SWITCHBOARD MULTIPLE CABLING
INSTALLATION
GENERAL EQUIPMENT REQUIREMENTS

CONTENTS PAGE

1. GENERAL

1.01 This section covers the general equipment requirements for installing the multiple cabling of switchboards and desks. Switchboard multiple cable consists of short lengths of cable (short multiple) extending from panel to panel in the line-up.

1.02 This section is reissued to make changes which are listed under reasons for reissue at the end of this section.

1.03 The requirements covered in this section shall be followed except as modified by applicable specifications and drawings.

2. INSTALLING MULTIPLE CABLES

A. Placing and Skinner Arrangement

2.01 Locate the cables in switchboards and desks so that as far as practicable, the cables are on the same level as the jacks or other equipment to which they are connected. Differences in level resulting in the following skinner slants are considered satisfactory.

	MAX. SLANT FROM CABLE TO APPARATUS TERMINAL	
	UPWARD	DOWNWARD
Cables on Multiple Shelf	1-1/2 inches	1/2 inch
Cables on Pins	1/2 inch	1-1/2 inches

(a) Upward or downward maximum slant dimension is taken from skinners; cables on pins at top of cable as skinners pass over other cables, cables on shelf at bottom of cable as skinners pass under other cables.

2.02 The butts should be accurately located with as little variation as the formed cables will permit. Ordinarily the shop ties on the forms are not removed during installation. However, should it be necessary for the installer to remove some of the ties they need not be replaced.

2.03 Bring the straight or short forms in from the right facing the rear of the switchboard and in front of the slanting or long forms.

(a) Place the multiple so that the skinners will be below all cables and other forms in front, in the same layer for all new and additional multiple (complete layers) on multiple shelves, and on pins when arranged for future multiple shelf support.

(b) Place the multipe so that the skinners will be above all cables and other forms in front, and in the same layer for all new and additional multiple (complete layers) on cable pins or brackets, except multiple on pins arranged for future multiple shelf support.

(c) Place the multiple to conform to the skinner arrangement of existing multiple for all additional multiple (incomplete layers) and extensions. The above also applies in cases where changes or additions are made after cable pin or bracket supports have been replaced by multiple shelves.

2.04 A 3/4-inch minimum clearance should be provided between the front edge of the multiple and the switchboard section uprights as shown in Fig. 6, to prevent binding of the cables when wedged.

B. Dummy Cables in Multiple Cable Runs

2.05 Ordinarily, nonmetallic type dummy cables should be used in place of regular cables in switchboard multiple. However, where the disparity in size between the nonmetallic dummy cables and corresponding switchboard cables is sufficient to adversely affect the pile-up, metallic cables should be specified. The code designations, shapes, and sizes of the nonmetallic type dummy cables are shown in Fig. 1.

2.06 For the straight portion of the switchboard line-up, round-, oval-, and flat-type cables may be used in one continuous length up to 100 panels. Short lengths of cable should be used where possible only on the inside of the multiple.

2.07 ***At turns in a switchboard line-up*** dummy cables should be run in one continuous length around the turn in the switchboard line-up, with the following exception.

(a) Flat-type nonmetallic cables cannot be bent edgewise at turns in a switchboard line-up. Use continuous pieces for each regular section, and 4-inch pieces at each angle section when the distance between the ends of the pieces in the regular sections is 12 inches or more. When the distance between the ends of the pieces in a layer in the regular sections is less than 12 inches, the 4-inch pieces should be omitted. Fig. 2 illustrates the method of using flat-type nonmetallic dummy cables in angle sections.

2.08 ***Metallic dummy cables which are exposed*** on the outside (rear) layer of the multiple should be formed, tied with shop ties, and the skinners cut off closely to the form. The dummy cables in the inner layers need not be formed.

2.09 ***Nonmetallic cables which are exposed*** on the outside (rear) of the multiple should be terminated at the butts of the regular cables (except in the end section).

2.10 ***The ends of unformed dummy cables*** should be located at approximately the center of a panel, except where the dummy cable serves as a continuation of a regular formed cable. In this case, the unformed ends should be located under the webbing adjacent to the formed cable with the unformed ends approximately at the edge of the webbing nearer the tip of the formed cable.

