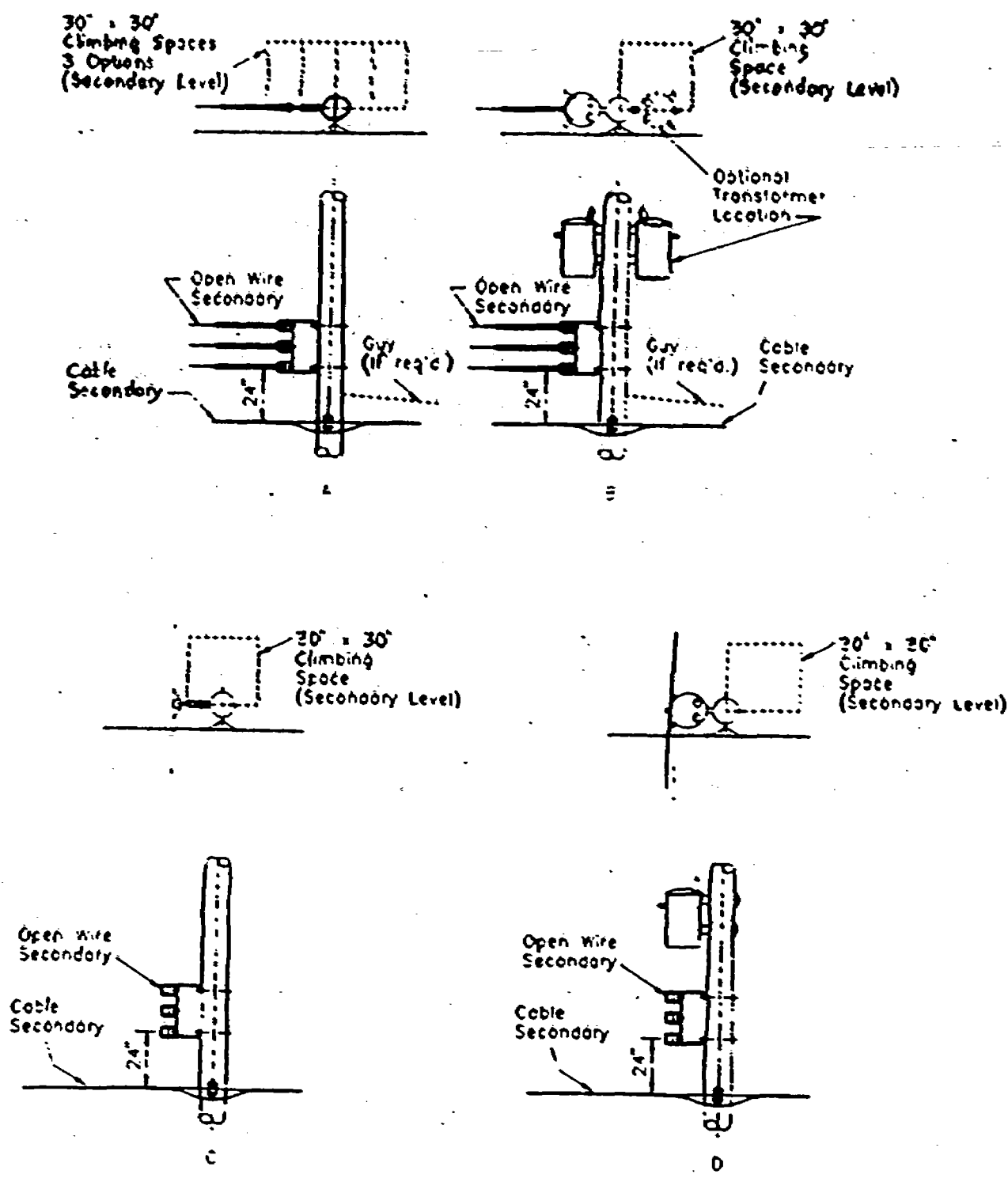
Requirements for Supply Lines Climbing Space



Rule 54.10

Fig. 54-13

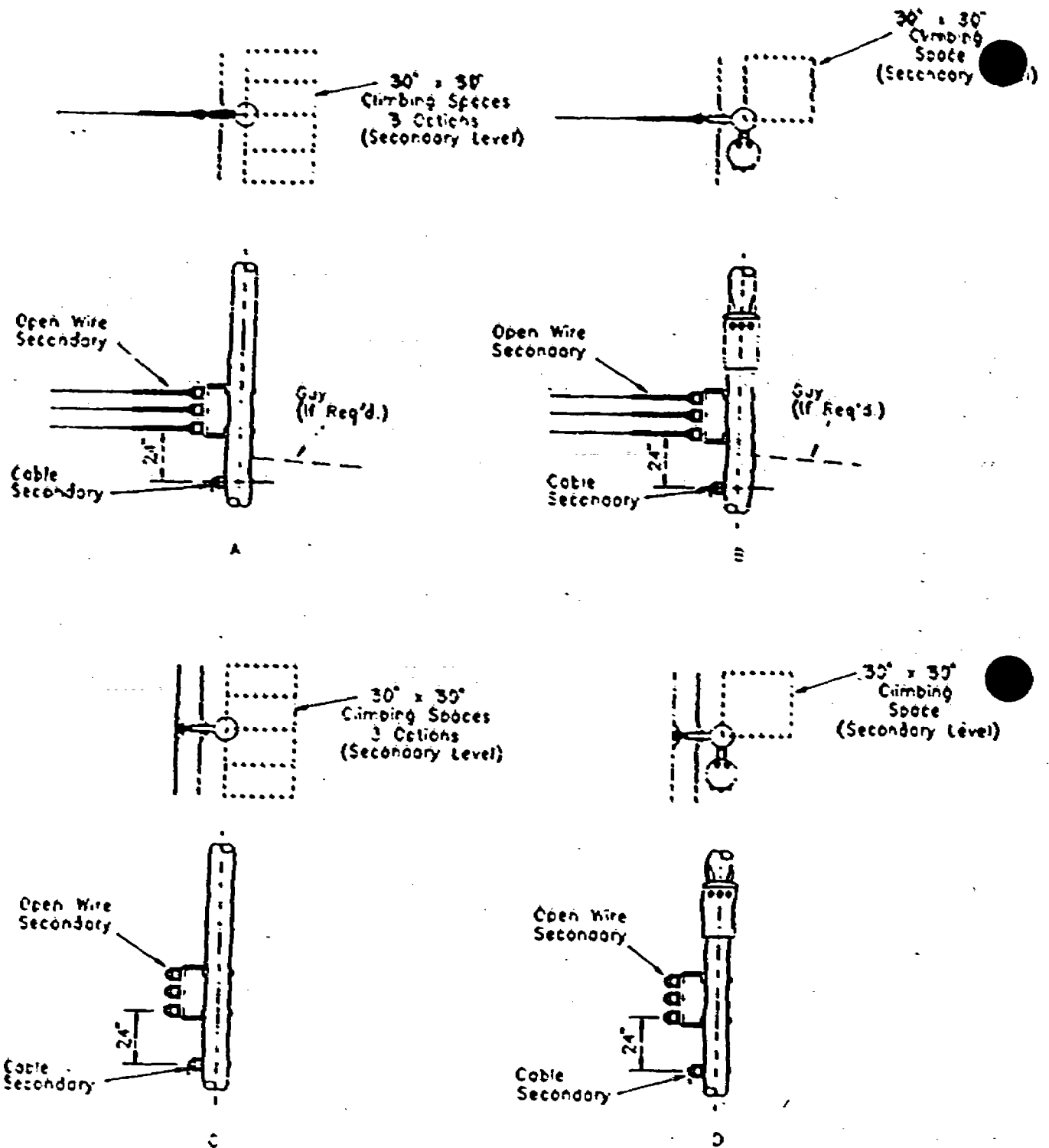
Requirements for Supply Lines Climbing Space



Rule 54.10

Fig. 54-14

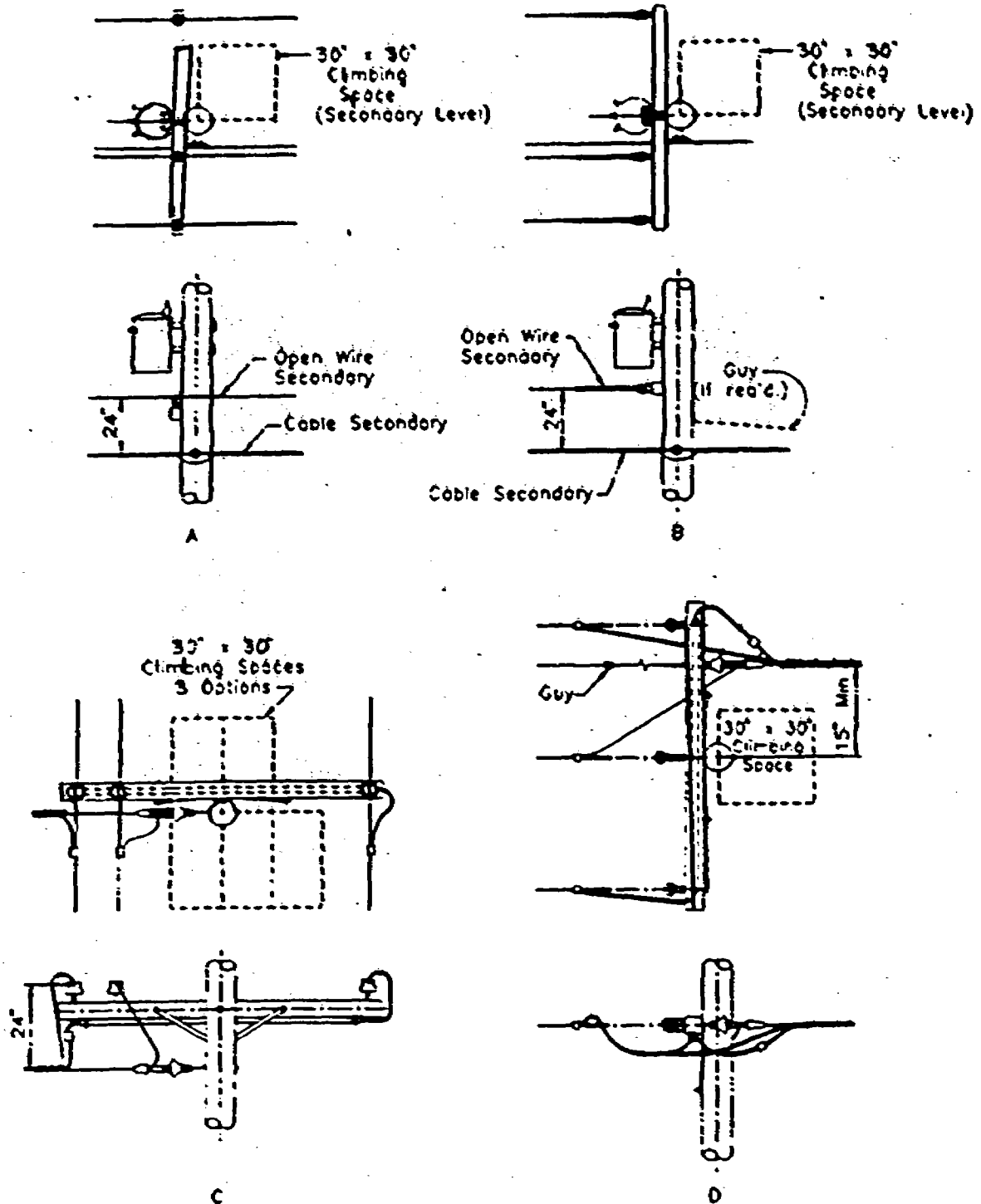
Requirements for Supply Lines Climbing Space



Rule 54.10

Fig. 54-15

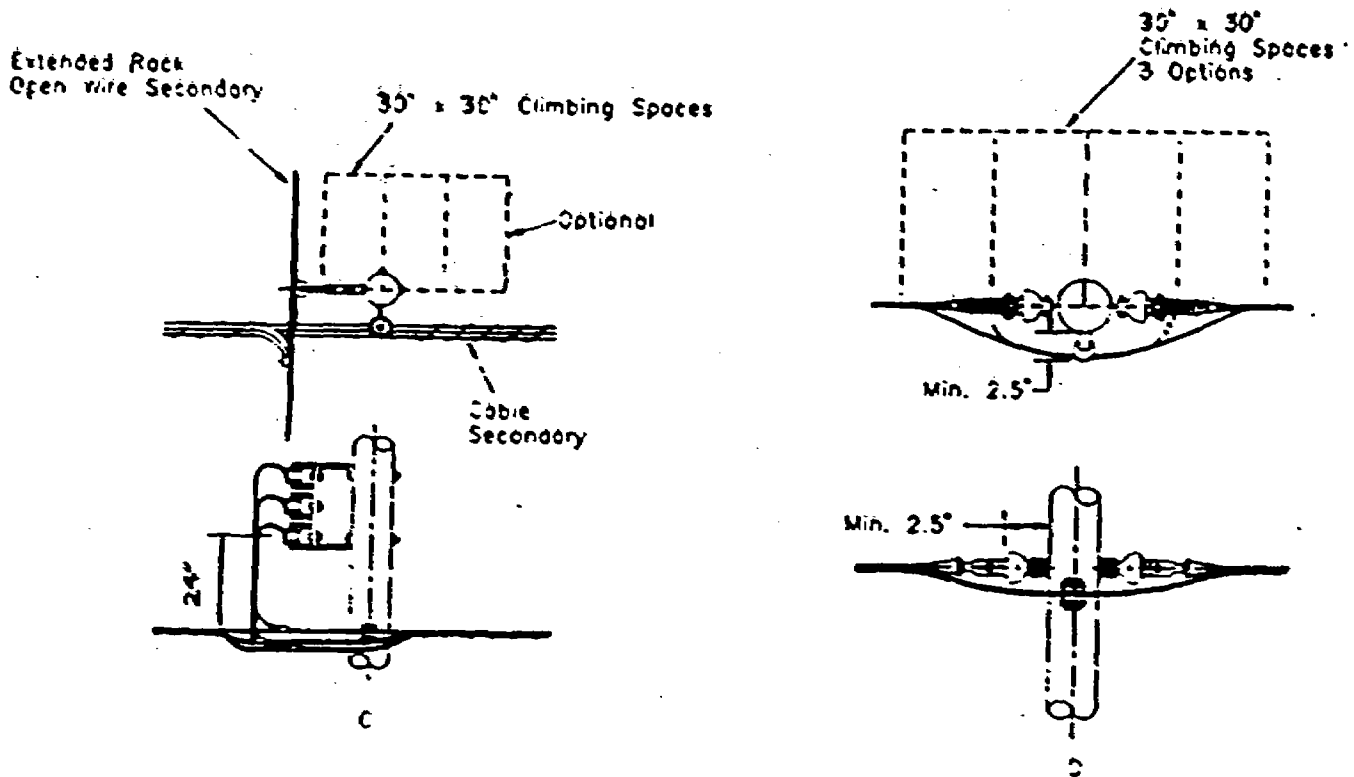
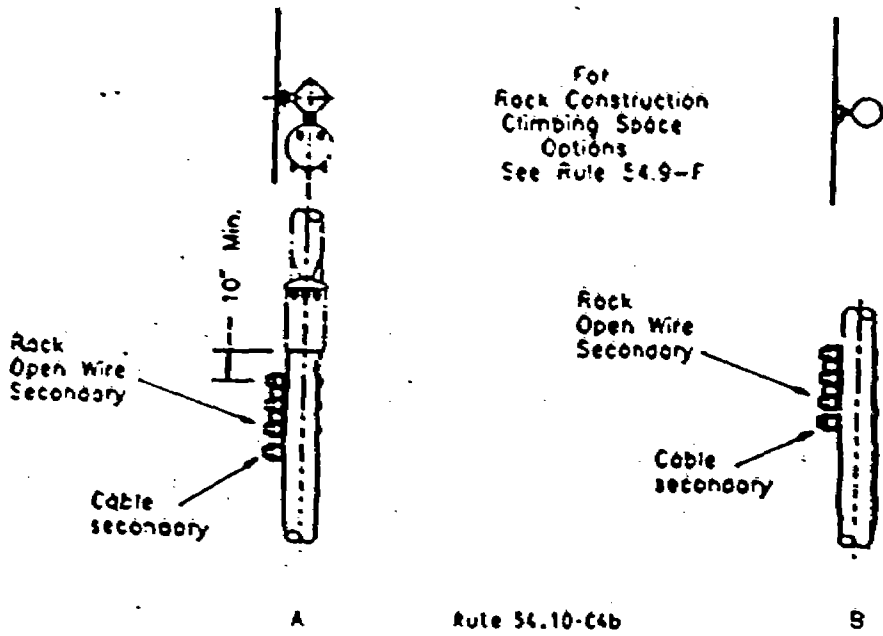
Requirements for Supply Lines Climbing Space



Rule 54.10

Figure 54-16

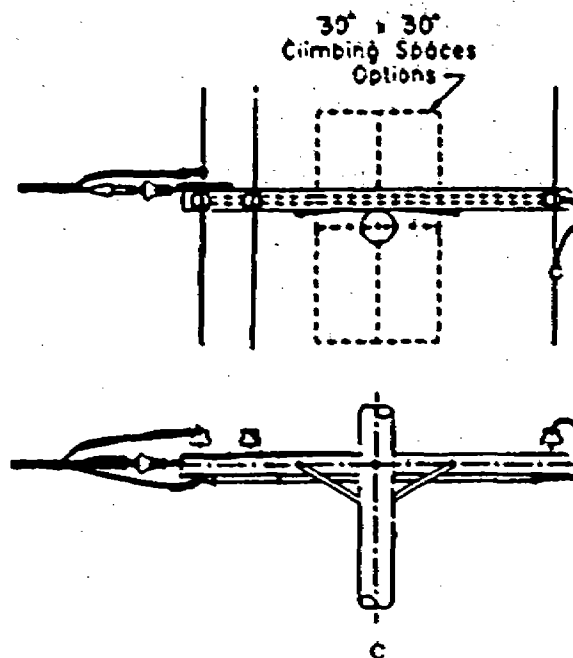
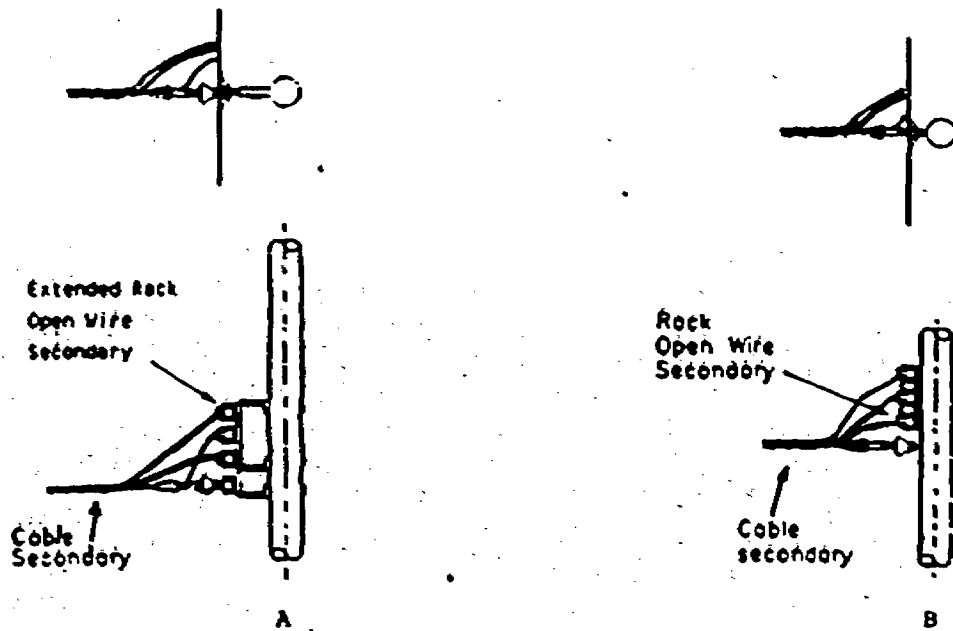
Requirements for Supply Lines Climbing Space



Rule 54.10

Fig. 54-17

Requirements for Supply Lines
Climbing Space
(T-Tap Tangent Construction)



Rule 54.10-B4b

Fig. 54-18

THIS IS A COMPLETE COPY OF RULE 54.10 FINAL PROPOSED RULE CHANGES
(FINAL)

Rule 54.10 Low Voltage Multiconductor Cable With Bare Neutral, 0-750 Volts

A. GENERAL

The following rules cover requirements for 0-750 volt bare neutral multiconductor cable (when used as line conductor) and are supplemental to the other rules of this order.

