

PREPARATORY OPERATIONS
 PREPARATION OF CABLE RUNS

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1. GENERAL

1.1 Scope of Section

1.11 This section covers information requirements and methods relative to operations which are to be performed preparatory to running switchboard cable and wire.

1.2 General Information Pertaining to Arrangement of Tools, Precautions, Verification, Specifications and Drawings and Figures

1.21 Refer to Section 1 of this handbook for information pertaining to these items.

2. INSTALLING EQUIPMENT

NOTE: The tools and supplies generally used for operations covered by these methods are as follows:

2.1 Tools

- R-2062 Bracket, Cable Guide
- R-4397 Guide, Cable
- R-4321 Guide, Cable (Order as TS-526)
- *R-3662 Cutter, Steel Strapping, Safety (For cutting band wire on cable reels)
- R-2749 Wrench, O.E.
- *Indicates tools generally available in kit used on job.

2.2 Supplies

- | | |
|--|--|
| <ul style="list-style-type: none"> RM-626122 P-68616 RM-583101 RM-669152 SD-97-218A ID-1270 RM-552417 Purchase locally R-4254 | <ul style="list-style-type: none"> Canvas, 40" Fiber, Detail Fiber, Gray Sheet, 1/64" Gloves, Cotton Tags, Cable Tags, Warning-Work Circuit Tube, Rigid PVC, 3/4" Strap Iron for Support Cables 1/8" x 1" per FIG. 20 PVC Insulators for Bar Type Cable Rack. (Order Detail 1 to 4 as required per FIGS. 10 to 14.) |
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3. PREPARATION OF CABLE RUNS

3.1 Protection to Prevent Injury to Equipment

3.11 Place warning tags (ID-1270) on equipment to be worked on or which may be disturbed when working on adjacent equipment.

3.12 Protect apparatus with wooden guards, frames or sheets of plywood or other sturdy material secured to the metal framework.

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3.13 At rear of fuse panels, place temporary protection of sheet fiber around details such as live bus bars and lugs, even though they are protected with tape. Tape may be cut where it passes around corners if struck by falling objects.

3.14 Cover battery and generator feeders, at distributing frames and other terminations, with fiber or other sturdy material which will afford both electrical and mechanical protection.

3.15 Message register cabinet doors should be removed when adding form cables to existing equipment to protect doors and facilitate cabling operations.

3.2 Location of Cable Rack

3.21 Determine whether the location of the cable rack is as shown on cabling plan drawings and that provision has been made for the ultimate cabling.

3.3 Check Existing Cable Rack for Protection

3.31 On additions, check the cable turn-off points of existing bar type cable racks on which cables are to be added to determine whether adequate protection is in place on the cable rack stringers and cable rack straps (horns) in accordance with PAR. 3.5 of this section. Where protection has been omitted, apply protection in the standard manner where feasible; otherwise, place it in the most convenient manner.

3.32 When installation activity requires to open a cable hole to run cables between floors, the cable rack foot should be inspected as outlined in Handbook 18, Section 6A.

3.4 Temporary Designation and Equipment

3.41 Stencil cable route designations on pieces of cardboard about 4" x 5" in size and hang them in conspicuous relative locations as indicated on cabling and cable rack plan drawings and specifications when they show cable routing information. These designations will aid in running cable through the specified routes as shown on the front of the cable tags.