2.11 At the end section, extend the unformed ends of metallic dummy cables and the ends of nonmetallic dummy cables beyond the butts of the regular cables to the edge of the webbing.

2.12 ***Treatment of Ends of Dummy Cables:*** The unformed ends of metallic dummy cables should be completely taped with gray friction tape for protection.

2.13 The ends of nonmetallic dummy cables should be wrapped with acetate fiber tape for a distance of 3/4 inch. Overlap the ends of the tape approximately 3/4 inch.

2.14 ***Dummy Cables With Frame-to-Multiple Cables:*** When the frame-to-multiple cables are oval type and the switchboard multiple cables are flat type, dummy cables will be furnished which are to be cut and secured with twine to the oval cables entering the first section. The purpose is to maintain the proper skinner length for the frame-to-multiple cables and to furnish a support for the webbing.

(a) Locate dummy cables in front of associated frame-to-multiple cables with right-to-left growth of switchboard and in the rear with left-to-right growth.

(b) Extend dummy cables associated with frame-to-multiple cables through the lifting space beyond the first clip or clamp in the cable turning section. Stagger the ends of the dummy cables so as to avoid an abrupt change in the dimensions of the regular cable runs.

(c) Extend dummy cables beyond the butts of the regular cables in the first section to the edge of the webs to support the webs as shown in Fig. 3.

(d) Where dummy cables are used for incomplete or omitted hundred groups, extend the cables to the main rack in order to reserve the regular cable position for future installation.

2.15 ***Securing Dummy Cables:*** When using pieces of dummy cable one section or less in length, or where difficulty is encountered in retaining the dummy cable in place, secure the ends to a regular cable in the same layer, or the layer below, with double No. 6 twine.

2.16 Both ends of unformed dummy cables should be "Chicago" stitched to the adjacent regular cable in the same horizontal layer to hold them in place. Where unformed dummy cables in a horizontal layer terminate at the same point, the ends should be "Chicago" stitched together.

2.17 Dummy cables in multiple runs should be secured in horizontal layers by means of webbing, in the same manner as outlined under Webbing Cables in Switchboards and Desks.

2.18 Where dummy cables terminate at an end panel, the cables should be secured in place with fiber strips as shown in Fig. 4.

C. Cross-over Fans — Clamped Type

2.19 Where clamping is required on "cross-over" fans, steel spacers should be placed between layers of cable groups and clamped so as to hold the cables firmly in place.

2.20 Where sewing is used on "cross-over" fans, it should be of a temporary nature only and the exposed sewing should be removed where practicable.

D. Cables in Lifting Space

2.21 The cables in the lifting space at the ends of switchboards should not be fastened within that space. Where the first panel is a blank panel, it may be considered as part of the lifting space. The "build-up" of the cables in the lifting space should be such that the required slope of the cables will be maintained in the ultimate cabling as shown in Fig. 5.