The term "messenger", as defined in rule 21.11 when used in Rule 54.10, includes the bare neutral conductor whenever such conductor serves both as a conductor and also as a principal supporting member of the cable.

The term "unprotected conductors", used in rule 54.10, means conductors as defined Rule 20.8-E.

The vertical clearances from primary lead wires and drip loops to bare neutral multiconductor cable shall be maintained as specified in Rule 54.4-C6.

B. CONDUCTOR ARRANGEMENT AND CLEARANCES

(1) Clearance From Poles: Bare Neutral multiconductor cables may have clearances less than 15 inches from centerline and 3 inches from surface of pole, as specified in Table 1, Column D, Cases 8 and 9, respectively, but shall have a clearance of not less than 2.5 inches from the surface of pole and shall be supported on an insulator.

NOTE: Revised January 8, 1980 by Decision No. 91186.

(2) Clearance (Unattached) From Nonclimbable Street Lighting or Traffic Signal Poles or Standards: Multiconductor cables passing (unattached) nonclimbable street lighting and traffic signal poles or standards, including mastarms, brackets, and lighting fixtures may have a clearance less than the 36 inches specified in Table 1, Case 10, Column D, 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 centerline of pole, standard, attaching mastarms, or fixture; 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 changing lamps or maintaining equipment.

NOTE: Added January 8, 1980 by Decision No. 91186 and revised March 9, 1988 by Resolution E-3076.

(3) Clearance Between Conductors in Bare Neutral Multiconductor Cables: No specified clearance is required between the insulated phase conductors and the bare neutral (see Rule 57.4-C). The multiconductor cable shall be treated as a single conductor in the application of other clearance requirements.

(4) Arrangement at Transitions from Bare Neutral Multiconductor Cable to Other Types of Construction (e.g., Extended Rack, Rack or Crossarm): The vertical clearance of 2 feet required by Rule 54.10-C4, between a cable and other unprotected line conductors, shall not be held to apply at locations where multiconductor cable terminates (ends), and the cable transitions to other types of construction of the same voltage classification (0-750 Volts). The following vertical clearance requirements shall apply:

(a) Where those other conductors are terminated (end) in another direction, no specified vertical clearance is required (See Fig. 54-13).

(b) Where those other conductors are in tangent configuration (not terminated) and the type of construction is:

(1) Extended Rack Construction: The minimum vertical clearance above or below unprotected conductors shall be 8 inches and the multiconductor cable shall have a minimum clearance of 15 inches from the centerline of pole. The multiconductor cable may be either terminated directly on an extended rack neutral position insulator or on its own individual insulator.

(2) Rack Construction: The minimum vertical clearance above or below unprotected conductors shall be 10 inches. The multiconductor cable may be either terminated directly on a rack neutral position insulator or on its own individual insulator.

(3) Crossarm Construction: The minimum vertical clearance above or below unprotected conductors shall be 2 feet. The multiconductor cable may be terminated on the end of a crossarm and no specified vertical clearance is required (See Fig 54-18).

The climbing space shall be determined and maintained in the same quadrant or on the same side of the pole in accordance with climbing space requirements in Rules 54.7, 54.9-F, 54.10-F or 54.12-F; whichever is related to the climbing space selected.

(5) Arrangement for Deadend Construction: On poles with the messenger dead ended in more than one direction, the grounded messenger or insulated phase conductors of the multiconductor cable shall not be attached to more than three sides of the pole and shall not be less than 2.5 inches from the surface of the pole. The climbing space shall be determined by Rule 54.10-F3 of this order (See Fig. 54-17).

(FINAL)

C. VERTICAL CLEARANCE BETWEEN CONDUCTOR LEVELS

When attached to poles, crossarms, or other supports at less than 15 inches from the centerline of pole, bare neutral multiconductor cable shall not be less than 6 feet vertically above or 6 feet vertically below unprotected conductors, except as modified below:

(1) **With Guard Arm Placed Above Cable:** Where a guard arm is placed above bare neutral multiconductor cable in accordance with the provisions of Rule 57.7, the vertical clearance of 6 feet may be reduced to not less than 4 feet below unprotected conductors of 750-22,500 volts.

(2) **Cable Attached 15 Inches or More From Center Line of Pole:** When bare neutral multiconductor cable is attached (or supported) 15 inches or more from the centerline of pole, the vertical clearance of 6 feet may be reduced to not less than 4 feet below unprotected conductors of 750-22,500 volts. When the vertical clearance is reduced to less than 6 feet, all portions of service drops attached at that level shall be 15 inches or more from the centerline of pole.

(3) **Cable Deadended Under a Transformer:** No guard arm will be required over bare neutral multiconductor cable deadended on the surface of a pole directly below a transformer installation. Such cable shall have a vertical clearance of not less than:

- (a) 4 feet below unprotected line conductors; and
- (b) As specified in Rule 54.4-C6 below the lowest point of the drip loop of primary leads to the transformer(s); and
- (c) 10 inches below the lowest part of the transformer case(s) or hanger(s).

(4) **Cable Above or Below Other Types of Construction of the Same 0-750 Voltage Classification:** Where a bare neutral multiconductor cable is supported on the same pole above or below another conductor level of the same voltage classification that is supported on:

- (a) Crossarms or Extended Racks; The vertical clearance between these levels of conductors shall not be less than 2 feet and no guard arm is required (See Figs. 54-14 through 54-17); or on
- (b) Racks (Rule 54.9); The vertical clearance between these levels of conductors shall not be less than 10 inches for spans not exceeding 200 feet and 12 inches for spans in excess of 200 feet and no guard arm is required.

The climbing space shall be determined and maintained in the same quadrant or on the same side of pole through both conductor levels in accordance with climbing space requirements in Rules 54.7, 54.10-F, or 54.12-F, whichever rule is related to the climbing space selected (See Figs. 54-13 through 54-18).

EXCEPTION: When rack construction is present, the more stringent climbing space requirements of Rule 54.9-F shall always be maintained through both levels.

This provision (Rule 54.10-C4) is not applicable where the crossarm is a combination arm.

(5) Multiple Related Bare Neutral Multiconductor Cables: Where multiple bare neutral multiconductor cables having the same secondary voltage source (related) are supported on the same pole, no specified vertical clearance between such cables is required.

The climbing space shall be maintained in accordance with climbing space requirements in Rule 54.10-F.

(6) Multiple Unrelated Bare Neutral Multiconductor Cables: Where multiple bare neutral multiconductor cables not having the same secondary voltage source (unrelated) but are of the same voltage classification of 0-750 volts, and are supported on the same pole, no specified vertical clearance between such levels is required. However, each multiconductor cable shall be supported on a separate attachment (rack, spool, deadend clevis, etc.).

The climbing space shall be maintained in accordance with climbing space requirements in Rule 54.10-F.

D. SERVICE DROPS

Phase conductors of all service drops taken from bare neutral multiconductor cables shall have insulation equivalent to that specified in Rule 54.10-E1.

Where service drops are supported on a multiconductor cable's bare neutral messenger, the attachment to the messenger shall be an abrasion resistant connection.

E. CONDUCTOR MATERIAL AND STRENGTH

(1) Insulation: The phase conductors including jumper connections shall be covered with an insulation suitable for the voltage involved and shall conform with the requirements of Rule 20.8-G.

(2) Messenger: Where multiconductor cables are not maintained by workers using a cable chair, the additional allowance of the 200 pounds of vertical load specified in Rule 49.7-8 may be reduced to 50 pounds to allow for the load imposed by workers on ladders.

7. CLIMBING SPACE

(1) **Through Bare Neutral Multiconductor Cable Level:** A climbing space shall be maintained through the level of conductors supported in bare neutral multiconductor cable construction. Said climbing space shall be maintained for a vertical distance of not less than 4 feet above and below such cable. The position of the climbing space through the levels of conductors in such cable construction shall be related to the climbing space for conductor levels above and below the cable in accordance with Rules 54.7 and 93.

Where multiconductor cable is installed at pole top, the climbing space shall extend up to the level of such cable and need not be provided through and above such level.

(2) **Dimensions:** The dimensions of the climbing space shall be 30 inches square and shall be provided in one quadrant or on one side of the pole. The depth of the climbing space shall be measured from the centerline of the pole (See Figs. 54-13 through 54-18).

(3) **Allowable Climbing Space Obstructions:** Allowable climbing space obstructions are:

(a) Guys. However, not more than two guys having a vertical separation of 18 inches or less can be installed in any 4-foot section of climbing space.

(b) Suitably protected (covered only by wood, see Rule 22.2):

1) Vertical risers; or

2) Vertical runs; or

3) Ground wires.

Such risers, runs, and grounds are allowable provided that not more than one is installed in any 4-foot section of climbing space.

(c) Insulators and their attaching brackets may extend one-half their diameter into the climbing space.

(d) Conductors may extend one-half their diameter into the climbing space.

(e) Street light brackets may extend one-half their diameter into climbing space. Associated street light bracket struts are allowed in climbing space.

(f) Operating rods (e.g. switch rods) and their associated hardware may extend one-half their diameter into climbing space.

(g) Bands, limited to 6 inches in width with no more than one band allowed in any 24-inch section of climbing space (these limitations are excluded for pole stubbing and pole splicing bands when pole step provisions are installed).

(h) Bolts and their washers.

The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

NOTE: Revised March 9, 1968 by Resolution E-3076.

G. SAGS

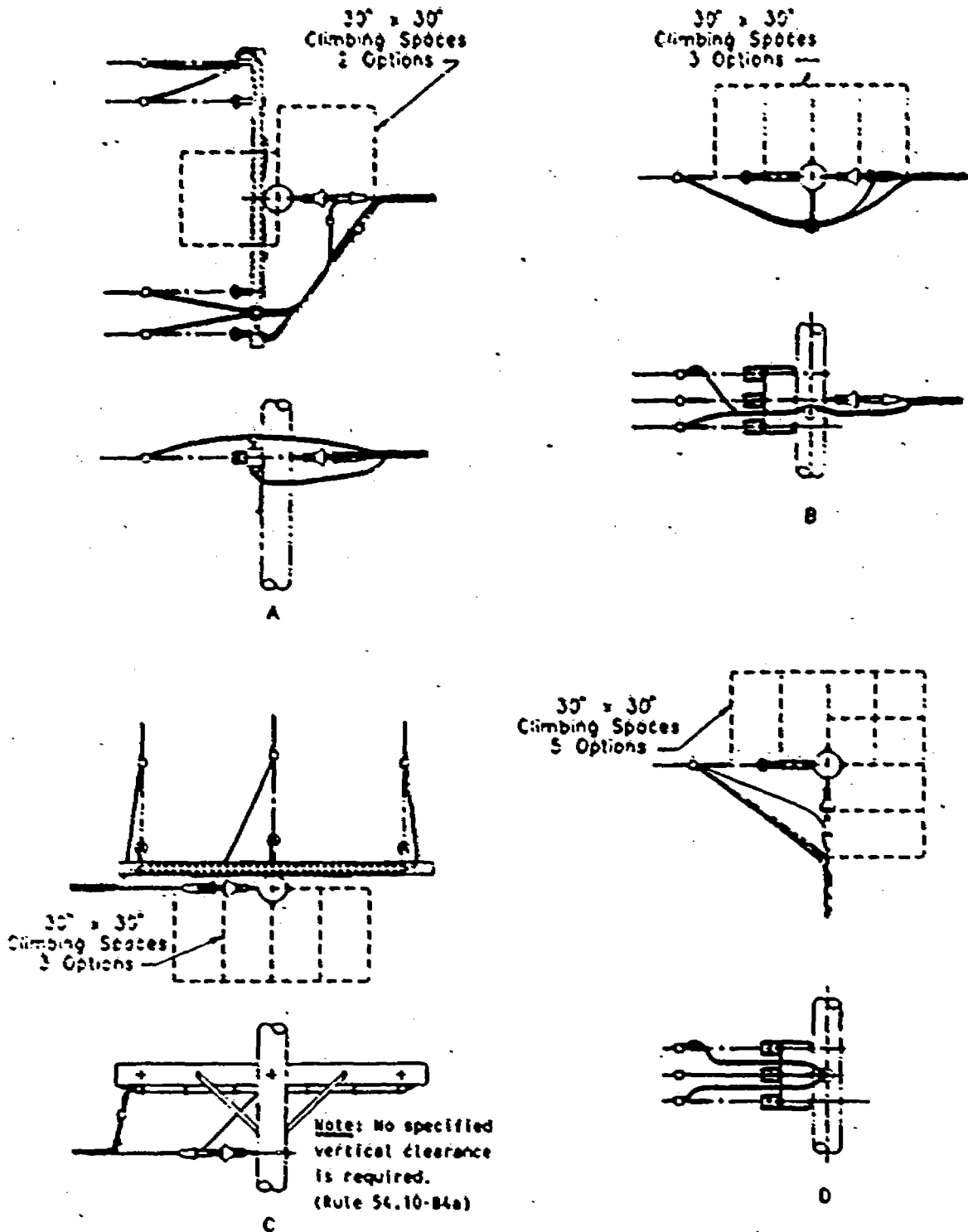
The sags of messengers which support multiconductor cable shall be such that under the maximum loading conditions, the tensions in the messengers shall not exceed the safe working stresses specified in Rule 49.7-B. Where the multiconductor cables are not maintained by workers using a cable chair, the 200-pound additional allowance for vertical loading specified in Rule 49.7-B may be reduced to 50 pounds to allow for the load imposed by workers on ladders.

H. FASTENINGS

Hardware used in connection with messengers shall meet the strength requirement of Rule 49.7-C. Deadend attachments used on messengers shall have a strength not less than that of the messenger. Where cables are not maintained by workers using a cable chair, the additional allowance of 200 pounds vertical load specified in Rule 49.7-C may be reduced to 50 pounds to allow for the load imposed by workers on ladders.

NOTE: Rule 54.10 added January 2, 1962 by Resolution No. E-1109.

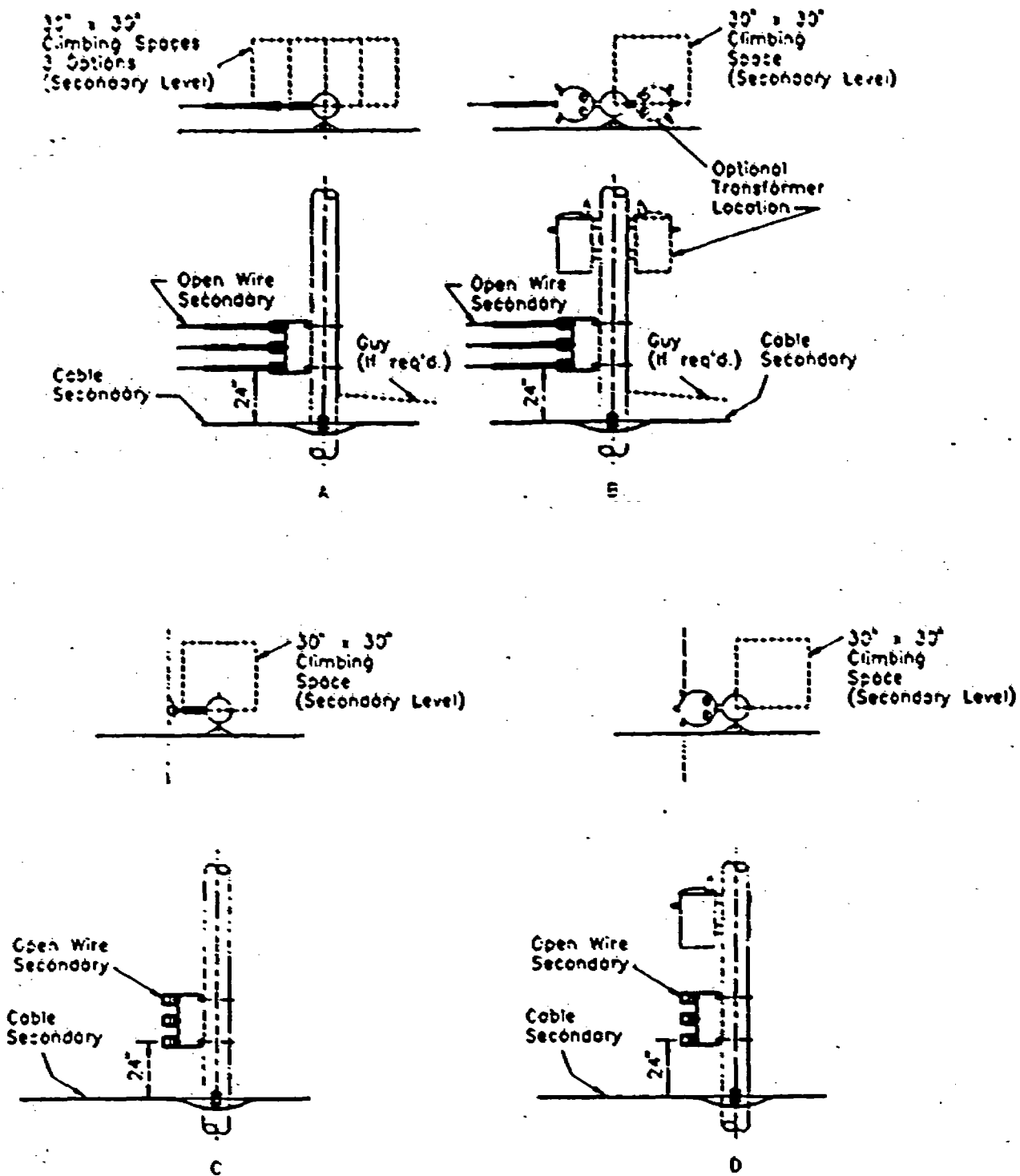
Requirements for Supply Lines
CLIMBING SPACE



Rule 54.10

Fig. 54-13

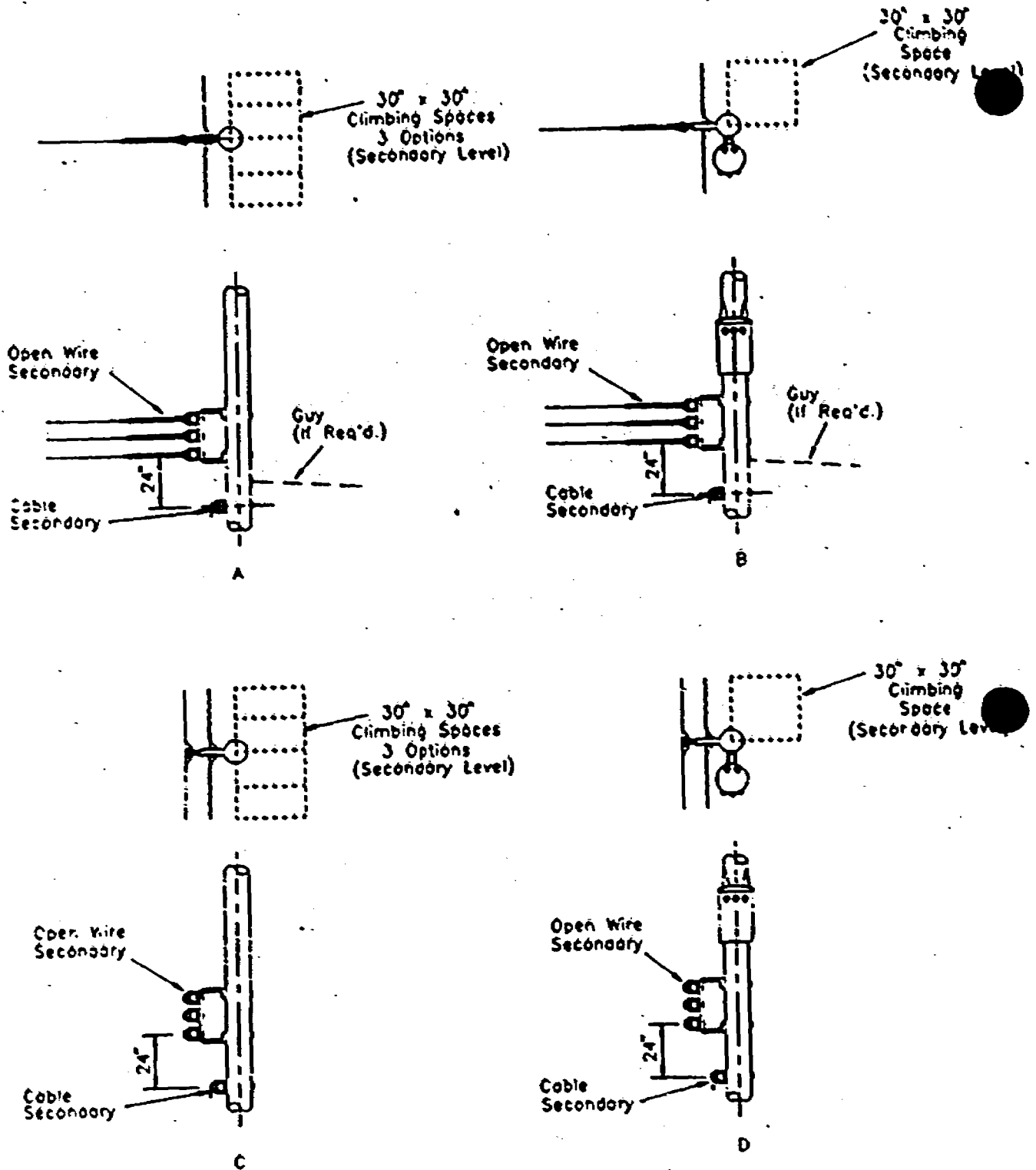
Requirements for Supply Lines
CLIMBING SPACE



Rule 54.10

Fig. 54-14

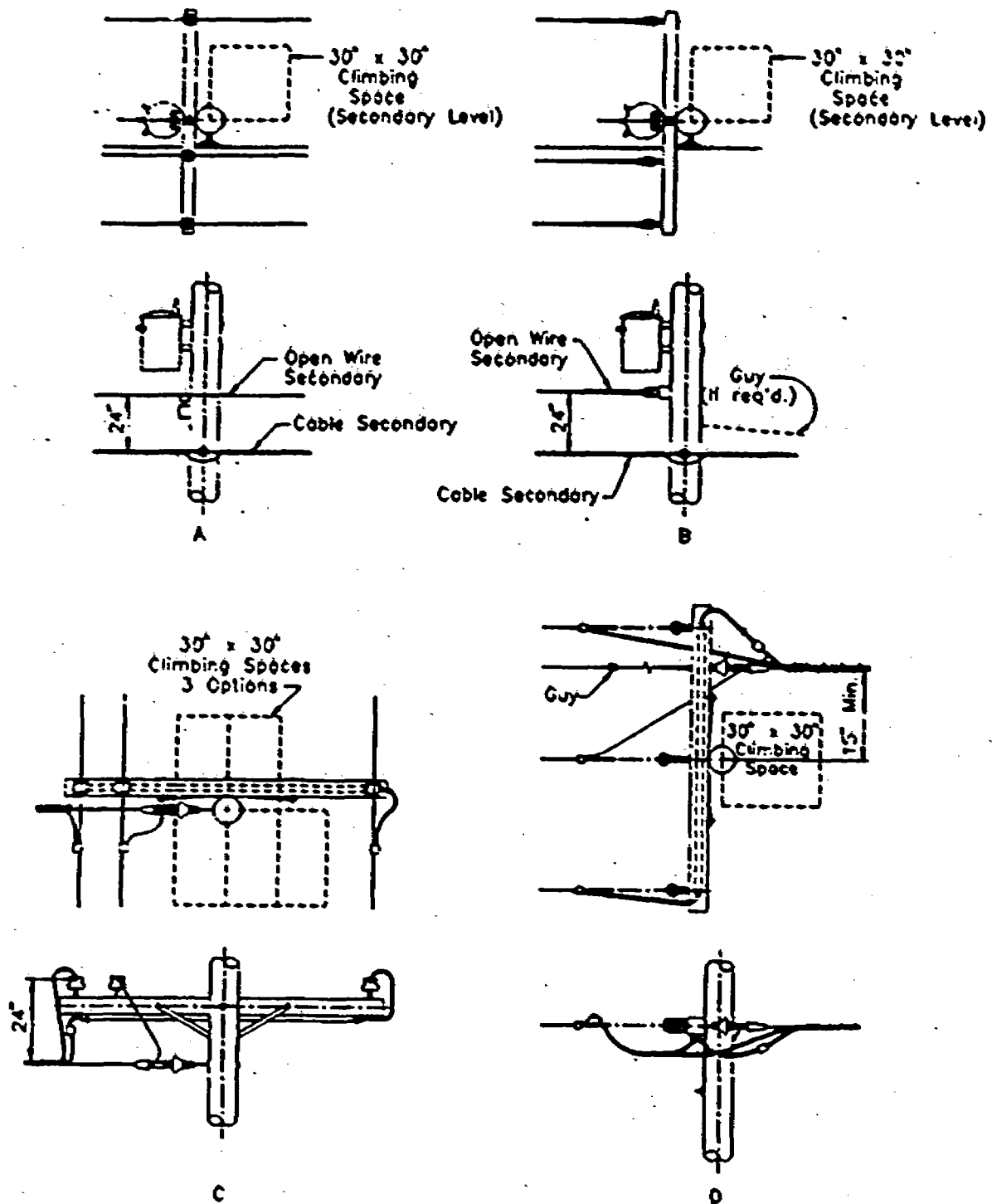
Requirements for Supply Lines
CLIMBING SPACE



Rule 54.10

Fig. 54-15

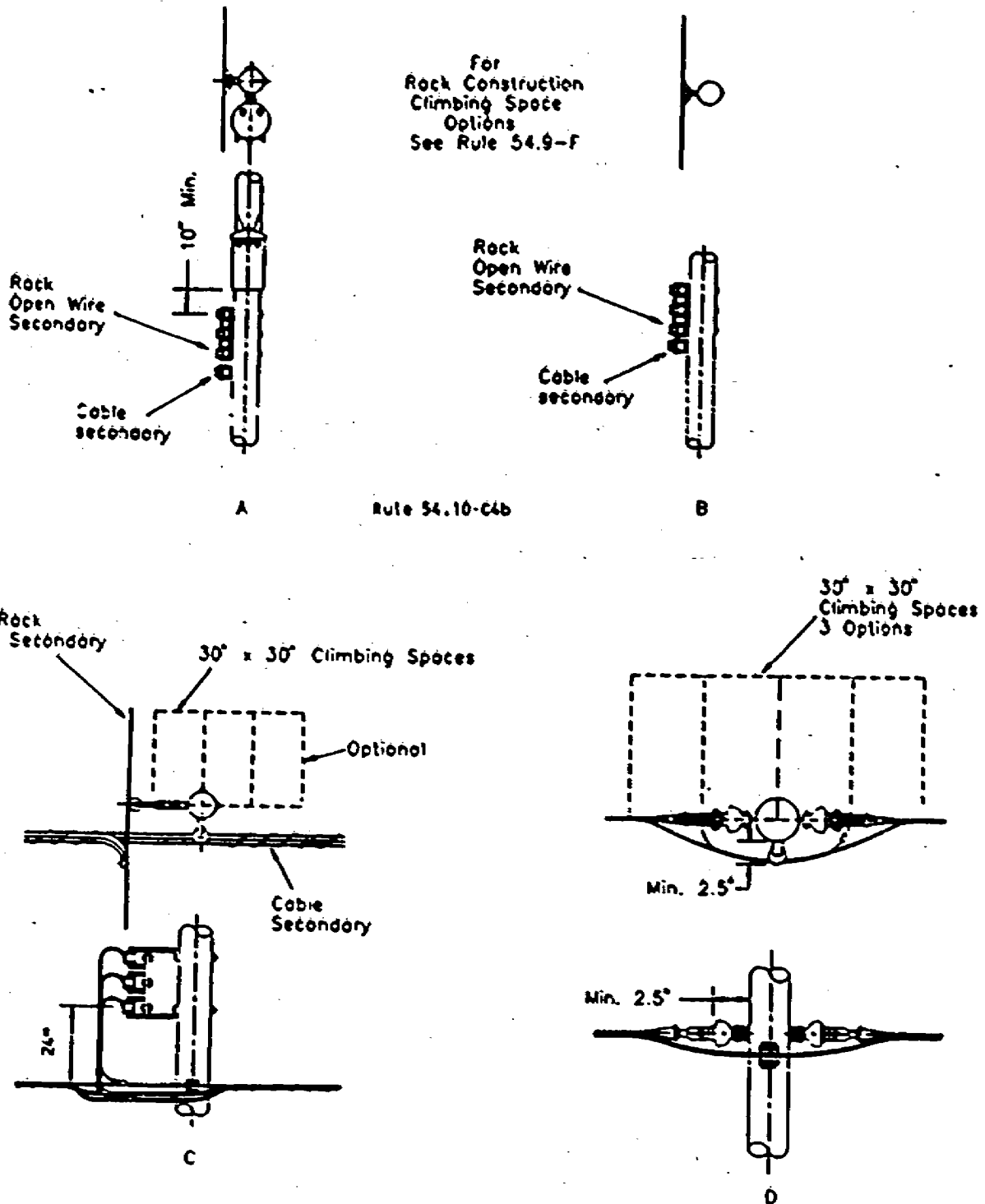
Requirements for Supply Lines
CLIMBING SPACE



Rule 54.10

Figure 54-16

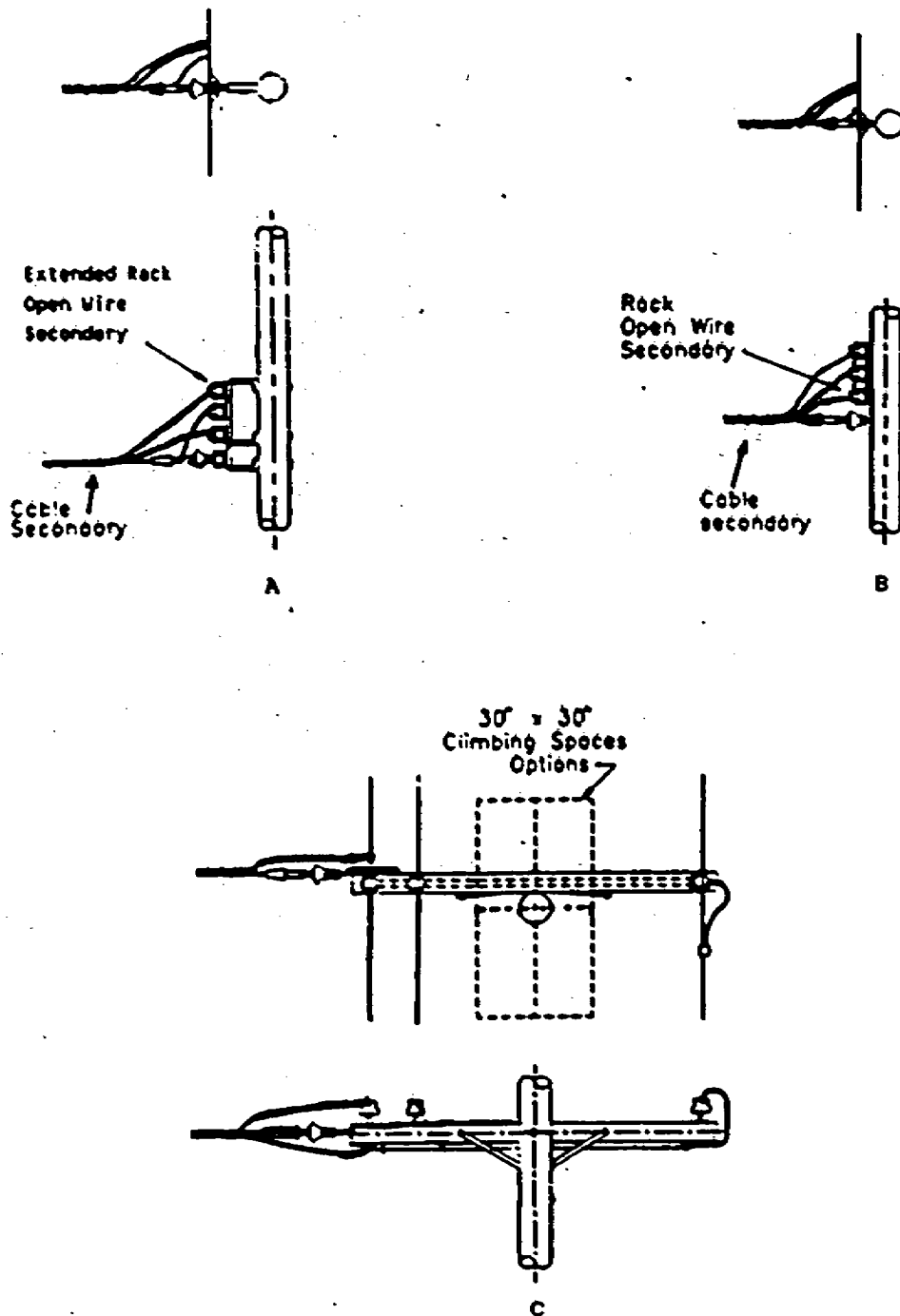
Requirements for Supply Lines
CLIMBING SPACE



Rule 54.10

Fig. 54-17

Requirements for Supply Lines
CLIMBING SPACE
(T-Tap Tangent Construction)



Rule 54.10-B4b

Fig. 54-18

**RATIONALE FOR PROPOSED O.O.95 RULE CHANGE
RULE 54.11-F AND RULE 54.11-G
AND
ASSOCIATED RULE CHANGE
RULE 54.11 (TITLE)**

**Insulators in Vertical and Horizontal Position Without the Use of Wood
Crossarms, More than 750 Volts (Vertical and Triangular Construction)**

These proposed rule changes are to simplify and clarify the existing language in Rules 54.11-F and 54.11-G. The addition of all allowable climbing space obstructions to 54.11-G allows this rule to stand alone removing the need to refer to other rules in the Order.

EXISTING RULE
RULE 54.11-F and RULE 54.11-G

F. CLIMBING SPACE

(1) Where Insulators are in Vertical or Horizontal Position, more than 750 volts: Climbing space shall be maintained through the levels of conductors for a vertical distance of not less than 4 feet above the top conductor and not less than 4 feet below the lowest conductor.

Exception: For a circuit at the top of the pole, the climbing space shall be maintained to the lowest conductor of the circuit on the climbing side of the pole (See Figure 54-10).

The climbing space shall be a square of horizontal dimensions tabulated below and one side of the climbing space shall pass through the center line of the pole.

Voltage of Conductors	Dimensions of Square
750 - 46000 Volts	36 inches
46000 - 75000 Volts	48 inches
More than 75000 Volts	48 inches plus 1/2" per kV in excess of 75 kV

(2) Dimensions Where Conductors are Deadended in Vertical Configuration: Climbing space through conductors shall be a square of the horizontal dimensions tabulated below, and shall be located either on one side or a quadrant of the pole (See Figure 54-11).

Note: Revised January 6, 1968 by Decision No. 73453 and May 22, 1990 by Resolution No. SU-5.

Voltage of Conductors	Dimensions of Square
750 - 7500 Volts	30 inches
7500 - 46000 Volts	36 inches
More than 46000 Volts . . .	36 inches plus 1/2" per kV in excess of 46 kV

G. ALLOWABLE CLIMBING SPACE OBSTRUCTIONS

Insulators and their attaching brackets which support line conductors may extend not more than one-half of their diameter into the climbing space.

Suitably protected vertical conductors attached to the surface of poles, and guys (except those guys contacting metal pins or deadend hardware as specified in Rule 52.7-D), are allowed in climbing spaces provided that not more than two guys (provided they are separated at the pole by a vertical distance of not more than 18 inches), and one vertical riser, run, or ground wire are installed in any 4-foot vertical section of climbing space.

NOTE: Rule 54.11 added January 6, 1968 by Decision No. 73455 and revised July 22, 1968 by Decision No. 74342 and March 9, 1988 by Resolution E-3076 and May 22, 1990 by Resolution SU-5.

Requirements for Supply Lines

CLIMBING SPACE
INSULATORS IN VERTICAL OR HORIZONTAL
POSITION WITHOUT WOOD CROSSARMS
Rule 54.11-F1

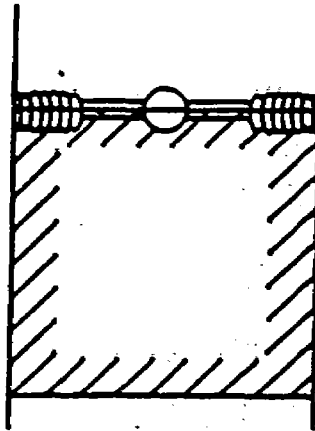


Figure 54-10

CLIMBING SPACE
DEAD ENDING IN VERTICAL CONFIGURATION
Rule 54.11-F2

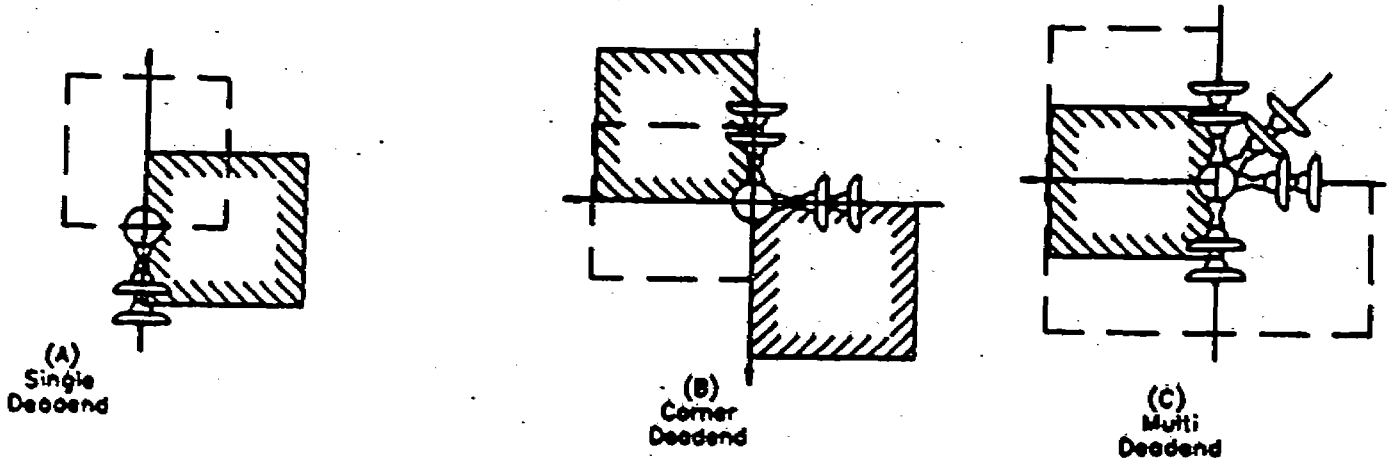


FIGURE 54-11

Figures 54-10 and 54-11

PROPOSED RULE CHANGE
(~~STRIKE OUT AND UNDERLINED~~)
RULE 54.11-F and RULE 54.11-G

F. CLIMBING SPACE

(1) Where Insulators are in Vertical or Horizontal Position ~~(Vertical or Triangular Configuration, more than 750 volts: Climbing space shall be maintained through the levels of conductors for a vertical distance of not less than 4 feet above the top conductor and not less than 4 feet below the lowest conductor. Exception: For a circuit at the top of the pole, the climbing space shall be maintained to the lowest conductor of the circuit on the climbing side of the pole (See Figure 54-10). For a pole top circuit that includes buck position conductors located within a vertical distance of 4 feet or less from the lowest associated line conductor, climbing space need only be maintained to the lowest conductor in the buck position on the climbing side of the pole.~~

The climbing space shall be a square of horizontal dimensions tabulated below, and one side of the climbing space shall pass through the center line of the pole (See Fig. 54-10). ~~Where conductors are deadended (e.g. line and buck or corner construction) below pole top in triangular configuration, 750-46000 volts, climbing space can be located in a quadrant of the pole. When quadrant climbing space is used the dimensions of the square shall be 42 inches.~~

Voltage of Conductors	Dimensions of Square
750 - 46000 Volts	36 inches
46000 - 75000 Volts	48 inches
More than 75000 Volts	48 inches plus 1/2" per kV in excess of 75 kV

(2) ~~Dimensions of Climbing Space Where Conductors are Deadended in Vertical Configuration: Climbing space through conductors shall be a square of the horizontal dimensions tabulated below, and shall be located either on one side or a quadrant of the pole (See Figure 54-11). For a circuit at the top of the pole refer to the exception in Rule 54.11-F.~~

Note: Revised January 6, 1968 by Decision No. 73453 and May 22, 1990 by Resolution No. SJ-5.