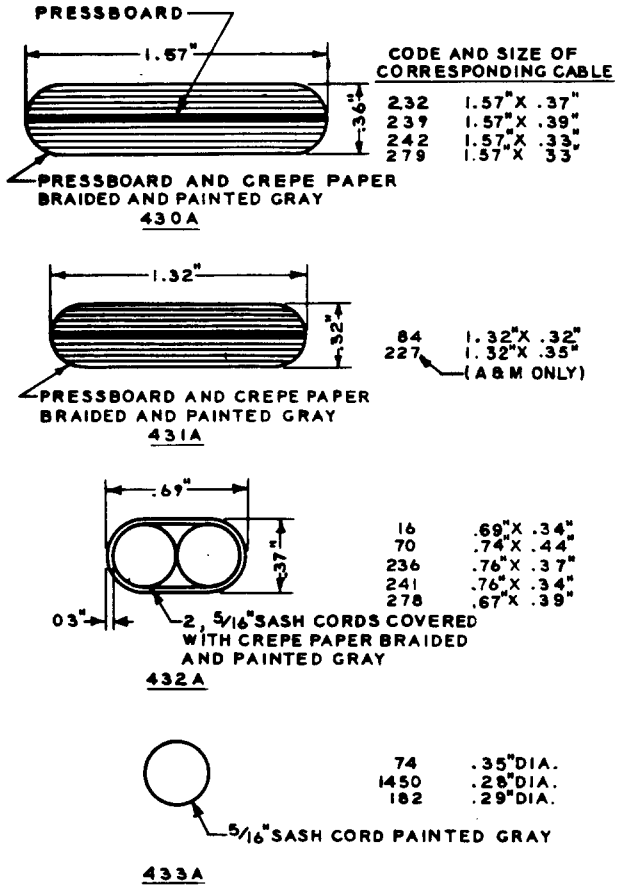


Fig. 1 — Nonmetallic Dummy Cables

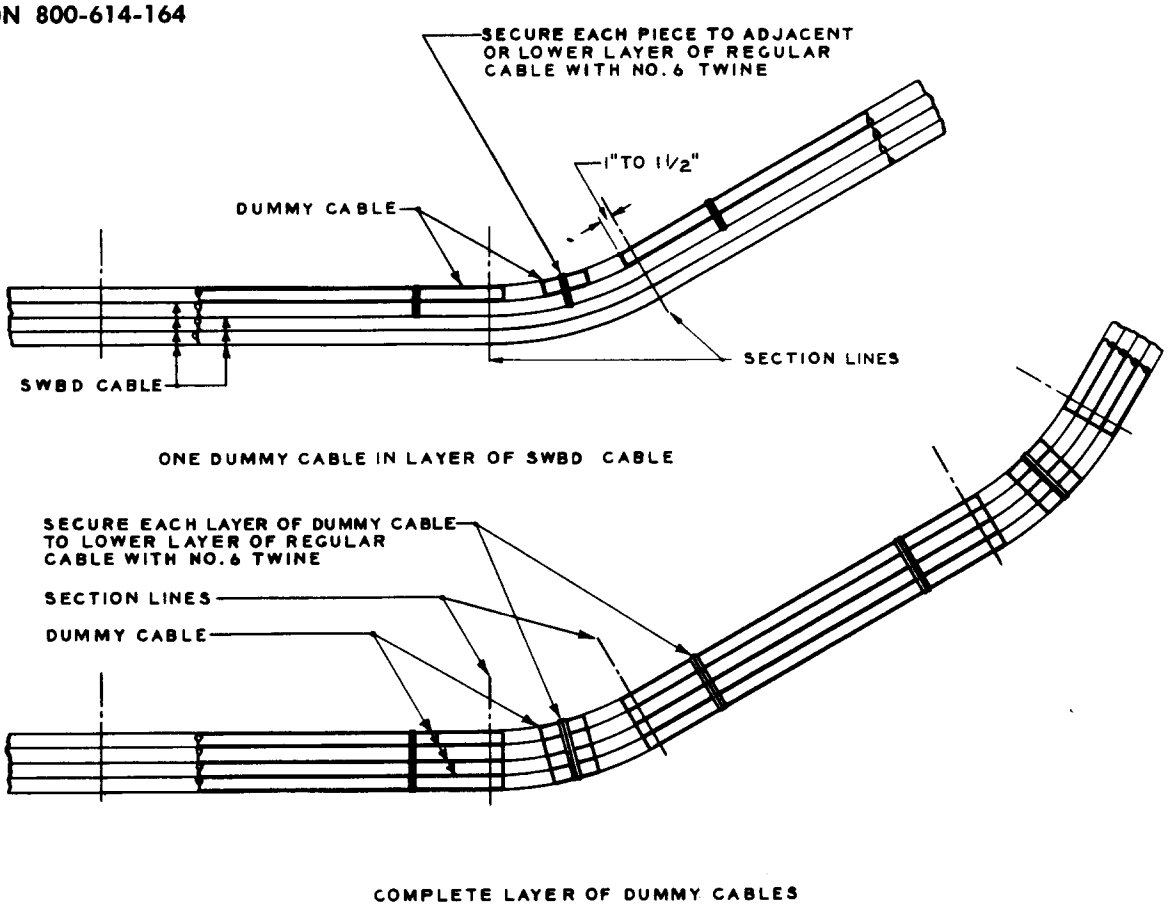


Fig. 2 – Method of Using Flat-type Nonmetallic Dummy Cables in Angle Sections

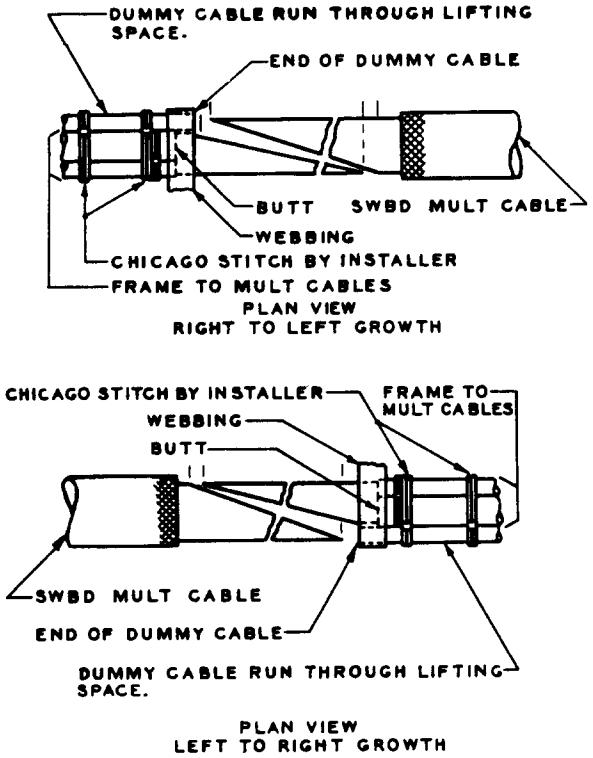


Fig. 3 – Method of Adding Dummy Cables To Frame-to-Multiple Cables

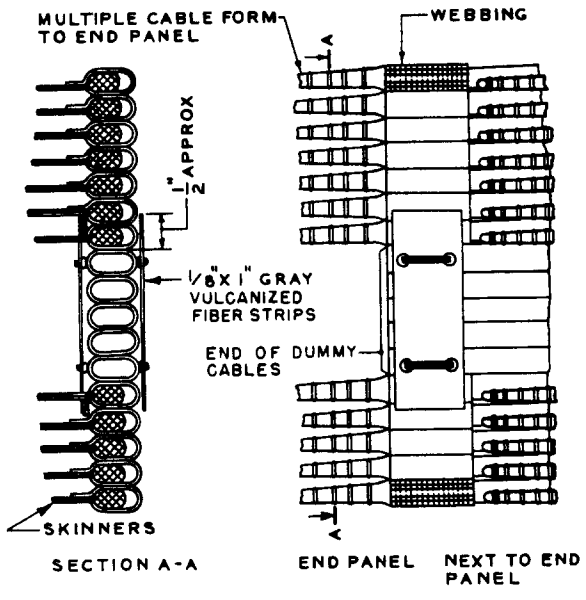


Fig. 4 – Fastening Dummy Cables In End Panels Of Switchboards

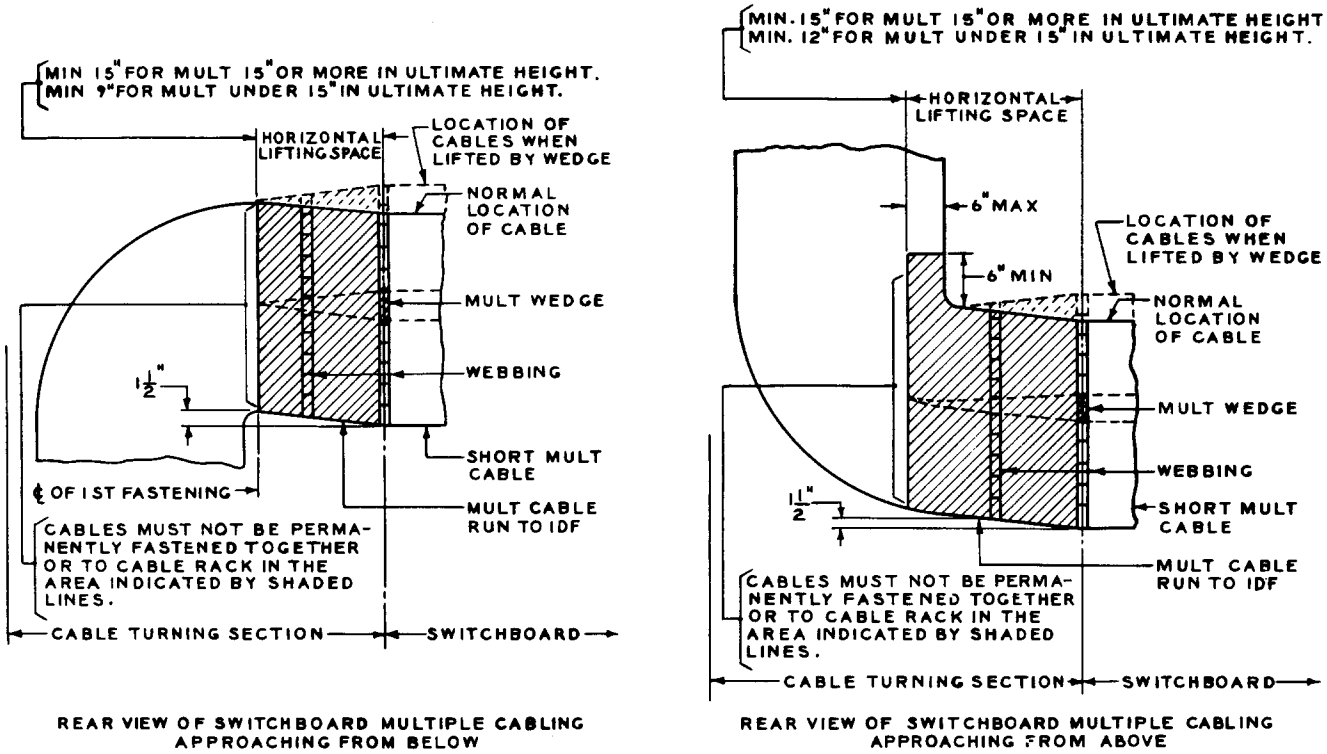


Fig. 5 – Cabling In Switchboard Cable Turning Sections