Voltage of Conductors	Dimensions of Square
750 - 7500 Volts	30 inches
7500 - 46000 Volts	36 inches
More than 46000 Volts	36 inches plus 1/2" per kV in excess of 46 kV

G. ALLOWABLE CLIMBING SPACE OBSTRUCTIONS

~~Insulators and their attaching brackets which support line conductors may extend not more than one-half of their diameter into the climbing space.~~

Suitably-protected-vertical-conductors-attached-to-the-surface-of poles-and-guys-(except-these-guys-contacting-metal-pins-or-deadend hardware-as-specified-in-Rule-52.7-D)-are-allowed-in-climbing-spaces provided-that-not-more-than-two-guys-(provided-they-are-separated-at-the pole-by-a-vertical-distance-of-not-more-than-18-inches)-and-one-vertical riser-run-or-ground-wire-are-installed-in-any-4-foot-vertical-section-of climbing-space.

Allowable climbing space obstructions in triangular and vertical configuration without the use of wood crossarms are:

- (1) Crossarms, brackets, and their supporting members.
- (2) Insulators which support line conductors, jumpers, and incidental wires may extend one-half of their diameter into the climbing space.
- (3) Conductors may extend one-half of their diameter into the climbing space.
- (4) Suitably protected (covered only by wood, see Rule 22.2):
 - (a) Vertical risers or
 - (b) Vertical runs or
 - (c) Ground wires.

Such risers, runs, and grounds are allowable provided that not more than one is installed in any 4-foot section of climbing space.

- (5) Guys (except those guys which are metallically contacting metal pins or deadend hardware as specified in Rule 52.7-D). However, not more than two guys having a vertical separation of 18 inches or less can be installed in any 4-foot section of climbing space.
- (6) Street light brackets may extend one-half their diameter into climbing space. Associated street light bracket struts are allowed in climbing space.
- (7) Operating rods (e.g. switch rods) and their associated hardware may extend one-half their diameter into climbing space.
- (8) Bands, limited to 6 inches in width with no more than one band allowed in any 24-inch section of climbing space (these limitations are excluded for pole stubbing and pole splicing bands when pole step provisions are installed).
- (9) Bolts and their washers. If bolts are bonded, a Secure electrical contact shall be made. The covering of bolts and bond wire is not required in triangular and vertical configuration without the use of wood crossarms. See Rule 52.3-B5 for bolt cover requirement.

Modification of these requirements in Rule 54.11-9 are specified in: Rule 54.7-A3 for wood crossarm construction; Rule 54.9-F for rack construction; Rule 54.10-F3 for multiconductor cable with bare neutral construction; Rule 54.12-F3 for extended rack construction; and Rule 58.5-2 for switches.

NOTE: Rule 54.11 added January 6, 1968 by Decision No. 73455 and revised July 22, 1968 by Decision No. 74342 and March 9, 1988 by Resolution E-3076 and May 22, 1990 by Resolution SU-5.

Requirements for Supply Lines

CLIMBING SPACE
INSULATORS IN VERTICAL OR HORIZONTAL
POSITION WITHOUT WOOD CROSSARMS
Rule 54.11-F1

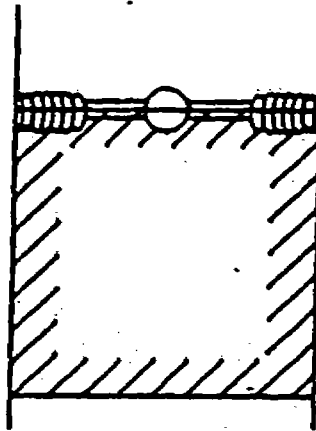


Figure 54-10

CLIMBING SPACE
DEAD ENDING IN VERTICAL CONFIGURATION
Rule 54.11-F2

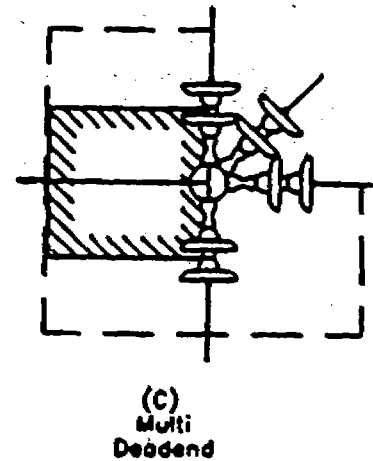
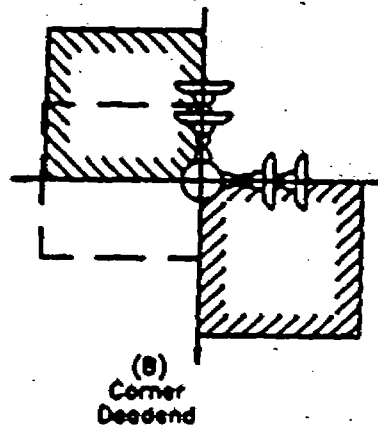
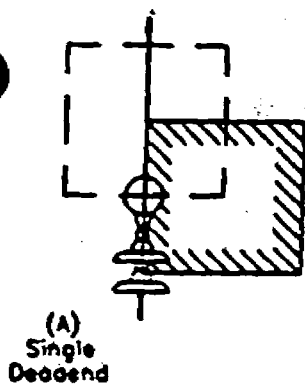


FIGURE 54-11

Figures 54-10 and 54-11

**PROPOSED RULE CHANGE
(FINAL)
RULE 54.11-F and RULE 54.11-0**

F. CLIMBING SPACE

(1) Where insulators are in Vertical or Horizontal Position (Vertical or Triangular Configuration), more than 750 volts: Climbing space shall be maintained through the levels of conductors for a vertical distance of not less than 4 feet above the top conductor and not less than 4 feet below the lowest conductor. Exception: For a circuit at the top of the pole, the climbing space shall be maintained to the lowest conductor of the circuit on the climbing side of the pole. For a pole top circuit that includes buck position conductors located within a vertical distance of 4 feet or less from the lowest associated line conductor, climbing space need only be maintained to the lowest conductor in the buck position on the climbing side of the pole.

The climbing space shall be a square of horizontal dimensions tabulated below, and one side of the climbing space shall pass through the center line of the pole (See Fig. 54-10). Where conductors are deadended (e.g. line and buck or corner construction) below pole top in triangular configuration, 750-46000 volts, climbing space can be located in a quadrant of the pole. When quadrant climbing space is used the dimensions of the square shall be 42 inches.

Voltage of Conductors	Dimensions of Square
750 - 46000 Volts	36 inches
46000 - 75000 Volts	48 inches
More than 75000 Volts	48 inches plus 1/2" per kV in excess of 75 kV

(2) Dimensions of Climbing Space Where Conductors are Deadended in Vertical Configuration: Climbing space through conductors shall be a square of the horizontal dimensions tabulated below, and shall be located either on one side or a quadrant of the pole (See Figure 54-11). For a circuit at the top of the pole refer to the exception in Rule 54.11-F1.

Note: Revised January 6, 1968 by Decision No. 73453 and May 22, 1990 by Resolution No. SU-5.

Voltage of Conductors	Dimensions of Square
750 - 7500 Volts	30 inches
7500 - 46000 Volts	36 inches
More than 46000 Volts	36 inches plus 1/2" per kV in excess of 46 kV

G. ALLOWABLE CLIMBING SPACE OBSTRUCTIONS

Allowable climbing space obstructions in triangular and vertical configuration without the use of wood crossarms are:

- (1) Crossarms, brackets, and their supporting members.
- (2) Insulators which support line conductors, jumpers, and incidental wires may extend one-half of their diameter into the climbing space.
- (3) Conductors may extend one-half of their diameter into the climbing space.
- (4) Suitably protected (covered only by wood, see Rule 22.2):
 - (a) Vertical risers; or
 - (b) Vertical runs; or
 - (c) Ground wires.

Such risers, runs, and grounds are allowable provided that not more than one is installed in any 4-foot section of climbing space.

- (5) Guys (except those guys which are metallically contacting metal pins or deadend hardware as specified in Rule 52.7-D). However, not more than two guys having a vertical separation of 18 inches or less can be installed in any 4-foot section of climbing space.
- (6) Street light brackets may extend one-half their diameter into climbing space. Associated street light bracket struts are allowed in climbing space.
- (7) Operating rods (e.g. switch rods) and their associated hardware may extend one-half their diameter into climbing space.
- (8) Bands, limited to 6 inches in width with no more than one band allowed in any 24-inch section of climbing space (these limitations are excluded for pole stubbing and pole splicing bands when pole step provisions are installed).
- (9) Bolts and their washers. If bolts are bonded, a secure electrical contact shall be made. The covering of bolts and bond wire is not required in triangular and vertical configuration without the use of wood crossarms. SEE RULE 58.3-85 FOR BOLT COVER REQUIREMENT.

Modification of these requirements in Rule 54.11-G are specified in: Rule 54.7-A3 for wood crossarm construction; Rule 54.9-F for rack construction; Rule 54.10-F3 for multiconductor cable with bare neutral construction; Rule 54.12-F3 for extended rack construction; and Rule 58.5-D for switches.

NOTE: Rule 54.11 added January 6, 1968 by Decision No. 73455 and revised July 22, 1968 by Decision 74342 and March 9, 1968 by Resolution E-3076 and May 22, 1990 by Resolution SU-5.

Requirements for Supply Lines

CLIMBING SPACE
INSULATORS IN VERTICAL OR HORIZONTAL
POSITION WITHOUT WOOD CROSSARMS
Rule 54.11-F1

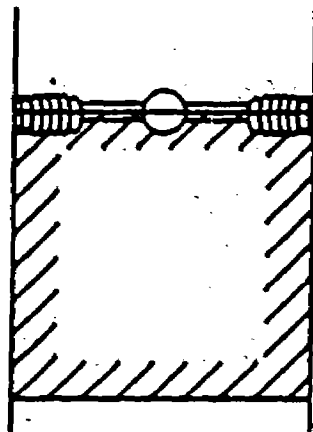


Figure 54-10

CLIMBING SPACE
DEAD ENDING IN VERTICAL CONFIGURATION
Rule 54.11-F2

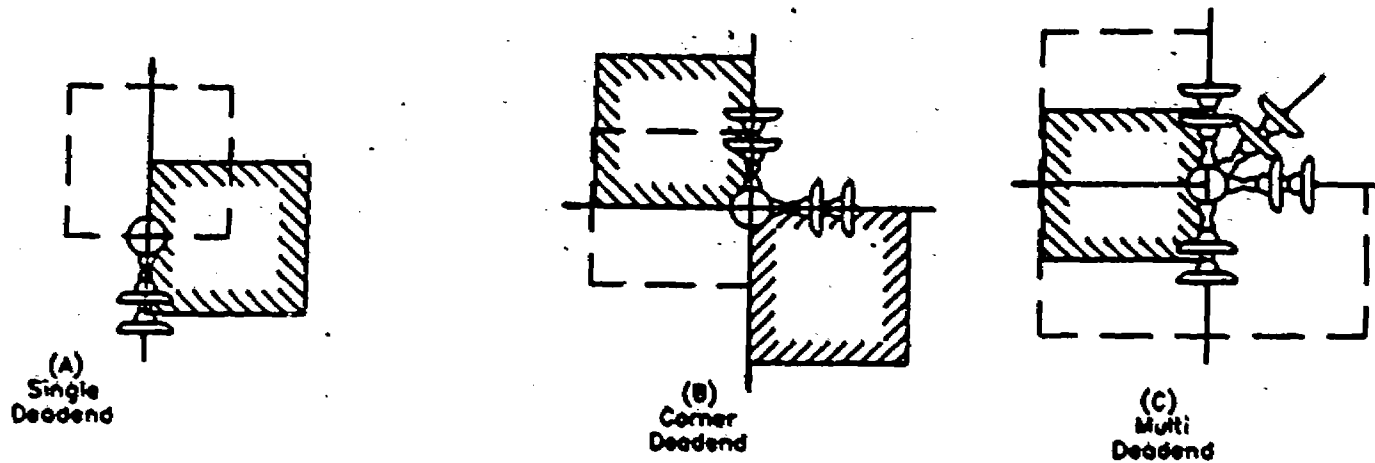


FIGURE 54-11

Figures 54-10 and 54-11

ASSOCIATED RULE CHANGE
(WITH RULE 54.11-F & G)
RULE 54.11
(TITLE ONLY)

- 54.11 Insulators in Vertical and Horizontal Position Without the Use of
Wood Crossarms, More Than 750 Volts

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINED)
RULE 54.11
(TITLE ONLY)

- 54.11 Insulators in Vertical and Horizontal Position Without the Use of
Wood Crossarms, More Than 750 Volts (Vertical and Triangular
Construction)

PROPOSED RULE CHANGE
(FINAL)
RULE 54.11
(TITLE ONLY)

- 54.11 Insulators in Vertical and Horizontal Position Without the Use of
Wood Crossarms, More than 750 Volts (Vertical and Triangular
Construction)

RATIONALE FOR PROPOSED O.O.95 RULE CHANGE
RULE 54.12-F3
Low Voltage Extended Racks, 0-750 Volts

This proposed rule change is to simplify and clarify the existing language in Rule 54.12-F3. The addition of all allowable climbing space obstructions allows this rule to stand alone, removing the need to refer to other rules in the Order.

EXISTING RULE
Rule 54.12-F3

Rule 54.12, Low Voltage Extended Racks, 0-750 Volts

Rule 54.12-F3 ALLOWABLE CLIMBING SPACE OBSTRUCTIONS:

(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.

NOTE: Rule 54.12 Added January 21, 1992, by Resolution BU-10.

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINED)
Rule 54.12-F3

Rule 54.12, Low Voltage Extended Racks, 0-750 Volts

Rule 54.12-F3 ALLOWABLE CLIMBING SPACE OBSTRUCTIONS:

(3) Allowable Climbing Space Obstructions: Allowable climbing space obstructions are: 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

(a) Guys. However, not more than two guys having a vertical separation of 18 inches or less can be installed in any 4-foot section of climbing space.

(b) Suitably protected (covered only by wood, see Rule 22.2):

1) Vertical risers; or

2) Vertical runs; or

3) Ground wires.

Such risers, runs, and grounds are allowable provided that not more than one is installed in any 4-foot section of climbing space.

(c) Insulators and their attaching brackets may extend one-half their diameter into the climbing space.

(d) Conductors may extend one-half their diameter into the climbing space.

(e) Street light brackets may extend one-half their diameter into climbing space. Associated street light bracket struts are allowed in climbing space.

(f) Operating rods (e.g. switch rods) and their associated hardware may extend one-half their diameter into climbing space.

(g) Bands, limited to 6 inches in width with no more than one band allowed in any 24-inch section of climbing space (these limitations are excluded for pole stubbing and pole splicing bands when pole step provisions are installed).

(h) Bolts and their washers.

The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

NOTE: Rule 54.12 Added January 21, 1992, by Resolution SU-10.

PROPOSED RULE CHANGE
(FINAL)
Rule 54.12-F3

Rule 54.12, Low Voltage Extended Racks, 0-750 Volts

Rule 54.12-F3 ALLOWABLE CLIMBING SPACE OBSTRUCTIONS:

(3) Allowable Climbing Space Obstructions: Allowable climbing space obstructions are:

(a) Guys. However, not more than two guys having a vertical separation of 18 inches or less can be installed in any 4-foot section of climbing space.

(b) Suitably protected (covered only by wood, see Rule 22.2):

- 1) Vertical risers; or
- 2) Vertical runs; or
- 3) Ground wires.

Such risers, runs, and grounds are allowable provided that not more than one is installed in any 4-foot section of climbing space.

(c) Insulators and their attaching brackets may extend one-half their diameter into the climbing space.

(d) Conductors may extend one-half their diameter into the climbing space.

(e) Street light brackets may extend one-half their diameter into climbing space. Associated street light bracket struts are allowed in climbing space.

(f) Operating rods (e.g. switch rods) and their associated hardware may extend one-half their diameter into climbing space.

(g) Bands, limited to 6 inches in width with no more than one band allowed in any 24-inch section of climbing space (these limitations are excluded for pole stubbing and pole splicing bands when pole step provisions are installed).

(h) Bolts and their washers.

The terminals or terminal fittings of risers or runs shall not be installed within climbing spaces.

NOTE: Rule 54.12 Added January 21, 1972, by Resolution SU-10.

**RATIONALE FOR PROPOSED G.O. 95 RULE CHANGE
RULE 56.4 CLEARANCES
(ASSOCIATED RULE CHANGE, RULE 37, TABLE 1)**

These proposed rule changes will keep consistent with associated rule changes in the Communication section of the Order. It requires all parts of guys, along public thoroughfares, to have a minimum of 8 feet clearance above ground.

ASSOCIATED CHANGE:

Rule 37, Table 1, Case 5, column A. - 7 ft. should read 8 ft.

Existing Rule
G.O. 95 Rule 56.4 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 thoroughfares which is an entrance to or exit from industrial or commercial premises.
 - 2) A clearance of not less than 14 feet is permitted for the 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 thoroughfares 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.

NOTE: Revised January 21, 1962, by Resolution SU-10.

- (2) Over Private Property:** Those portions of guys over private roadways or areas normally accessible to vehicles may have a clearance above ground less than 18 feet (Table 1, Case 3, Column A) but not less than 16 feet in rural districts and not less than 14 feet in urban districts.

- (3) Over Swimming Pools: (See Rule 54.4-A4 and Fig. 54-1)**

NOTE: Added January 2, 1962 by Resolution No. E-1109, and November 21, 1960 by Resolution SU-6.

**Strike Out and Underline
G.O. 95 Rule 56.4 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~~ commercial premises.

2) A clearance of not less than 14 feet is permitted for the 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 thoroughfares 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~~ 8 feet above the ground.

3) Such guys without insulators shall not be less than ~~7~~ 8 feet above the ground.

NOTE: Revised January 21, 1992, by Resolution SU-10.

(2) Over Private Property: Those portions of guys over private roadways or areas normally accessible to vehicles may have a clearance above ground less than 18 feet (Table 1, Case 3, Column A) but not less than 16 feet in rural districts and not less than 14 feet in urban districts.

(3) Over Swimming Pools: (See Rule 54.4-A3 and Fig. 54-1)

NOTE: Added January 2, 1962 by Resolution No. E-1109 and revised November 21, 1990 by Resolution SU-6.

**Proposed Final Rule
G.O. 95 Rule 56.4 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 the 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 thoroughfares 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 8 feet above the ground.

3) Such guys without insulators shall not be less than 8 feet above the ground.

NOTE: Revised January 21, 1992, by Resolution SU-10.