3. WEBBING CABLES IN SWITCHBOARDS AND DESKS

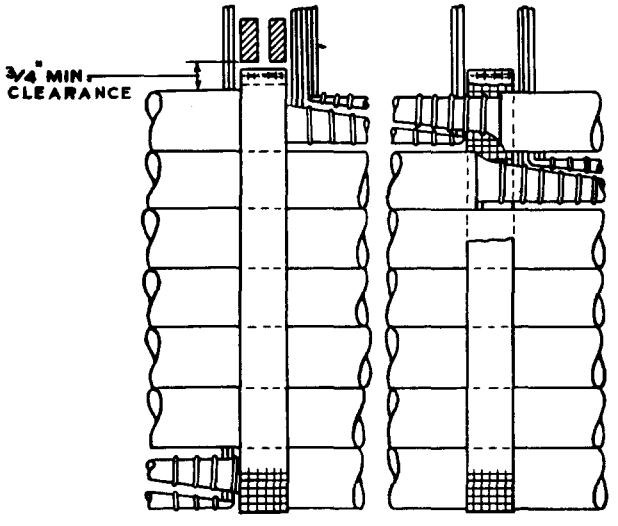
A. Types and Uses of Webbing

3.01 Multiple cable in switchboards and desks should be webbed with nonelastic webbing Type 1, LRM-374, (WECo specification 57836), approximately 1-1/8 inches wide. In general, the cables should be webbed in layers one cable deep.

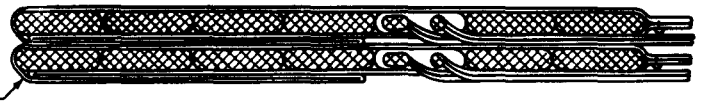
(a) Where units of face equipment consist of two or more mountings such as jacks, lamps, keys, and signals which are collectively served by two or more layers of short multiple cable placed on pins, all of the cables serving the unit should be webbed together providing no cable in the group is formed out over more than one panel. Where the cables are installed on a multiple shelf, each layer of cables should be webbed separately with double webbing.

(b) In the case of checking multiple where two cables serve the same test strip, include both cables under one webbing.

3.02 ***Graduated Double or Folded Webbing:*** Short multiple cables placed on multiple shelves, and on pins when arranged for future multiple shelf support, three or more cables wide per layer, should be webbed with graduated double webbing arranged so that the folded portion of the webbing will compensate for the thickness of the cable skinners as shown in Fig 6. The folded portion of the webbing should not overlap the forms or skinners in front, nor

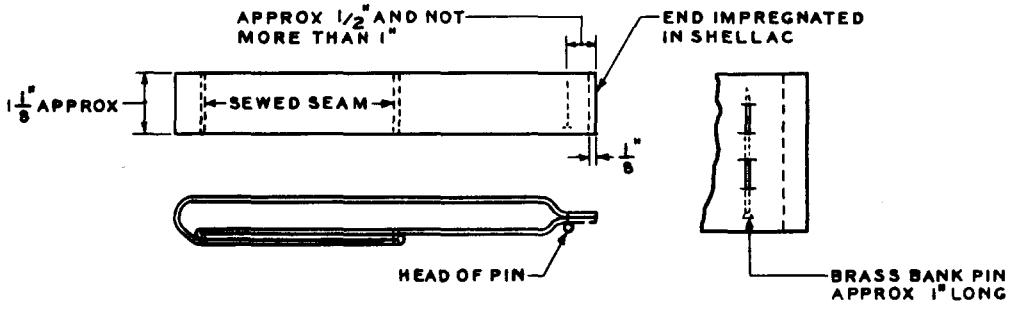


PLAN VIEW OF CABLES



SHORT MULTIPLE CABLES WITH SKINNERS UNDER CABLES

SHORT MULTIPLE CABLES WITH SKINNERS OVER CABLES



DETAILS OF DOUBLE WEBBING

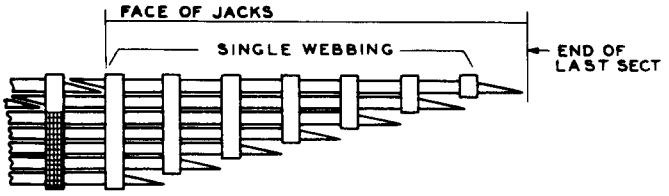
ENLARGED VIEW OF WEBBING AT END FACING FRONT OF SWBD

Fig. 6 – Webbing Cables in Switchboards and Desks — Graduated Double Webbing

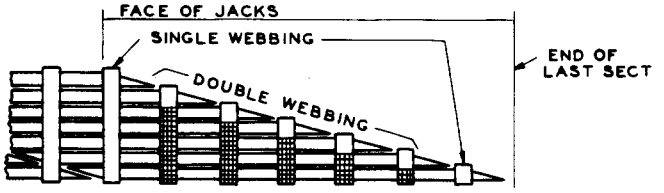
extend back so far as to be visible from the rear. Double webbing should be made from one piece of fabric doubled back and sewed at the folds as shown in Fig. 6.

(a) An exception is made for additions to existing switchboards in which single webbing was used. In this case, the added and extended multiple should also be provided with single webbing.

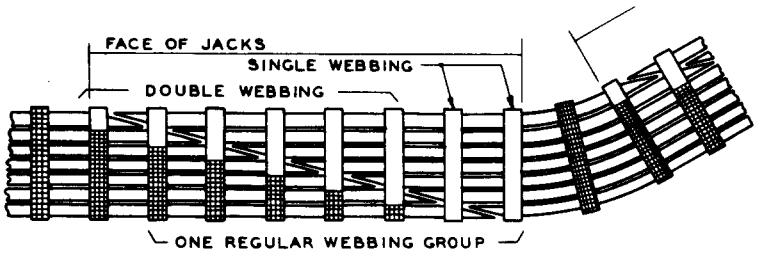
(b) Although double webbing is specified for cables on multiple shelves, regular webbing sets consisting of single and double webs are used at multiple appearances. Fig. 7 shows a typical application of a webbing group or set. The shaded portion of the webs indicates the number of cables over which the double or folded portion of the webs extend to compensate for the thickness of skinners. Typical methods of webbing at end sections are also shown in Fig. 7.



WEBBING AT END SECTION
(SUPPORTED SKINNERS)



WEBBING AT END SECTION
(UNSUPPORTED SKINNERS)



WEBBING AT REGULAR SECTIONS

NOTE:
THE SHADED PORTIONS OF THE WEBS INDICATE THE CABLES OVER WHICH THE DOUBLE OR FOLDED PORTION EXTENDS.