(2) Over Private Property: Those portions of guys over private roadways or areas normally accessible to vehicles may have a clearance above ground less than 18 feet (Table 1, Case 3, Column A) but not less than 16 feet in rural districts and not less than 14 feet in urban districts.

(3) Over Swimming Pools: (See Rule 54.4-A3 and Fig. 54-1)

NOTE: Added January 2, 1962 by Resolution No. E-1109 and revised November 21, 1990 by Resolution SU-6.

Rationale for Proposed G.O. 95 Rule change
Rules 56.9 and 86.9

After considerable discussion and an attempt to write a definition for traffic, it was decided by the Committee to require a guy marker on all anchor guys. Also, a clarification was added on how to mark multiple guys on one anchor rod.

EXISTING RULE

56.9 GUY MARKER (GUY GUARD)

A substantial marker of suitable material, including but not limited to metal or plastic, not less than 8 feet in length, shall be securely attached to an anchor guy which is exposed to traffic.

NOTE: Revised September 15, 1964 by Decision No. 67820, and November 21, 1990 by Resolution SU-6.

STRIKEOUT & UNDERLINE

56.9 GUY MARKER (GUY GUARD)

A substantial marker of suitable material, including but not limited to metal or plastic, not less than 8 feet in length, shall be securely attached to all anchor guys, ~~which is exposed to traffic~~. Where more than one guy is attached to an anchor rod only the outer most guy is required to have a marker.

NOTE: Revised September 15, 1964 by Decision No. 67820, and November 21, 1990 by Resolution SU-6.

NEW RULE

56.9 GUY MARKER (GUY GUARD)

A substantial marker of suitable material, including but not limited to metal or plastic, not less than 8 feet in length, shall be securely attached to all anchor guys. Where more than one guy is attached to an anchor rod only the outer most guy is required to have a marker.

NOTE: Revised September 15, 1994 by Decision No. 67820, and November 21, 1990 by Resolution SU-6.

EXISTING RULE

86.9 GUY MARKER (GUY GUARD)

A substantial marker of suitable material, including but not limited to metal or plastic, not less than 8 feet in length, shall be securely attached to an anchor guy which is exposed to traffic.

NOTE: Revised September 15, 1964 by Decision No. 67820, and November 21, 1990 by Resolution SU-6.

STRIKEOUT & UNDERLINE

86.9 GUY MARKER (GUY GUARD)

A substantial marker of suitable material, including but not limited to metal or plastic, not less than 8 feet in length, shall be securely attached to all an anchor guys, which-is-exposed-to traffic. Where more than one guy is attached to an anchor rod only the outer most guy is required to have a marker.

NOTE: Revised September 15, 1964 by Decision No. 67820, and November 21, 1990 by Resolution SU-6.

NEW RULE

86.9 GUY MARKER (GUY GUARD)

A substantial marker of suitable material, including but not limited to metal or plastic, not less than 8 feet in length, shall be securely attached to all anchor guys. Where more than one guy is attached to an anchor rod only the outer most guy is required to have a marker.

NOTE: Revised September 15, 1964 by Decision No. 67820, and November 21, 1990 by Resolution SU-6.

RATIONALE FOR PROPOSED G.O.95 RULE CHANGE :
(RULE 74.4-B2)

This proposed rule change will clarify the existing language and make the rule easier to comprehend.

EXISTING RULE
RULE 74.4-B2

74.4 Clearances

B. ABOVE RAILWAYS

(2) **Crossings:** Unless electric railroad systems are protected by interlocking plant at grade crossings with interurban or other heavy or high speed railway systems, the trolley contact conductors shall be at the same elevation above their own tracks throughout the crossing and next adjoining spans and, in addition thereto, catenary construction shall be provided when crossing spans exceed 100 feet (see Appendix C, Figs. 62 and 63). This rule is not intended to apply where pantograph collector or similar device is used.

Note: Revised February 1, 1948 by Supplement No.1 (Decision No. 41134, Case No.4324)

PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)

74.4 Clearances

B. ABOVE RAILWAYS

(2) **Crossings** At Grade Crossing of Railroads : Unless electric railroad systems are protected by interlocking plant at grade crossings with interurban or other heavy or high speed railway systems, the trolley contact conductors shall be at the same elevation above their own tracks throughout the crossing and next adjoining spans, ~~and, in addition thereto~~ In addition to the above, catenary construction shall be provided when crossing spans exceed 100 feet (see Appendix-C, Figs. 62-and-63 74-2). This rule is not intended to apply where pantograph collector or similar device is used.

Note: Revised February 1, 1948 by Supplement No.1 (Decision No. 41134, Case No. 4324)

PROPOSED RULE CHANGE
(FINAL)

74.4 Clearances

B. ABOVE RAILWAYS

(2) At Grade Crossing of Railroads: Unless electric railroad systems are protected by interlocking plant at grade crossings with interurban or other heavy or high speed railway systems, the trolley contact conductors shall be at the same elevation above their own tracks throughout the crossing and next adjoining spans. In addition to the above, catenary construction shall be provided when crossing spans exceed 100 feet (see Fig. 74-2). This rule is not intended to apply where pantograph collector or similar device is used.

Note: Revised February 1, 1948 by Supplement No.1(Decision No. 41134, Case No. 4324)

Requirements for Supply Lines

RULE 74.4-B2

CONSTRUCTION REQUIREMENTS
OF TROLLEY CONTACT CONDUCTORS

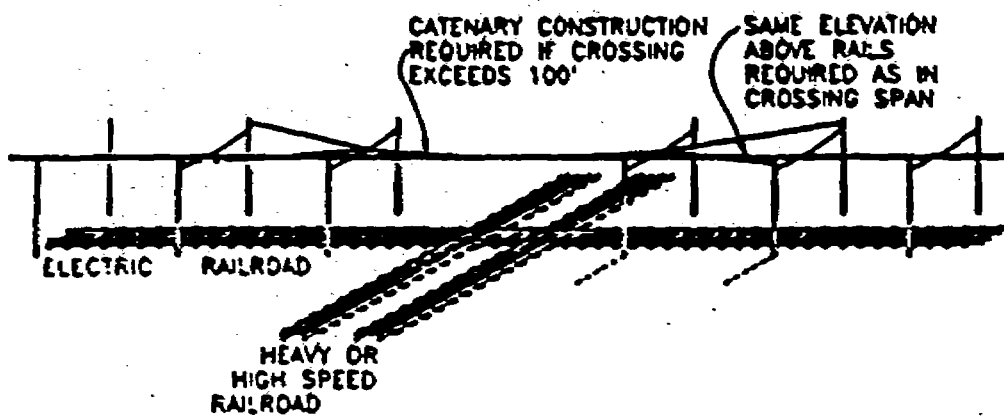
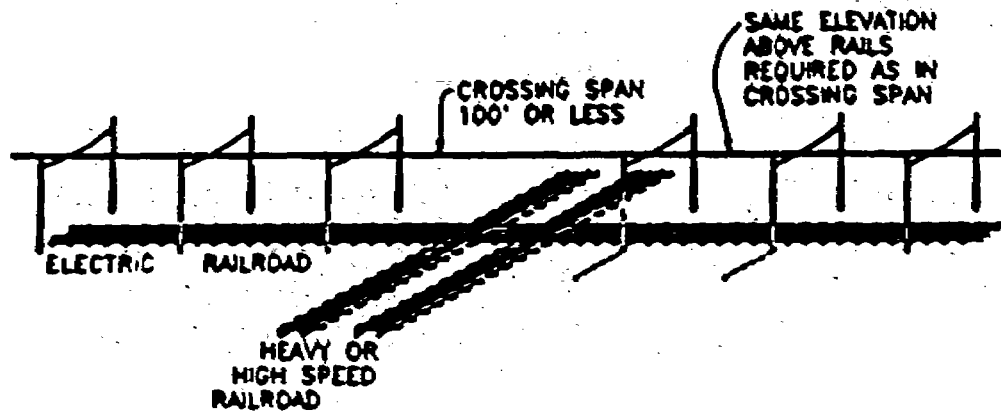


Figure 74-2

RATIONALE FOR PROPOSED G.O. 95 RULE CHANGES
RULE 84.4-E
RULE 84.8-C 4
RULE 86.4-F

The present G.O. 95 rules provide reduction of clearances specified in Rule 37, Table I, Case 6, Columns A and B for conductors (including messengers and cables), guys and service drops over roofs of 3/8 pitch (37 degrees from horizontal). A pitch of 3/8 does not equal 37 degrees.

These proposed changes will eliminate references to 3/8 pitch (37 degrees from horizontal) and replace them with reference to a slope of 9 inches rise per 12 inches of run. In addition a sketch is proposed for clarification.

In addition, the words "other" and "similar" are being deleted from Rule 86.4-E as "other" was inadvertently added and "similar" was to have been removed by Resolution SU-15.

Two additional changes are being made for grammatical reasons. In the title of Rule 84.4-E the word "BUILDING" is being made plural "BUILDINGS" thereby establishing consistency of plural use. In Rule 84.8-C (4)b the word "does" is being changed to "do" as the subject is plural.

**EXISTING G.O. 95 RULE
RULE 84.4 E**

RULE 84 CONDUCTORS

RULE 84.4 CLEARANCES

E. ABOVE ALONGSIDE OR IN IMMEDIATE PROXIMITY TO BUILDING, BRIDGES AND OTHER STRUCTURES.

Conductors should be arranged so as not to hamper or endanger firefighters and workers in performing their duties. The basic clearances of communication conductors from buildings are specified in Table 1, Cases 6 and 7, Column B. The horizontal clearance (Table 1, Case 7) shall be maintained until the vertical clearance (Table 1, Case 6) is attained (see Fig. 84-4). The requirements of Table 1, Case 7, Column B also apply at fire escapes, windows, doors, and other points at which entrance or exit might be reasonably expected.

Communication cables are not required to be any specified distance from the other sides of buildings, bridges and other similar structures, but they shall be installed so that they do not interfere with the free use of fire escapes, windows, doors and other points at which entrance or exit might be reasonably expected.

The vertical clearance of communication conductors (including cables) above buildings specified in Table 1, Case 6, Column B may be reduced to not less than 2 feet under either of the following conditions:

- 1. Over roofs of 3/8 pitch (37 degrees from the horizontal) or greater, or*
- 2. Over roofs where the conductor does not overhang the building by more than 6 feet.*

See Rule 84.8-C4 for service drop clearance requirements.

Note: Revised November 21, 1990 by Resolution SU-6; and November 6, 1992 by Resolution No. SU-15.

**PROPOSED RULE CHANGE
STRIKE OUT AND UNDERLINE
RULE 84.4 E**

RULE 84 CONDUCTORS

RULE 84.4 CLEARANCES

E. ABOVE ALONGSIDE OR IN IMMEDIATE PROXIMITY TO BUILDINGS, BRIDGES AND OTHER STRUCTURES.

Conductors should be arranged so as not to hamper or endanger firefighters and workers in performing their duties. The basic clearances of communication conductors from buildings are specified in Table 1, Cases 6 and 7, Column B. The horizontal clearance (Table 1, Case 7) shall be maintained until the vertical clearance (Table 1, Case 6) is attained (see Fig. 84-4). The requirements of Table 1, Case 7, Column B also apply at fire escapes, windows, doors, and other points at which entrance or exit might be reasonably expected.

Communication cables are not required to be any specified distance from the other sides of buildings, bridges and other similar structures, but they shall be installed so that they do not interfere with the free use of fire escapes, windows, doors and other points at which entrance or exit might be reasonably expected.

The vertical clearance of communication conductors (including cables) above buildings specified in Table 1, Case 6, Column B may be reduced to not less than 2 feet under either of the following conditions:

1. Over roofs whose slope exceeds 9 inches of rise per 12 inches of run (see sketch) of 3/8 pitch (37 degrees from the horizontal) or greater, or

Run = 12"

Rise = 9"



2. Over roofs where the conductor does not overhang the building by more than 6 feet.

See Rule 84.8-C4 for service drop clearance requirements.

Note: Revised November 21, 1990 by Resolution SU-6; and November 6, 1992 by Resolution No. SU-15.

PROPOSED G.O. 95 RULE CHANGE
FINAL
RULE 84.4 E

RULE 84. CONDUCTORS

RULE 84.4 CLEARANCES

E. ABOVE ALONGSIDE OR IN IMMEDIATE PROXIMITY TO BUILDINGS, BRIDGES AND OTHER STRUCTURES.

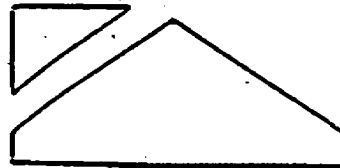
Conductors should be arranged so as not to hamper or endanger firefighters and workers in performing their duties. The basic clearances of communication conductors from buildings are specified in Table 1, Cases 6 and 7, Column B. The horizontal clearance (Table 1, Case 7) shall be maintained until the vertical clearance (Table 1, Case 6) is attained (see Fig. 84-4). The requirements of Table 1, Case 7, Column B also apply at fire escapes, windows, doors, and other points at which entrance or exit might be reasonably expected.

Communication cables are not required to be any specified distance from the sides of buildings, bridges and other structures, but they shall be installed so that they do not interfere with the free use of fire escapes, windows, doors and other points at which entrance or exit might be reasonably expected.

The vertical clearance of communication conductors (including cables) above buildings specified in Table 1, Case 6, Column B may be reduced to not less than 2 feet under either of the following conditions:

1. Over roofs whose slope exceeds 9 inches of rise per 12 inches of run (see sketch), or
 $\text{Run} = 12''$

$\text{Rise} = 9''$



2. Over roofs where the conductor does not overhang the building by more than 6 feet.

See Rule 84.8-C4 for service drop clearance requirements.

Note: Revised November 21, 1990 by Resolution SU-6; and November 6, 1992 by Resolution No. SU-15.

**EXISTING G.O. 95 RULE
RULE 84.8-C (4)**

- RULE 84** **CONDUCTORS**
RULE 84.8 **SERVICE DROPS**
RULE 84.8-C **BETWEEN CONDUCTORS**

RULE 84.8-C **(4) From Buildings and Structures: Service drops should be arranged so as not to hamper or endanger firefighters and workers in performing their duties.**

Service drops are not required to clear buildings any specified horizontal distance but shall be so installed that they do not interfere with the free use of fire escapes, windows, doors and other points at which entrance or exit might be expected.

Service drops are not required to clear the roofs of buildings on the premises served any specified vertical distance. The vertical clearance above buildings on premises other than the one being served shall not be less than 8 feet, except that a reduction to not less than 2 feet is permitted under either of the following conditions:

- a. Over roofs of 3/8 pitch (37 degrees from horizontal) or greater, or*
- b. Over roofs where the service drop does not overhang the building by more than 6 feet.*

Note: Revised November 21, 1990 by Resolution SU-6.

PROPOSED G.O. 95 RULE CHANGE
STRIKE OUT AND UNDERLINE
RULE 84.8-C (4)

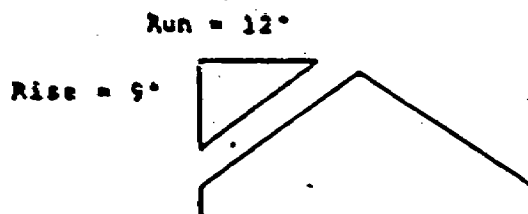
RULE 84 CONDUCTORS
RULE 84.8 SERVICE DROPS
RULE 84.8-C BETWEEN CONDUCTORS

RULE 84.8-C (4) From Buildings and Structures: Service drops should be arranged so as not to hamper or endanger firefighters and workers in performing their duties.

Service drops are not required to clear buildings any specified horizontal distance but shall be so installed that they do not interfere with the free use of fire escapes, windows, doors and other points at which entrance or exit might be expected.

Service drops are not required to clear the roofs of buildings on the premises served any specified vertical distance. The vertical clearance above buildings on premises other than the one being served shall not be less than 8 feet, except that a reduction to not less than 2 feet is permitted under either of the following conditions:

a. Over roofs whose slope exceeds 9 inches of rise per 12 inches of run (see sketch), of ~~3/8~~ pitch (~~37~~ degrees from horizontal) or greater or



b. Over roofs where the service drops do does not overhang the building by more than 6 feet.

Note: Revised November 21, 1990 by Resolution SU-6.

PROPOSED G.O. 95 RULE CHANGE
FINAL
RULE 84.8-C (4)

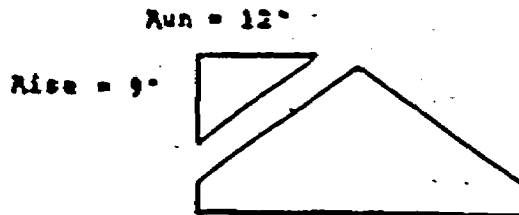
RULE 84 CONDUCTORS
RULE 84.8 SERVICE DROPS
RULE 84.8-C BETWEEN CONDUCTORS

RULE 84.8-C (4) *From Buildings and Structures: Service drops should be arranged so as not to hamper or endanger firefighters and workers in performing their duties.*

Service drops are not required to clear buildings any specified horizontal distance but shall be so installed that they do not interfere with the free use of fire escapes, windows, doors and other points at which entrance or exit might be expected.

Service drops are not required to clear the roofs of buildings on the premises served any specified vertical distance. The vertical clearance above buildings on premises other than the one being served shall not be less than 8 feet, except that a reduction to not less than 2 feet is permitted under either of the following conditions;

a. *Over roofs whose slope exceeds 9 inches of rise per 12 inches of run (see sketch), or*



b. *Over roofs where the service drops do not overhang the building by more than 6 feet.*

Note: Revised November 21, 1990 by Resolution S.U.6.

**EXISTING G.O. 95 RULE
RULE 86.4 F**

RULE 86. GUY AND ANCHORS

RULE 86.4 CLEARANCES

F. ABOVE BUILDINGS

The minimum vertical clearance of 8 feet specified for guys above buildings (Table 1, Case 6, Column A) may be reduced over roofs of 3/8 pitch (37 degrees from the horizontal) or greater to a clearance of not less than 2 feet.

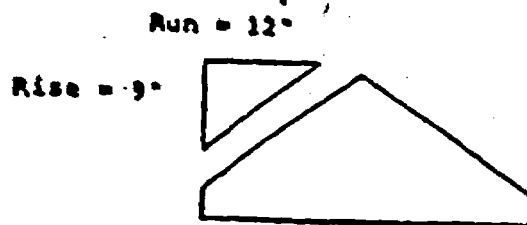
**PROPOSED G.O. 95 RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 86.4 F**

RULE 86. GUY AND ANCHORS

RULE 86.4 CLEARANCES

F. ABOVE BUILDINGS

The minimum vertical clearance of 8 feet specified for guys above buildings (Table 1, Case 6, Column A) may be reduced over roofs of $2/8$ pitch (~~37 degrees from the horizontal~~) or greater to a clearance of not less than 2 feet when the roof slope exceeds 9 inches of rise per 12 inches of run (see sketch).



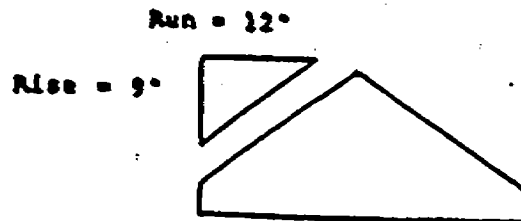
**PROPOSED G.O. 95 RULE CHANGE
FINAL
RULE 86.4 F**

RULE 86. GUY AND ANCHORS

RULE 86.4 CLEARANCES

F. ABOVE BUILDINGS

The minimum vertical clearance of 8 feet specified for guys above buildings (Table 1, Case 6, Column A) may be reduced to a clearance of not less than 2 feet when the roofs slope exceeds 9 inches of rise per 12 inches of run (see sketch).



**RATIONALE FOR PROPOSED G.O. 95 RULE CHANGE
RULE 86.4
CLEARANCES**

This proposed rule change is submitted to correct an inadvertent partial omission of the existing rule.

**EXISTING G.O. 95 RULE
RULE 86.4
GUY CLEARANCES
RULE 86.4-A1
ABOVE GROUND**

RULE 86. GUY'S and ANCHORS

RULE 86.4

86.4 Clearances

The basic minimum clearances specified in Tables 1 and 2, Rules 37 and 38 respectively. Modifications are specified in the following provisions:

RULE 86.4-A1

A. ABOVE GROUND

- (1) Over, Across or Along Public Thoroughfares:**
Minimum clearance shall not be less than 18 feet (Table 1, Case 3, Column A).

EXCEPTIONS:

- (a)** *A minimum clearance of 16 feet is permitted over an entrance to or exit from industrial or commercial premises.*
- (b)** *A minimum clearance of 14 feet is permitted over private residential premises.*
- (c)** *Clearance of overhead guys along public thoroughfares, above ground which is not normally accessible to vehicles, may be less than as specified in Table 1, Column A, Cases 3 and 4 (18 feet and 15 feet respectively), but shall not be less than 8 feet.*

NOTE: Revised January 19, 1994 by Resolution SU-25.

**PROPOSED G.O. 95 RULE CHANGE
(STRIKE OUT AND UNDERLINED)
RULE 86.4
GUY CLEARANCES
RULE 86.4-A1
ABOVE GROUND**

RULE 86. GUYS and ANCHORS

RULE 86.4

86.4 Clearances

The basic minimum clearances are specified in Tables 1 and 2, Rules 37 and 38 respectively. Modifications are specified in the following provisions:

RULE 86.4-A1

A. ABOVE GROUND

- (1) *Over, Across or Along Public Thoroughfares:
Minimum clearance shall not be less than 18 feet (Table 1, Case 3, Column A).*

EXCEPTIONS:

- (a) *A minimum clearance of 16 feet is permitted over an entrance to or exit from industrial or commercial premises.*
- (b) *A minimum clearance of 14 feet is permitted over an entrance to or exit from private residential premises.*
- (c) *Clearance of overhead guys along public thoroughfares, above ground which is not normally accessible to vehicles, may be less than as specified in Table 1, Column A, Cases 3 and 4 (18 feet and 15 feet respectively), but shall not be less than 8 feet.*

NOTE: Revised January 19, 1994 by Resolution SU-25.

**PROPOSED G.O. 95 RULE CHANGE
(FINAL)
RULE 86.4
GUY CLEARANCES
RULE 86.4-A1
ABOVE GROUND**

RULE 86. GUYs and ANCHORS

RULE 86.4

86.4 Clearances

The basic minimum clearances are specified in Tables 1 and 2, Rules 37 and 38 respectively. Modifications are specified in the following provisions:

RULE 86.4-A1

A. ABOVE GROUND

- (1) Over, Across or Along Public Thoroughfares:**
Minimum clearance shall not be less than 18 feet (Table 1, Case 3, Column A).

EXCEPTIONS:

- (a)** *A minimum clearance of 16 feet is permitted over an entrance to or exit from industrial or commercial premises.*
- (b)** *A minimum clearance of 14 feet is permitted over an entrance to or exit from private residential premises.*
- (c)** *Clearance of overhead guys along public thoroughfares, above ground which is not normally accessible to vehicles, may be less than as specified in Table 1, Column A, Cases 3 and 4 (18 feet and 15 feet respectively), but shall not be less than 8 feet.*

NOTE: Revised January 19, 1994 by Resolution SU-25.

**RATIONALE FOR PROPOSED G.O. 95 RULE CHANGE
RULE 84.6-E
RULE 87.7-D NEW RULE
RISERS**

This rule relating to communication risers presently resides in Rule 84 "Conductors". As cables are the primary transmission medium for communications, it is proposed to move this rule to Rule 87 "Cables and Messengers".

The present rule requires cables be encased in "securely" grounded iron or steel pipe. This requirement cannot be met when the supporting underground conduit is non-conductive plastic. It is proposed to expand this rule to require that when a riser cable with a conductive outer sheath, such as lead, is supported by non-conductive underground conduit and protected from the ground level to 8 feet above by a conductive metal pipe or u-guard, that this riser guard be "effectively" grounded.

In addition, the requirement to suitably cover a riser in the area 6 feet below the level of unprotected supply conductors is being modified to reduce this requirement to not less than 4 feet when the riser is guarded in accordance with rule 87.4-C 3.

See associated Rule Change 84.6-D.

See associated Index page H-25.

EXISTING G. O. 95 RULE

RULE 84.6-E

RULE 84 **Conductors**

RULE 84.6 **Vertical and Lateral Conductors**

RULE 84.6-E **Risers**

Risers of wires or underground cables shall be covered from the ground line to a level not less than 8 feet above the ground line by one of the following:

1. *Grounded (see definition 21.2) iron or steel pipe, metal U-guard or other metallic covering of equal strength or;*
2. *Conduit or U-shaped moulding meeting the requirements as specified in Rule 22.2*

Risers shall be covered by a suitable protective covering as defined in Rule 22.2, for a vertical distance of 3 feet above to 6 feet below the level of unprotected supply conductors, when supported on the same pole or structure, or within a 6-foot radius of another pole supporting unprotected supply conductors.

Note: Revised June 2, 1965 by Resolution No. 8-1977; June 21, 1977 by Resolution No. 8-1982; February 12, 1989 by Resolution No. 8-1982; March 2, 1990 by Resolution 8-2079, and January 16, 1994 by Resolution 8-2122

EXISTING G.O. 95 RULE
STRIKE OUT AND UNDERLINE
RULE 84.6-E

RULE 84 Conductors

RULE 84.6 Vertical and Lateral Conductors

RULE 84.6-E Risers Intentionally Left Blank

(Note: Risers revised and moved to 87.7-D)

~~Risers of wires on underground cables shall be covered in the ground line to a depth of 18 inches below the ground line by one of the following:~~

~~1. Covered with a layer of 12 inches of earth or 6 inches of concrete or 4 inches of brick or 2 inches of stone or 1 inch of asphalt.~~

~~2. Covered with a layer of 12 inches of earth or 6 inches of concrete or 4 inches of brick or 2 inches of stone or 1 inch of asphalt.~~

~~Risers shall be covered by a suitable protective covering as defined in rule 22.7. No lead sheath or plastic or bitumastic or felt or paper or any other material shall be used when supported by the pole or structure, or in any case where it is necessary to add any other suitable protective covering.~~

~~No lead sheath shall be used on any wire by decision No. 1907 by Resolution No. 11/1909, or by decision No. 1907 by Resolution No. 11/1909, or by decision No. 1907 by Resolution No. 11/1909, or by decision No. 1907 by Resolution No. 11/1909.~~

NEW G. O. 95 RULE
(STRIKE OUT AND UNDERLINE)
RULE 87.7-D

Rule 87 Cables and Messengers

Rule 87.7 Covering or Guarding

Rule 87.7-D Risers

(1) Covered From Ground Level to 8 Feet Above The Ground;

Risers shall be protected from the ground level to a level not less than 8 feet above the ground by:

- (a) Securely or effectively grounded iron or steel pipe (or other covering at least of equal strength). When metallic sheathed cable rising from underground non-metallic conduit is protected by metallic pipe or moulding, such pipe or moulding shall be effectively grounded as specified in Rule 21.2-A, or
- (b) Non-metallic conduit or rigid u-shaped moulding. Such conduit or moulding shall be of material as specified in Rule 22.2.

(2) Covered From 8 Feet Above The Ground Level and Above:

- (a) Risers shall be covered by a suitable protective covering, as defined in Rule 22.2 where within a vertical distance of 3 feet above or 6 feet below the level of unprotected supply conductors when supported on the same pole or structure or within a 6-foot radius of another pole supporting unprotected supply conductors, except that when the riser is protected by a guard arm installed in accordance with Rule 87.4-C 3, the 6 feet may be reduced to not less than 4 feet.

Note: Revised June 5, 1966, by Resolution No. 9971; June 21, 1977 by Resolution No. E-1893; February 12, 1980 by Resolution No. E-1842; March 8, 1982 by Resolution No. E-2076, and January 13, 1984 by Resolution No. 81-24.

(FINAL)
G.O. 95 RULE
RULE 84.6-E

- RULE 84 Conductors
RULE 84.6 Vertical and Lateral Conductors
RULE 84.6-E Intentionally Left Blank
(Note: Risers revised and moved to 87.7-D)

(FINAL)
G.O. 95 RULE
RULE 87.7-D

Rule 87.7-D Risers

- (1) Covered From Ground Level to 8 Feet Above The Ground:
Risers shall be protected from the ground level to a level not less than 8 feet above ground by:
 - (a) Securely or effectively grounded iron or steel pipe (or other covering at least of equal strength). When metallic sheathed cable rising from underground non-metallic conduit is protected by metallic pipe or molding, such pipe or molding shall be effectively grounded as specified in Rule 21.2-A, or
 - (b) Non-metallic conduit or rigid u-shaped molding. Such conduit or molding shall be of material as specified in Rule 22.2.
- (2) Covered from 8 Feet Above the Ground Level and Above:
 - (a) Riser shall be covered by a suitable protective covering, as defined in Rule 22.2, where within a vertical distance of 3 feet above or 6 feet below the level of unprotected supply conductors when supported on the same pole or structure or within a 6 foot radius of another pole supporting unprotected supply conductors, except that when the riser is protected by a guard arm installed in accordance with Rule 87.4-C3, the 6 feet may be reduced to not less than 4 feet.

Note: Revised June 7, 1965 by Decision No. 69071; June 21, 1977 by Resolution No. E-1689; February 13, 1980 by Resolution No. E-1863; March 9, 1988 by Resolution E-3076; and January 19, 1994 by Resolution No. SU-25.

EXISTING G. O. 95 RULE
Rule 84.6-D

84. CONDUCTORS

84.6 VERTICAL AND LATERAL CONDUCTORS

84.6-D VERTICAL RUNS

Vertical runs of communication wires or cables supported on the surface of wood poles or structures, shall be covered by a suitable protective covering (see Rule 22.2) where within a vertical distance of 3 feet above or 6 feet below unprotected supply conductors supported on the same pole or structure. Vertical runs of communication wires or cables on the surface of a wood pole shall be covered by a suitable protective covering where within a 6-foot radius of any other pole supporting supply conductors except that those portions of such runs which are more than 3 feet above or 6 feet below the level of unprotected supply conductors need not be covered. The plastic pipe specified in Rule 22.2-C shall have a minimum wall thickness of 0.15 inch. Cable and drop wire runs to or from terminal boxes are excepted from these requirements for covering, under the following conditions:

Where guard arms are installed above messengers or longitudinal cables which are less than 6 feet below but not less than 4 feet below unprotected supply conductors of 0-750 volts, or where cables are supported on crossarms at not less than 15 inches from center line of pole, in which cases any portion of metal sheathed cable runs on surface of pole below the guard arm and in the same quadrant as the longitudinal cable (see App. G, Fig. 87), or below and on the same side of the pole with a crossarm which supports a longitudinal cable, need not be covered.

Runs of bridled conductors, attached to surface of pole, need not be covered provided such runs are below the guard arm and in the same quadrant as the longitudinal cable, or where such runs are below and on the same side of pole with a cable arm and are not in the climbing space, or are connected to service drops which are placed in accordance with the provisions of Rule 84.8-B2b.

Where bridled runs are not required to be covered by these rules, they shall be supported by bridle hooks or rings spaced at intervals of not more than 24 inches.

Vertical runs shall be treated as risers (see Rule 84.6-E) where within a distance of 8 feet from the ground line.

Runs which terminate in the top of enclosures which afford ample mechanical protection to the runs may extend within 8 feet of the ground but not less than 6 feet of the ground without being treated as risers.

Note Revised June 7, 1968 by Decision No. 60071.

**PROPOSED RULE CHANGE
(STRIKE OUT AND UNDERLINE)
Rule 84.6-D**

84. CONDUCTORS

84.6 VERTICAL AND LATERAL CONDUCTORS

84.6 D. VERTICAL RUNS

Vertical runs of communication wires or cables supported on the surface of wood poles or structures, shall be covered by a suitable protective covering (see Rule 22.2) where within a vertical distance of 3 feet above or 6 feet below unprotected supply conductors supported on the same pole or structure. Vertical runs of communication wires or cables on the surface of a wood pole shall be covered by a suitable protective covering where within a 6-foot radius of any other pole supporting supply conductors except that those portions of such runs which are more than 3 feet above or 6 feet below the level of unprotected supply conductors need not be covered. The plastic pipe specified in Rule 22.2-C shall have a minimum wall thickness of 0.15 inch. Cable and drop wire runs to or from terminal boxes are excepted from these requirements for covering, under the following conditions:

Where guard arms are installed above messengers or longitudinal cables which are less than 6 feet below but not less than 4 feet below unprotected supply conductors of 0-750 volts, or where cables are supported on crossarms at not less than 15 inches from center line of pole, in which cases any portion of metal sheathed cable runs on surface of pole below the guard arm and in the same quadrant as the the longitudinal cable (see App. G, Fig. 87), or below and on the same side of the pole with a crossarm which supports a longitudinal cable, need not be covered.

Runs of bridled conductors, attached to surface of pole, need not be covered provided such runs are below the guard arm and in the same quadrant as the longitudinal cable, or where such runs are below and on the same side of pole with a cable arm and are not in the climbing space, or are connected to service drops which are placed in accordance with the provisions of Rule 84.8-B2b.

Where bridled runs are not required to be covered by these rules, they shall be supported by bridle hooks or rings spaced at intervals of not more than 24 inches.

Vertical runs shall be treated as risers (see Rule ~~84.6E~~ 87.7-D) where within a distance of 8 feet from the ground line.

Runs which terminate in the top of enclosures which afford ample mechanical protection to the runs may extend within 8 feet of the ground but not less than 6 feet of the ground without being treated as risers.

Note: Revised June 7, 1965 by Decision No. 89071.

84. CONDUCTORS

84.6 VERTICAL AND LATERAL CONDUCTORS

84.6 D. VERTICAL RUNS

Vertical runs of communication wires or cables supported on the surface of wood poles or structures, shall be covered by a suitable protective covering (see Rule 22.2) where within a vertical distance of 3 feet above or 6 feet below unprotected supply conductors supported on the same pole or structure. Vertical runs of communication wires or cables on the surface of a wood pole shall be covered by a suitable protective covering where within a 6-foot radius of any other pole supporting supply conductors except that those portions of such runs which are more than 3 feet above or 6 feet below the level of unprotected supply conductors need not be covered. The plastic pipe specified in Rule 22.2-C shall have a minimum wall thickness of 0.15 inch. Cable and drop wire runs to or from terminal boxes are excepted from these requirements for covering, under the following conditions:

Where guard arms are installed above messengers or longitudinal cables which are less than 6 feet below but not less than 4 feet below unprotected supply conductors of 0-750 volts, or where cables are supported on crossarms at not less than 15 inches from center line of pole, in which cases any portion of metal sheathed cable runs on surface of pole below the guard arm and in the same quadrant as the longitudinal cable (see App. G, Fig. 87), or below and on the same side of the pole with a crossarm which supports a longitudinal cable, need not be covered.

Runs of bridled conductors, attached to surface of pole, need not be covered provided such runs are below the guard arm and in the same quadrant as the longitudinal cable, or where such runs are below and on the same side of pole with a cable arm and are not in the climbing space, or are connected to service drops which are placed in accordance with the provisions of Rule 84.8-B2b.

Where bridled runs are not required to be covered by these rules, they shall be supported by bridle hooks or rings spaced at intervals of not more than 24 inches.

Vertical runs shall be treated as risers (see Rule 87.7-b) where within a distance of 8 feet from the ground line.

Runs which terminate in the top of enclosures which afford ample mechanical protection to the runs may extend within 8 feet of the ground but not less than 6 feet of the ground without being treated as risers.

Note Revised June 7, 1965 by Decision No. 69071.

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RATIONALE FOR PROPOSED G.O. 95 RULE CHANGE

RULE 86.8-C

REQUIREMENT FOR COMMUNICATIONS GUY INSULATORS

The proposed rule change will provide a consistent standard for dry flashover voltage of guy insulators.

Presently Rule 56.8 specifies ANSI Standard C29.1-1982 and this rule specifies AIEE Standard No. 41 - March 1930.

Additionally a spelling error is being corrected in text.

EXISTING G.O. 95 RULE
RULE 86.8-C

RULE 86. GUYS

RULE 86.8 GUY INSULATORS

RULE 86.8-C VOLTAGE REQUIREMENTS

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

Insulation used in guys on communication lines shall have a dry flashover voltage not less than as specified in Table 16 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.

EXISTING G.O. 95 RULE
(STRIKE OUT AND UNDERLINE)
RULE 86.8-C

- RULE 86.** **GUYS**
- RULE 86.8** **GUY INSULATORS**
- RULE 86.8-C** **VOLTAGE REQUIREMENTS**

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

Insulators insulation used in guys on communication lines shall have a dry flashover voltage not less than as specified in Table 16 when tested in accordance with the ~~Standards (No. 44, 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 G.O. 95 RULE CHANGE
(FINAL)
RULE 86.8-C

- RULE 86. GUY S**
- RULE 86.8 GUY INSULATORS**
- RULE 86.8-C VOLTAGE REQUIREMENTS**

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

Insulators used in guys on communication lines shall have a dry flashover voltage not less than as specified in Table 16 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.

RATIONALE FOR PROPOSED G.O. 95 RULE CHANGE

RULE 87.1

The existing contents are redundant and unnecessary since such information is already given in Section II.

EXISTING G.O. 95 RULE
RULE 87.1

RULE 87.1 Definition:

The term cable includes rubber-insulated single conductors, duplex, triplex, paired conductors, whether single or grouped, and multiple-conductor cables, and is defined in Rule 20.3. The term messenger is defined in Rule 21.11.

EXISTING G.O. 95 RULE
(STRIKE OUT AND UNDERLINE)
RULE 87.1

RULE 87.1 Definition:

(see Rules 20.3 and 21.11)

~~*The term cable includes rubber-insulated single conductors, duplex, triplex, paired conductors whether single or grouped, and multiple conductor cables, and is defined in Rule 20.3. The term messenger is defined in Rule 21.11.*~~

PROPOSED G.O. 95 RULE CHANGE
(FINAL)
RULE 87.1

RULE 87.1 Definition:

(see Rules 20.3 and 21.11)

PROPOSED G.O. 95 RULE CHANGE
(STRIKE OUT AND UNDERLINE)
RULE 87.4-H (NEW RULE)

87. CABLES AND MESSENGERS

87.4 CLEARANCES

87.4-H FROM GROUNDED METAL BOXES, HARDWARE AND EQUIPMENT
ASSOCIATED WITH SUPPLY LINES.

Cables and messengers installed on non-metallic poles or
non-metallic structures shall have a minimum clearance
of 48 inches below or 72 inches above grounded metal
boxes, hardware or metal cases for equipment associated
with supply lines.

EXCEPTIONS:

(1) The 72 inches above may be reduced to 48 inches
where there is not a pole mounted communication drop
distribution terminal above the grounded metal box,
hardware or metal case for equipment, or where the
grounded metal box, hardware or metal case for equipment
is securely bonded to the communication cable and/or
messenger. See Figure 54-4.

(2) The 72 inches may also be reduced to 48 inches
when the grounded metal box, hardware or metal case for
equipment is on the opposite side of a pole from a pole
mounted communication drop distribution terminal.

PROPOSED G.O. 95 RULE CHANGE
(FINAL)
RULE 87.4-H (NEW RULE)

87. CABLES AND MESSENGERS
- 87.4 CLEARANCES
- 87.4-H FROM GROUNDED METAL BOXES, HARDWARE AND EQUIPMENT ASSOCIATED WITH SUPPLY LINES.

Cables and messengers installed on non-metallic poles or non-metallic structures shall have a minimum clearance of 48 inches below or 72 inches above grounded metal boxes, hardware or metal cases for equipment associated with supply lines.