Fig. 7 – Typical Methods of Webbing Cables

3.03 ***Single Webbing:*** Multiple cables placed on cable pins or cable brackets, except when arranged for future multiple shelf support, should be webbed with single thickness webbing.

3.04 ***Incomplete layers of cable*** two or more cables wide on multiple shelves should, in all cases, be webbed with single webbing. Incomplete layers of a single cable wide need not be webbed whether on pins or multiple shelves.

B. Color of Webbing

3.05 On new equipments, use black webbing on the bottom layer of cables of each complete group or subgroup of 100 circuits and gray webbing for all other layers of multiple cables in switchboards or desks as shown in Fig. 3.

(a) Web multiple cables being extended into new sections being added to existing lineups of switchboards and desks using the same color arrangement as for new equipments (that is, black on the bottom layer of cables of each group and gray for all other layers) regardless of the color arrangement of the webbing on the existing multiple cables.

(b) Web multiple cables added to existing switchboards or desks with the same color arrangement of the webbing as previously used on the existing equipment.

(c) In toll switchboards, including the positions with DSA board features, the multiple cables should be webbed with black and gray webbing in accordance with the usual practices except for the miscellaneous multiple which should be webbed entirely with gray webbing. In separate DSA switchboards, the entire multiple should be webbed with gray webbing.

(d) For equipments such as the 1A teletypewriter switchboards where the position of the multiple shelf is lowered as additional trunk multiple is installed, the bottom layer of cable will be webbed with gray webbing when the lowest group is less than a full group.

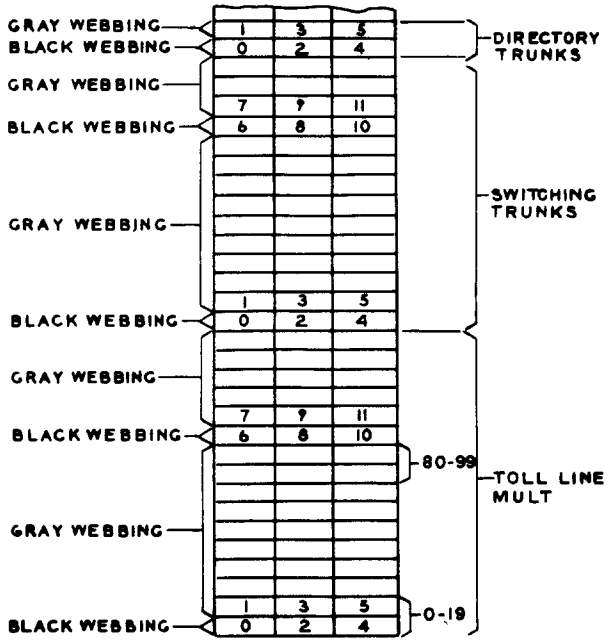


Fig. 8 – Arrangement of Webbing

C. Location and Placing of Webbing

3.06 Web multiple cables behind each stile strip. The webbing should be centered at each stile strip and should be in a vertical alignment.

3.07 The location and type of webbing at angle sections, cable turning sections, and similar places, should, in general, agree with the arrangement and spacing of the webbing in the associated switchboard.

3.08 Place the webbing with the ends in front of the cable nearest the front of the switchboard or desk as shown in Fig. 6. Webbing should be pinned approximately 1/2 inch from the ends but in no case should this dimension exceed 1 inch. The pin should pass through the webbing at four points approximately 1/4 inch apart and both the head and the point of the pin should be on the underside of the webbing as shown in Fig. 6.

REASONS FOR REISSUE

1. 1.01 covering general information was revised to add the meaning of term "short multiple cable."

2. 2.01(a) covering the point from where the slant dimension of skinners should be measured was added.

3. 2.13 covering the treatment of ends of nonmetallic dummy cables was revised to omit waxing.

4. Fig. 1 covering nonmetallic dummy cables was revised to bring the cable dimensions up to date.

5. 3.01 covering webbing of multiple cable was revised to add LRM number of the webbing.

6. 3.05 covering color of webbing was revised to clarify the requirements.

7. Fig. 8 covering arrangement of webbing was revised to show circuits numbered from bottom up.