EXCEPTIONS:

- (1) The 72 inches above may be reduced to 48 inches where there is not a pole mounted communication drop distribution terminal above the grounded metal box, hardware or metal case for equipment, or where the grounded metal box, hardware or metal case for equipment is securely bonded to the communication cable and/or messenger. See Figure 54-4.
- (2) The 72 inches may also be reduced to 48 inches when the grounded metal box, hardware or metal case for equipment is on the opposite side of a pole from a pole mounted communication drop distribution terminal.

**PROPOSED RULE CHANGE
STRIKE OUT AND UNDERLINE
RULE 92.1-F (6) (NEW RULE)**

92.0 CONDUCTORS, CABLES AND MESSENGERS

92.1 VERTICAL CLEARANCES

92.1-F BETWEEN CONDUCTORS, CABLE, MESSENGERS AND MISCELLANEOUS EQUIPMENT

**92.1-F (6) BETWEEN GROUNDED METAL BOXES, HARDWARE AND EQUIPMENT
ASSOCIATED WITH SUPPLY LINES AND COMMUNICATION CABLES AND
MESSENGERS**

See Rules 54.4-G, 87.4-H and Figure 54-4.

**PROPOSED G.O. 95 RULE CHANGE
FINAL
RULE 92.1-F (6) (NEW RULE)**

- 92.0 CONDUCTORS, CABLES AND MESSENGERS**
- 92.1 VERTICAL CLEARANCES**
- 92.1-F BETWEEN CONDUCTORS, CABLES, MESSENGERS AND MISCELLANEOUS EQUIPMENT**
- 92.1-F (6) BETWEEN GROUNDED METAL BOXES, HARDWARE AND EQUIPMENT ASSOCIATED WITH SUPPLY LINES AND COMMUNICATION CABLES AND MESSENGERS**

See Rules 54.4-G, 87.4-H and Figure 54-4.

RATIONALE FOR PROPOSED RULE CHANGES
NEW RULES 92.4 AND 87.9
GROUNDING
AND
REVISED RULE 83.4
BONDING

No provisions exist under the present General Order (G.O.) 95 Rules for addressing the grounding or isolating of communication cable systems. Systems include cables, messengers, and guys, or a combination of these facilities at the supply or communication level.

In Section IX, Joint Poles, the proposed (new) Rule 92.4 will require that all exposed messengers be grounded and all exposed guys be isolated with insulators. Exposed means cables, messengers, or guys that are subject to power contacts, induction, or lightning.

All ground rods shall not be less than 5/8-inch in diameter by 8 feet (total) in length. They shall be made of corrosion-resisting metal and installed according to specific installation requirements that are common throughout G.O. 95. However, other than an approved ground rod can be installed as long as it meets both of the following requirements: an approved ground rod is impossible to install due to severe rocky soil; and what is installed has equivalent electrical properties to an approved 5/8" X 8' ground rod.

So that bonding has the same interval requirements as that of grounding, the bonding requirement interval in Rule 83.4 was changed from every 1500 feet to every 1320 feet.

Finally, in Section VIII, Detailed Construction Requirements For Communication Lines, added (new) Rule 87.9 - Grounding, that makes reference to (new) Rule 92.4.

**PROPOSED RULE CHANGE
NEW RULE 92.4
GROUNDING**

Rule 92. CONDUCTORS, CABLES AND MESSENGERS

Rule 92.4 Grounding (New Rule)

A. GENERAL

The following rules cover the grounding or isolating of communication cable systems, as defined herein. Systems include cables, messengers, and guys, or a combination of these facilities at the supply or communication level.

The term "cable" means stranded conductor or a combination of conductors that includes Fiber Optic Supply Cable, Fiber Optic Communication Cable, or Non-Dielectric Fiber Optic Cable as defined in Rule 20.3.

The term "messenger" is defined in Rule 21.11.

The term "guy" is defined in Rule 21.3. The definition of "exposed" as applied to a guy in Rule 21.3-C shall also apply to cables and messengers.

B. APPLICABILITY

The grounding of exposed communication cable systems includes cables with metallic shields, sheaths, or messenger(s). The isolating of exposed guys includes both overhead and anchor guys. Exposed communication cable systems are those that are subject to power contacts, power induction, or lightning. Cables, messengers, or guys are subject to power contacts and power induction if they:

- (1) Are attached to the same pole as a supply conductor; or
- (2) Cross a supply conductor; or
- (3) Are within 8 feet horizontally and any distance vertically of a supply conductor(s); or
- (4) Are attached to the same pole which supports an existing exposed messenger or guy, even though that pole does not support supply conductors of more than 250 volts.

C. MATERIAL AND SIZE

(1) **Grounding Conductors:** The grounding conductors of the communication messenger system shall conform to each of the following requirements:

- (a) The grounding conductor from each ground rod (ground electrode) to the base of the pole shall not be less than 1 foot below the surface of the ground.
- (b) The conductor from each ground rod (ground electrode) to the base of the pole shall not have less ampacity and mechanical strength than the grounding conductor from the base of the pole to the messenger.
- (c) The grounding conductor from the ground rod (ground electrode) to the messenger shall be continuous, unless suitable electrical compression connections are used.

(d) The grounding conductor shall have a minimum ampacity equivalent to No. 6 AWG copper.

(2) Ground Rods (Ground Electrodes): Ground rods on the communication messenger system(s) shall conform to each of the following requirements:

(a) Ground rods shall be corrosion-resisting metal rods or pipes (or equivalent in electrical properties).

(b) Ground rods shall not be less than 5/8-inch in diameter by 8 feet (total) in length; this may include two (2) four-foot joined sections.

(c) Ground rods shall be driven into the ground so that one end of the ground rod is at a minimum depth of 8 feet below the surface of the ground. The top end of the ground rod shall not be less than 1 foot below the surface of the ground.

(d) Pole-butt plates or wrappings shall not be used either in lieu of the aforesaid ground rods, pipes, or as electrodes supplementary thereto.

(e) The driven ground rod(s), pipe(s), or equivalent shall be located 24 inches or more from the surface of the pole.

D. LOCATION OF GROUNDS ON EXPOSED CABLES WITH METALLIC SHIELDS, SHEATHS, OR MESSENGERS; AND ON EXPOSED GUYS

(1) Exposed Cables and Messengers: The exposed communication cables and messengers shall be grounded:

At all dead-end poles and at intervals not greater than every one-quarter of a mile (1320 feet).

(2) Exposed Guys: Communication guys exposed to supply conductors energized at 22,500 volts or less shall be insulated. Also see Rules 86.6, 86.7 and 86.8.

The grounding of exposed cables, messengers, and guys is in addition to the ground connections at individual services.

Grounding of exposed messengers near supply electric substations may be constrained by technical requirements with cooperation between supply and communication companies.

Existing

Section VIII: Detailed Construction Requirements For Communication Lines

Rule 87 Cables and Messengers

Rule 87.8 Sags

**Proposed Rule Change
Strike Out and Underline**

Section VIII: Detailed Construction Requirements For Communication Lines

Rule 87 Cables and Messengers

Rule 87.8 Sags

Rule 87.9 Grounding (New Rule) (see Rule 92.4)

**Proposed Rule Change
New Rule**

Section VIII: Detailed Construction Requirements For Communication Lines

Rule 87 Cables and Messengers

Rule 87.8 Sags

Rule 87.9 Grounding (see Rule 92.4)

Existing Rule

Section VIII: Detailed Construction Requirements For Communication Lines.

Rule 83 Pins, Deadends, And Conductor Fastenings

Rule 83.4 Bonding

A. MESSENGERS ON THE SAME POLE

(1) Bonds Between Separate Communication Messengers or Guys Above or Below Electric Circuits: Bonds are required between separate communication messengers or guys, attached above or below electric supply circuits, railway signal circuits or Class T electric railroad or trolley circuits on the same pole line system, at all dead-end poles and at intervals not to exceed 1,500 feet.

Note: Rule 83.4 Added March 9, 1988 by Resolution No. E-3076

Strike Out and Underline

Section VIII: Detailed Construction Requirements For Communication Lines.

Rule 83 Pins, Deadends, And Conductor Fastenings

Rule 83.4 Bonding

A. MESSENGERS ON THE SAME POLE

(1) Bonds Between Separate Communication Messengers or Guys Above or Below Electric Circuits: Bonds are required between separate communication messengers or guys, attached above or below electric supply circuits, railway signal circuits or Class T electric railroad or trolley circuits on the same pole line system, at all dead-end poles and at intervals not to exceed ~~1,500~~ 1320 feet.

Note: Rule 83.4 Added March 9, 1988 by Resolution No. E-3076

New Rule

Section VIII: Detailed Construction Requirements For Communication Lines.

Rule 83 Pins, Deadends, And Conductor Fastenings

Rule 83.4 Bonding

A. MESSENGERS ON THE SAME POLE

(1) Bonds Between Separate Communication Messengers or Guys Above or Below Electric Circuits: Bonds are required between separate communication messengers or guys, attached above or below electric supply circuits, railway signal circuits or Class T electric railroad or trolley circuits on the same pole line system, at all dead-end poles and at intervals not to exceed 1320 feet.

Note: Rule 83.4 Added March 9, 1988 by Resolution No. E-3076

GENERAL ORDER NO. 128 RULE SECTION

PROPOSED RULE CHANGE
GO 128
RULE 12.1
RATIONALE

The proposed rule change is to help clarify that a new element to an existing underground system must be installed in compliance with the present rules, but the existing system's elements must be brought into compliance with newer rules than those they were installed under only when that element of the existing system is being replaced or reconstructed.

PROPOSED RULE CHANGE
GO 128
RULE 12.3
RATIONALF

The proposed change is to Show that elements of an existing underground system must conform to the requirements that were in effect at the time of their construction or replacement.

Existing G.O. 128
Rule 12.3

12.3 Systems Constructed Prior To These Rules

The requirements of these rules do not apply to systems or portions thereof constructed, reconstructed or replaced prior to the effective date of such rules, except as set forth below. In all other particulars, such systems shall conform to requirements in effect at the time of their construction or replacement.

Strike out and Underline

12.3 Systems Constructed Prior To These Rules

The requirements of these rules do not apply to systems, or elements of a system ~~portions of a system~~ constructed, reconstructed or replaced prior to the effective date of such rules, except as set forth below. In all other particulars, such systems, or elements of a system, shall conform to requirements in effect at the time of their construction or replacement.

Example: Pulling cable into an existing conduit system does not require upgrading the existing conduit system.

PROPOSED FINAL RULE

12.3 Systems Constructed Prior To These Rules

The requirements of these rules do not apply to systems, or elements of a system constructed, reconstructed or replaced prior to the effective date of such rules, except as set forth below. In all other particulars, such systems, or elements of a system, shall conform to requirements in effect at the time of their construction or replacement.

Example: Pulling cable into an existing conduit system does not require upgrading the existing conduit system.

Rationale For Proposed GO 128 Rule Change
Rule 20.1 Bond

To clarify the purpose of Bond and eliminate the reference to fault current, leakage current and electrolytic action. The reason for eliminating the references is that the only way to obtain this protection is by grounding.

Existing Rule
GO 128 Rule 20.1
Bond

- 20.1 BOND means an electrical connection from one metallic element to another for the purpose of minimizing potential differences and providing suitable conductivity for fault current or to mitigate leakage current and electrolytic action.

Strike out and Underline
GO 128 Rule 20.1
Bond

- 20.1 BOND means an electrical connection from one ~~metallic~~ conductive element to another for the purpose of maintaining a common electrical ~~minimizing potential differences and providing suitable conductivity for fault current or to mitigate leakage current and electrolytic action.~~

Proposed Final Rule
GO 128 Rule 20.1
Bond

- 20.1 BOND means an electrical connection from one conductive element to another for the purpose of maintaining a common electrical potential.

Rationale For Proposed GO 128 Rule Change
Rule 20.2 Cable

Removes the interpretation that insulated conductors or fibers must be enclosed in a sheath. Not all cables used in supply or communication are enclosed in a sheath.

**Existing Rule
GO 128 Rule 20.2
Cable**

20.2 CABLE means an insulated conductor or a combination of insulated conductors, and/or a fiber or group of fibers which are enclosed in a sheath.

- A. BURIED CABLE means a suitably insulated cable installed directly in the earth (not in conduit or duct).
- B. FIBER OPTIC CABLE means a transparent fiber or group of fibers used to transmit light for communication purposes.
 - 1. Dielectric Fiber Optic Cable means a fiber optic cable which contains no components capable of conducting electricity.
 - 2. Non-Dielectric Fiber Optic Cable means a fiber optic cable which contains components capable of conducting electricity.

NOTE: Revised November 6, 1992 by Resolution No. SU-15.

**Strikeout and Underline
GO 128 Rule 20.2
Cable**

20.2 CABLE means an insulated conductor or a combination of insulated conductors, and/or a fiber or group of fibers ~~which are enclosed in a sheath.~~

- A. BURIED CABLE means a suitably insulated cable installed directly in the earth (not in conduit or duct).
- B. FIBER OPTIC CABLE means a transparent fiber or group of fibers used to transmit light for communication purposes.
 - 1. Dielectric Fiber Optic Cable means a fiber optic cable which contains no components capable of conducting electricity.
 - 2. Non-Dielectric Fiber Optic Cable means a fiber optic cable which contains components capable of conducting electricity.

NOTE: Revised November 6, 1992 by Resolution No. SU-15.

**Proposed Final Rule
GO 128 Rule 20.2
Cable**

20.2 CABLE means an insulated conductor or a combination of insulated conductors, and/or a fiber or group of fibers.

A. BURIED CABLE means a suitably insulated cable installed directly in the earth (not in conduit or duct).

B. FIBER OPTIC CABLE means a transparent fiber or group of fibers used to transmit light for communication purposes.

1. Dielectric Fiber Optic Cable means a fiber optic cable which contains no components capable of conducting electricity.

2. Non-Dielectric Fiber Optic Cable means a fiber optic cable which contains components capable of conducting electricity.

NOTE: Revised November 6, 1992 by Resolution No. SU-15.

PROPOSED RULE CHANGE
GO 128
RULE 20.5
RATIONALE

The proposed rule change is to help clarify that "concurrently installed" applies to joint trench operations.

EXISTING G.O. 128
RULE 20.5

20.5 CONCURRENTLY INSTALLED means occurring at or about the same time by virtue of joint planning and agreement by two or more parties.

STRIKE OUT AND UNDERLINE

20.5 CONCURRENTLY INSTALLED means occurring at or about the same time by virtue of joint planning and agreement by two or more parties. This applies to joint trench operations.

PROPOSED FINAL RULE

20.5 CONCURRENTLY INSTALLED means occurring at or about the same time by virtue of joint planning and agreement by two or more parties. This applies to joint trench operations.

Rationale For Proposed GO 128 Rule Change
Rule 20.6 Conductor

Rewritten to include fiber optics and ~~correspond~~ with GO 95 Rule 20.8

Existing Rule
GO 128 Rule 20.6
Conductor

- 20.6 CONDUCTOR means a wire, or combination of wires not insulated from one another, suitable for carrying electric current.

Strike out and Underline
GO 128 Rule 20.6
Conductor

- 20.6 CONDUCTOR means a material suitable for wire, or combination of wires not insulated from one another, suitable for carrying electric current.
- A. Carrying electric current, usually in the form of a wire, cable or bus bar, or,
- B. Transmitting light in the case of fiber optics.

Proposed Final Rule
GO 128 Rule 20.6
Conductor

- 20.6 CONDUCTOR means a material suitable for:
- A. Carrying electric current, usually in the form of a wire, cable or bus bar, or,
- B. Transmitting light in the case of fiber optics.

Rationale For Proposed GO 128 Rule Change
Rule 20.7 Conduit

This change brings the definition of conduit up to generally accepted industry terminology

Existing Rule
GO 128 Rule 20.7
Conduit

20.7 CONDUIT means a duct or combination of ducts.

Strike out and Underline
GO 128 Rule 20.7
Conduit

20.7 CONDUIT means a tube or duct or combination of ducts for enclosing conductors or cables.

Proposed Final Rule
GO 128 Rule 20.7
Conduit

20.7 CONDUIT means a tube or duct for enclosing conductors or cables.

Rationale For Proposed GO 128 Rule Change
Rule 20.8 Cover

Rewritten to clarify meaning.

Existing Rule
GO 128 Rule 20.8
Cover

20.8 COVER (TOP) means the distance between the uppermost surface of an underground cable or duct and grade (See Rule 21.4).

Strike out and Underline
GO 128 Rule ~~20.8~~ 21.0
Cover

~~20.8~~ 20.9 COVER (TOP) means the radial distance between the uppermost surface of an underground cable or conduit duct and grade. ~~(See Rule 21.4).~~

Proposed Final Rule
GO 128 Rule 21.0
Cover

20.9 COVER means the radial distance between the surface of an underground cable or conduit and grade.

Rationale For Proposed GO 128 Rule Change
Rule 20.9 Duct

This rule was moved from 20.9 to 21.0 to in order to be in alphabetical sequence due to a change in rules 20.8 and 21.0

(Existing Rule)
GO 128 Rule 20.9

20.9 DUCT means a fabricated tube for receiving and containing conductors and cables.

(Strike Out and Underline)
GO 128 Rule 20.9

~~20.0~~21.0 DUCT means a fabricated tube for receiving and containing conductors and cables.

(Final)

GO 128 Rule 21.0
21.0 DUCT means a fabricated tube for receiving and containing conductors and cables.

Rationale For Proposed GO 128 Rule Change
Rule 21.0 Duct System

The word "duct" was replaced with the word "conduit" and the word "chambers" was removed because it meant the same as related components.

Existing Rule
GO 128 Rule 21.0
Duct System

21.0 DUCT SYSTEM means chambers, ducts and their related components used to enclose cables, conductors, and associated equipment.

Strike out and Underline
GO 128 Rule ~~21.0~~ 20.8
Duct-Conduit System

~~21.0~~ 20.8 CONDUIT DUCT SYSTEM means conduits ~~chambers, ducts~~ and their related components used to enclose cables, conductors, and associated equipment.

Proposed Final Rule
GO 128 Rule 20.8
Conduit System

20.8 CONDUIT SYSTEM means conduits and their related components used to enclose cables, conductors, and associated equipment.

Rationale For Proposed GO 128 Rule Change
Rule 21.2 Enclosed

Expanded to clarify and better define the intent as it relates to the safety of the general public.

Existing Rule
GO 128 Rule 21.2
Enclosed

- 21.2 ENCLOSED means surrounded by a case which will prevent accidental contact of a person with live parts.

Strike out and Underline
GO 128 Rule 21.2
Enclosed

- 21.2 ENCLOSED means surrounded by a case, ~~which will prevent accidental contact of a person with live parts.~~ cage or fence designed to protect the contained equipment and minimize the possibility of accidental contact by persons or objects.

Proposed Final Rule
GO 128 Rule 21.2
Enclosed

- 21.2 ENCLOSED means surrounded by a case, cage or fence designed to protect the contained equipment and minimize the possibility of accidental contact by persons or objects.

Rationale For Proposed GO 128 Rule Change
Rule 21.4 Grade (or Ground)

Reworded to clarify the definition to explain that the grade is at a specific point as it relates to cover or depth of facilities.

Existing Rule
GO 128 Rule 21.4
Grade (or Ground)

21.4 GRADE (or GROUND) means the surface (earth, roadway, sidewalk, landscaping, etc.) at the point in question. (See Appendix B, Figure 6)

Strike out and Underline
GO 128 Rule 21.4
Grade ~~(or Ground)~~

21.4 GRADE ~~(or GROUND)~~ means the surface (earth, roadway, sidewalk, landscaping, etc.) at the a given point in question or place. (See Appendix B, Figure 6)

Proposed Final Rule
GO 128 Rule 21.4
Grade

21.4 GRADE means the surface (earth, roadway, sidewalk, landscaping, etc.) at a given point or place. (See Appendix B, Figure 6)

Rationale For Proposed GO 128 Rule Change
Rule 21.5 Grounded

Clarifies the definition of Grounded by removing the reference of intent.
Reverses the order of importance between persons and equipment.

**Existing Rule
GO 128 Rule 21.5
Grounded**

21.5 GROUND~~ED~~ means connected to earth by an intentional ground connection or by an unintentional conducting path.

A. EFFECTIVELY GROUNDED (EFFECTIVE GROUND) means permanently connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to prevent the building up of voltages which may result in undue hazard to connected equipment or to persons.

If an impedance of less than 25 ohms is not obtained, the equivalent of a ground conductor not less than No. 6 AWG copper connected to two corrosion resisting rods, not less than 1/2 inch in diameter and 8 feet in length and continuous throughout, driven to a minimum depth of 8 feet in the earth at not less than 6 foot centers, will be considered an effective ground for the purpose of these rules.

**Strike out and Underline
GO 128 Rule 21.5
Grounded**

21.5 GROUND~~ED~~ means connected to earth by an ~~intentional ground connection or by an unintentional conducting~~ a conductive path.

A. EFFECTIVELY GROUNDED (EFFECTIVE GROUND) means permanently connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to prevent the building up of voltages which may result in undue hazard to persons or to connected equipment, ~~or to persons~~.

If an impedance of less than 25 ohms is not obtained, the equivalent of a ground conductor not less than No. 6 AWG copper connected to two corrosion resisting rods, not less than 1/2 inch in diameter and 8 feet in length and continuous throughout, driven to a minimum depth of 8 feet in the earth at not less than 6 foot centers, will be considered an effective ground for the purpose of these rules.

**Proposed Final Rule
GO 128 Rule 21.5
Grounded**

21.5 GROUNDED means connected to earth by a conductive path.

A. EFFECTIVELY GROUNDED (EFFECTIVE GROUND) means permanently connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current-carrying capacity to prevent the building up of voltages which may result in undue hazard to persons or to connected equipment.

If an impedance of less than 25 ohms is not obtained, the equivalent of a ground conductor not less than No. 6 AWG copper connected to two corrosion resisting rods, not less than 1/2 inch in diameter and 8 feet in length and continuous throughout, driven to a minimum depth of 8 feet in the earth at not less than 6 foot centers, will be considered an effective ground for the purpose of these rules.

Rationale For Proposed GO 128 Rule Change
Rule 21.6 Guarded

Change probability to possibility because contact is not necessarily probable but may be possible.

Existing Rule
GO 128 Rule 21.6
Guarded

- 21.6 GUARDED means covered, shielded, fenced, enclosed or otherwise protected, by means of suitable covers or casings, barriers, rails or screens, mats or platforms, to reduce the probability of dangerous contact or approach by persons or objects to an energized element.

Strike out and Underline
GO 128 Rule 21.6
Guarded

- 21.6 GUARDED means ~~covered, shielded, fenced, enclosed or otherwise protected, by means of suitable covers or casings, barriers, rails or screens, mats or platforms, to reduce the probability of dangerous contact or approach by persons or objects to an energized element~~ protected by a suitable cover or barrier to minimize the possibility of accidental contact.

Proposed Final Rule
GO 128 Rule 21.6
Guarded

- 21.6 GUARDED means protected by a suitable cover or barrier to minimize the possibility of accidental contact.

PROPOSED RULE CHANGE

GO 128

RULE 21.8

RATIONALE

The proposed rule change is to help clarify that "independently installed" elements were not installed by a joint trench operation.

EXISTING G.O. 128

RULE 21.8

21.8 INDEPENDENTLY INSTALLED means occurring at significantly different times and not relating to a mutual endeavor.

STRIKE OUT AND UNDERLINE,

21.8 INDEPENDENTLY INSTALLED means occurring at significantly different times and not relating to a mutual endeavor. Applies to elements of two or more systems not installed by a joint trench operation.

FINAL PROPOSED RULE

21.8 INDEPENDENTLY INSTALLED means occurring at significantly different times and not relating to a mutual endeavor. Applies to elements of two or more systems not installed by a joint trench operation.

Rationale For Proposed GO 128 Rule Change
Rule 21.9 Interconnection

Eliminated "electrical" to allow inclusion of fiber optics

Existing Rule
GO 128 Rule 21.9
Interconnection

21.9 INTERCONNECTION means the electrical joining of circuits which are of different ownership.

Strike out and Underline
GO 128 Rule 21.9
Interconnection

21.9 INTERCONNECTION means the ~~electrical~~ joining of circuits which are of different ownership.

Proposed Final Rule
GO 128 Rule 21.9
Interconnection

21.9 INTERCONNECTION means the joining of circuits which are of different ownership.

PROPOSED RULE CHANGE
GO 128
RULE 22.1
RATIONALE

The proposed rule change is to help clarify that a joint trench operation may occur with only elements of at least two underground systems being placed.

EXISTING G.O. 128
RULE 22.1

- 22.1 JOINT TRENCH means a trench opened and closed as a mutual endeavor of two or more parties for joint occupancy. (See Appendix B, Figure 6)

STRIKE OUT AND UNDERLINE

- 22.1 JOINT TRENCH OPERATION means a trench opened and closed as a mutual endeavor of two or more parties for joint occupancy. Joint occupancy may occur with only elements of two or more systems being placed. (See Appendix B, Figure 6)

PROPOSED FINAL RULE

- 22.1 JOINT TRENCH OPERATION means a trench opened and closed as a mutual endeavor of two or more parties for joint occupancy. Joint occupancy may occur with only elements of two or more systems being placed. (See Appendix B, Figure 6)

Rationale For Proposed GO 128 Rule Change
Rule 22.2 Live Parts

Added the word energized to clarify association with electrical.

Existing Rule
GO 128 Rule 22.2
Live Parts

22.2 LIVE PARTS means those parts which are electrically connected to points of potential different from that of the earth.

Strike out and Underline
GO 128 Rule 22.2
Live (Energized) Parts

22.2 LIVE (ENERGIZED) PARTS means those parts which are electrically connected to points of potential different from that of the earth.

Proposed Final Rule
GO 128 Rule 22.2
Live (Energized) Parts

22.2 LIVE (ENERGIZED) PARTS means those parts which are electrically connected to points of potential different from that of the earth.

Rationale For Proposed GO 128 Rule Change
Rule 22.5 Manhole

Added the word subsurface enclosure to clarify meaning.

Existing Rule
GO 128 Rule 22.5
Manhole

- 22.5 MANHOLE means a chamber, in an underground system containing working space large enough for a person to enter, which provides space and access for installation and maintenance of cables, transformers, or other equipment or apparatus. (See Appendix B, Figure 9)

Strike out and Underline
GO 128 Rule 22.5
Manhole

- 22.5 MANHOLE means a subsurface chamber enclosure in an underground system containing working space large enough for a person to enter, which provides space and access for installation and maintenance of cables, transformers, or other equipment or apparatus. (See Appendix B, Figure 9)

Proposed Final Rule
GO 128 Rule 22.5
Manhole

- 22.5 MANHOLE means a subsurface enclosure in an underground system containing working space large enough for a person to enter, which provides space and access for installation and maintenance of cables, transformers, or other equipment or apparatus. (See Appendix B, Figure 9)

Rationale For Proposed GO 128 Rule Change
Rule 22.7 Police, Fire Alarm and Traffic Control Circuits

Eliminated the definition because a definition of these terms is not necessary. Removed the reference to this definition in Rule 46 and renumbered the subparagraphs as necessary

Existing Rule
GO 128 Rule 22.7
Police, Fire Alarm and Traffic Control Circuits

- 22.7 POLICE, FIRE ALARM, and TRAFFIC CONTROL CIRCUITS means those cables and conductors utilized for the purpose of operating police, fire alarm, and traffic control systems.

Strike out and Underline
GO 128 Rule 22.7
~~Police, Fire Alarm and Traffic Control Circuits~~

- ~~22.7 POLICE, FIRE ALARM, and TRAFFIC CONTROL CIRCUITS means those cables and conductors utilized for the purpose of operating police, fire alarm, and traffic control systems.~~

Rationale For Proposed GO 128 Rule Change
Rule 23.6 Thoroughfare

Adds reference to Figure 1, which in addition to Figures 6 and 7 illustrates a thoroughfare and the underground facilities in relation to it.

(Existing Rule)
GO 128 Rule 20.9

23.6 THOROUGHFARE means any public or private highway, avenue, street, road, alley, or other place generally used for vehicular travel. (See Appendix B, Figures 6 and 7)

(Strike Out and Underline)
GO 128 Rule 20.9

23.6 THOROUGHFARE means any public or private highway, avenue, street, road, alley, or other place generally used for vehicular travel. (See Appendix B, Figures 1, 6 and 7)

(Final)
GO 128 Rule 21.0

23.6 THOROUGHFARE means any public or private highway, avenue, street, road, alley, or other place generally used for vehicular travel. (See Appendix B, Figures 1, 6 and 7)

Rationale For Proposed GO 128 Rule Change
Rule 23.7 Trench (Permanent Cable Trench)

Changed title to better identify it as pertaining to a permanent structure. Also, renumbered due to alphabetizing.

Existing Rule
GO 128 Rule 23.7
Trench (Permanent Cable Trench)

23.7 TRENCH (PERMANENT CABLE TRENCH) means a permanent trench with removable covering in which cables may be installed.

Strike out and Underline
GO 128 Rule 232.7
~~Trench (Permanent Cable Trench)~~

232.7 ~~TRENCH (PERMANENT CABLE TRENCH)~~ means a permanent trench with removable covering in which cables may be installed.

Proposed Final Rule
GO 128 Rule 22.7
Permanent Cable Trench

22.7 PERMANENT CABLE TRENCH means a permanent trench with removable covering in which cables may be installed.

Associated change: Figure 8 - See Definition 23.522.7

Rationale For Proposed GO 128 Rule Change
Rule 32.9 Ventilation

Eliminated Rule 32.9 where it was located and transferred a new written paragraph into Rule 34.1-c which more appropriately addresses ventilation with transformers in vaults.

Existing Rule
GO 128 Rule 32.9
Ventilation

32.9 Ventilation

Manholes and subsurface equipment enclosures containing transformers shall be provided with means of ventilation adequate to prevent transformer temperatures in excess of those at which the transformer may be safely operated.

Strike out and Underline
GO 128 Rule 32.9
Ventilation

32.9 Ventilation

~~Manholes and subsurface equipment enclosures containing transformers shall be provided with means of ventilation adequate to prevent transformer temperatures in excess of those at which the transformer may be safely operated. This space intentionally left blank.~~

Proposed Final Rule
GO 128 Rule 32.9

32.9 This space intentionally left blank.

Rationale For Proposed GO 128 Rule Change
Rule 34.2

Eliminated Rule 32.9 where it was located and transferred a new paragraph into Rule 34.2-c which more appropriately addresses ventilation with transformers in vaults.

**Existing Rule
GO 128 Rule 34.2
Equipment**

34.2 Equipment in Manholes, Vaults, Rooms and Other Enclosures
Equipment shall be so arranged as to provide reasonable accessibility to personnel and working space for the safe operation, maintenance, and replacement of said equipment.

A. FUSED DEVICES

Fused devices shall be so located that they are readily accessible and may be safely operated and re-fused and so that the blowing of the fuse will not endanger persons.

B. SECTIONALIZING SWITCHES

Sectionalizing switches shall be so located that they may be operated, maintained, or replaced from a readily and safely accessible place.

They shall be so installed that the center of the grip of the operating handle when in its highest position will not be more than 6 1/2 feet above the floor or other standing surface. Switches with viewing windows shall be so installed that the center of the viewing window will be not more than 6 1/2 feet above the floor or other standing surface.

C. TRANSFORMERS

Transformers operating at more than 600 volts, other than current and potential transformers and transformers which constitute a component part of other apparatus and which conform to the requirements of such apparatus, shall be readily accessible for operation, inspection, maintenance, and replacement.

Transformers shall be installed in such a manner as to permit safe operation, maintenance, or replacement of other equipment.

**Strike out and Underline
GO 128 Rule 34.2
Equipment**

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Transformers operating at more than 600 volts, other than current and potential transformers and transformers which constitute a component part of other apparatus and which conform to the requirements of such apparatus, shall be readily accessible for operation, inspection, maintenance, and replacement.

Transformers shall be installed in such a manner as to permit safe operation, maintenance, or replacement of other equipment.

Transformer installations shall be provided with means of ventilation adequate to prevent temperatures in excess of those at which the transformer may be safely operated.

**Proposed Final Rule
GO 128 Rule 34.2
Equipment**

34.2 Equipment in Manholes, Vaults, Rooms and Other Enclosures
Equipment shall be so arranged as to provide reasonable accessibility to personnel and working space for the safe operation, maintenance, and replacement of said equipment.

A. FUSED DEVICES

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Transformers shall be installed in such a manner as to permit safe operation, maintenance, or replacement of other equipment.

Transformer installations shall be provided with means of ventilation adequate to prevent temperatures in excess of those at which the transformer may be safely operated.

Rationale For Proposed GO 128 Rule Change

Rule 44.1 Separation of Supply and Communication Systems

Rule 44.1 was rewritten and expanded to address changes in the industry and to clarify the intent, as it relates to the safety of the general public and workers.

Existing Rule
GO 128 Rule 44.1

44. CONDUCTORS OF DIFFERENT SYSTEMS

44.1 Separation of Supply and Communication Systems

Communication cables and conductors for public use shall not occupy the same duct, manhole, or other underground splicing chamber with supply cables or conductors unless separated from the supply cables or conductors by a partition constructed of brick, concrete, tile or other suitable material. When such a partition is installed, separate access to each compartment shall be provided by means of divided covers or equivalent construction. (See Appendix B, Fig. 9 and 10)

This rule does not apply to utility tunnels, subways, or permanent cable trenches provided that supply cables and conductors of over 750 volts are either enclosed, guarded, installed in grounded metallic conduit, or have continuous grounded metallic sheath. Grounded metallic cable sheaths of the supply and communication systems need not be bonded. The cables and conductors of the supply and communication systems must be separately supported.

Strike out and Underline
GO 128 Rule 44.1

44. CONDUCTORS OF DIFFERENT SYSTEMS

44.1 Separation of Supply and Communication Systems

A. Communication cables and conductors for public use shall not occupy the same conduit, duct, manhole, or other underground splicing chamber with supply cables or conductors, unless separated from the supply cables or conductors by a partition constructed of brick, concrete, tile or other suitable material. When such a partition is installed, separate access to each compartment shall be provided by means of divided covers or equivalent construction. (See Appendix B, Fig. 9 and 10)

~~This rule does not apply to utility tunnels, subways, or permanent cable trenches provided that supply cables and conductors of over 750 volts are either enclosed, guarded, installed in grounded metallic conduit, or have continuous grounded metallic sheath. Grounded metallic cable sheaths of the supply and communication systems need not be bonded. The cables and conductors of the supply and communication systems must be separately supported.~~

B. Communication cables and conductors for public use shall not occupy the same manhole, or other underground splicing chamber with supply cables or conductors, unless separated from the supply cables or conductors by a partition, constructed of brick, concrete, tile or other suitable material. When such a partition is installed, separate access to each compartment shall be provided by means of divided covers or equivalent construction. (See Appendix B, Fig. 10).

EXCEPTIONS:

1. Rule 44.1B does not apply to utility tunnels, subways, or permanent cable trenches provided that supply cables and conductors, of over 750 volts, are either enclosed, guarded, installed in grounded metallic conduit, or have a continuous grounded metallic sheath. Grounded metallic cable sheaths of supply and communications systems need not be bonded. The cables and conductors of the supply and communications systems must be separately supported. (See Appendix B, Fig. 8).
2. Rules 44.1A & 44.1B do not apply to communications systems either owned, operated or maintained by a supply utility.
3. Rule 44.1B does not apply to mechanically and electrically protected (See Rule 22.9) communication systems.
4. Rule 44.1A does not apply to dielectric communication cables either owned, operated or maintained by a supply utility.

C. Any work performed in substructures that contain energized electrical facilities will be performed by qualified personnel under the supervision of a qualified electrical worker.

PROPOSED FINAL RULE
G.O. 128 RULE 44.1

44. CONDUCTORS OF DIFFERENT SYSTEMS

44.1 Separation of Supply and Communication Systems

- A. Communication cables and conductors for public use shall not occupy the same conduit with supply cables or conductors.
- B. Communication cables and conductors for public use shall not occupy the same manhole, or other underground splicing chamber with supply cables or conductors, unless separated from the supply cables or conductors by a partition, constructed of brick, concrete, tile or other suitable material. When such a partition is installed, separate access to each compartment shall be provided by means of divided covers or equivalent construction. (See Appendix B, Fig 10).

EXCEPTIONS:

- 1. Rule 44.1-B does not apply to utility tunnels, subways, or permanent cable trenches provided that supply cables and conductors, of over 750 volts, are either enclosed, guarded, installed in grounded metallic conduit, or have a continuous grounded metallic sheath. Grounded metallic cable sheaths of supply and communications systems need not be bonded. The cables and conductors of the supply and communications systems must be separately supported. (See Appendix B, Fig. 8).
 - 2. Rules 44.1-A & 44.1-B do not apply to communications systems either owned, operated or maintained by a supply utility.
 - 3. Rule 44.1-B does not apply to mechanically and electrically protected (See Rule 22.9) communication systems.
 - 4. Rule 44.1-A does not apply to dielectric communication cables either owned, operated or maintained by a supply utility.
- C. Any work performed in substructures that contain energized electrical facilities will be performed by qualified personnel under the supervision of a qualified electrical worker.

Rationale For Proposed GO 128 Rule Change
Rule 46 Police, Fire Alarm and Traffic Control Circuits

Eliminated the reference to the definition Rule 22.6. Rule 22.6 was the wrong reference. It should have been Rule 22.7. Rule 22.7 has been eliminated.

**Existing Rule
GO 128 Rule 45
Police, Fire Alarm and Traffic Control Circuits**

46. POLICE, FIRE ALARM, AND TRAFFIC CONTROL CIRCUITS
- 46.1 Definition (See Rule 22.6)
- 46.2 Maintenance and Inspection (See Rules 12.2 and 17.2)
- 46.3 Occupancy with Public Communication Systems
Police, fire alarm, and traffic control circuits may, with permission of the structure owner, occupy the same duct systems and manholes with public communication systems provided that they comply with all these rules applying to public communication systems.
- 46.4 Occupancy with Supply Systems
Police, fire alarm and traffic control circuits may, with permission of the structure owner, occupy underground structures of supply systems. Circuits so installed shall not enter underground structures of public communication systems except for the purpose of authorized interconnection of communication facilities.

**Strike out and Underline
GO 128 Rule 46
Police, Fire Alarm and Traffic Control Circuits**

46. POLICE, FIRE ALARM, AND TRAFFIC CONTROL CIRCUITS
- ~~46.1 Definition (See Rule 22.6)~~
- 46.21 Maintenance and Inspection (See Rules 12.2 and 17.2)
- 46.32 Occupancy with Public Communication Systems
Police, fire alarm, and traffic control circuits may, with permission of the structure owner, occupy the same duct systems and manholes with public communication systems provided that they comply with all these rules applying to public communication systems.

46.43 Occupancy with Supply Systems

Police, fire alarm and traffic control circuits may, with permission of the structure owner, occupy underground structures of supply systems. Circuits so installed shall not enter underground structures of public communication systems except for the purpose of authorized interconnection of communication facilities.

Proposed Final Rule

GO 128 Rule 46

Police, Fire Alarm and Traffic Control Circuits

46. POLICE, FIRE ALARM, AND TRAFFIC CONTROL CIRCUITS

46.1 Maintenance and Inspection (See Rules 12.2 and 17.2)

46.2 Occupancy with Public Communication Systems

Police, fire alarm, and traffic control circuits may, with permission of the structure owner, occupy the same duct systems and manholes with public communication systems provided that they comply with all these rules applying to public communication systems.

46.3 Occupancy with Supply Systems

Police, fire alarm and traffic control circuits may, with permission of the structure owner, occupy underground structures of supply systems. Circuits so installed shall not enter underground structures of public communication systems except for the purpose of authorized interconnection of communication facilities.