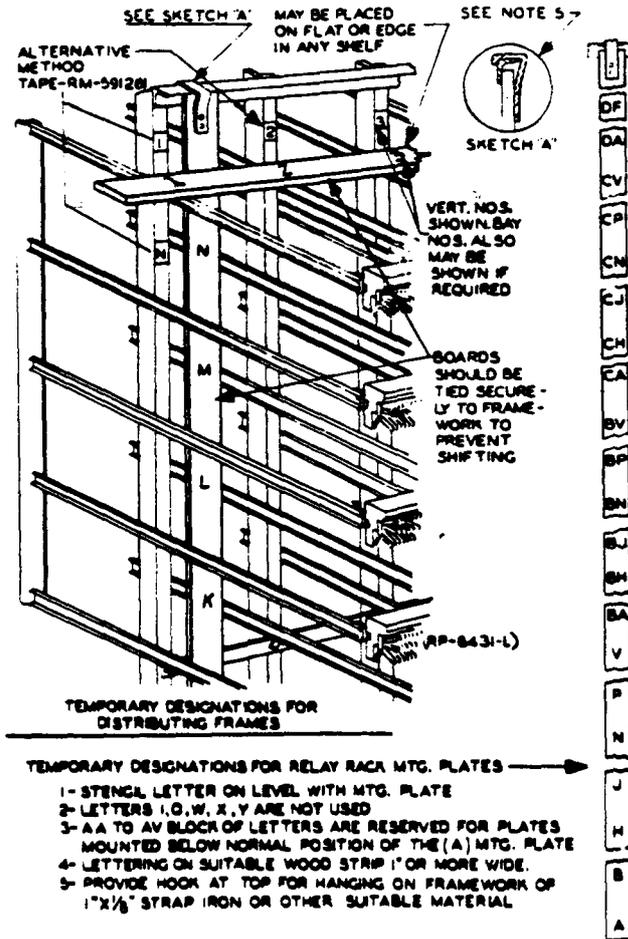


FIG. 1 TEMPORARY DESIGNATIONS AT DISTRIBUTING FRAMES AND RELAY RACKS (PAR. 3.42)

3.42 Temporary equipment location designations, such as those illustrated in FIG. 1 for distributing frame verticals and shelves, and for relay rack mounting plates, will be found advantageous on new jobs and on large additions, for quickly locating the position of cable terminations.

3.43 At Carrier equipment bays to aid in placing cables in proper duct, a piece of sealing or similar type tape stenciled H or L (high or low), or as required, in 3/4" characters shall be placed near the top of each duct.

3.5 Protection to Prevent Injury to Cables

3.51 General Requirements

3.511 Cables shall be protected at all locations where they bend sharply around or run across edges of metalwork.

3.5111 For specific methods and material to provide the protection at commonly used locations, refer to PARS. 3.52, 3.53, or 3.56 for the particular type of cable rack involved.

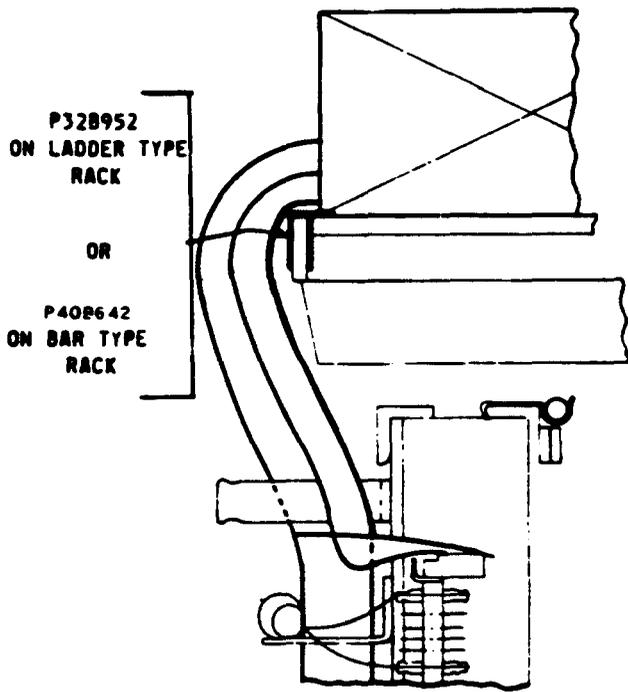
NOTE: Refer to Handbook 261, Section 200 for specific methods on protection of cable runs on ESS type cable rack.

3.5112 For locations not covered by specific methods, apply 1/64" Gray Sheet Fiber (RM-583101) to the metalwork if possible. Where fiber cannot be applied to the metalwork, wrap the fiber around the cable. Secure the fiber as specified in PAR. 3.512.

NOTE: Where cables run across the edges, but are not in actual contact with the metalwork, place the protection initially when the subsequent addition of cables or other activity in the immediate area may force the cables into contact with the edges of metalwork and protection cannot be added later when required.

3.512 Sheet fiber, when wrapped around metalwork or cables, should be securely fastened so as to prevent displacement and to avoid projecting edges or corners. Generally, this may be accomplished as follows:

- (a) Place bands around the fiber at each end, approximately 1/2" from the ends. If the fiber tends to bulge out in the center, apply additional bands as required to hold the edge of the fiber reasonably close to the metalwork, or:



(RP-12542-L)

FIG. 3 TYPICAL APPLICATION OF FIBER INSULATOR, P-32B952 AND P-40B642 (PARS. 3.521, 3.523, 3.531)

- (b) When other ties used to secure cables are to be subsequently placed around the fiber, place a temporary band around the fiber, approximately in the center, to hold the fiber in position until the cables are secured.
- (c) Bands shall be made with a double strand of approved twine made as a starting stitch and ended with a square knot.

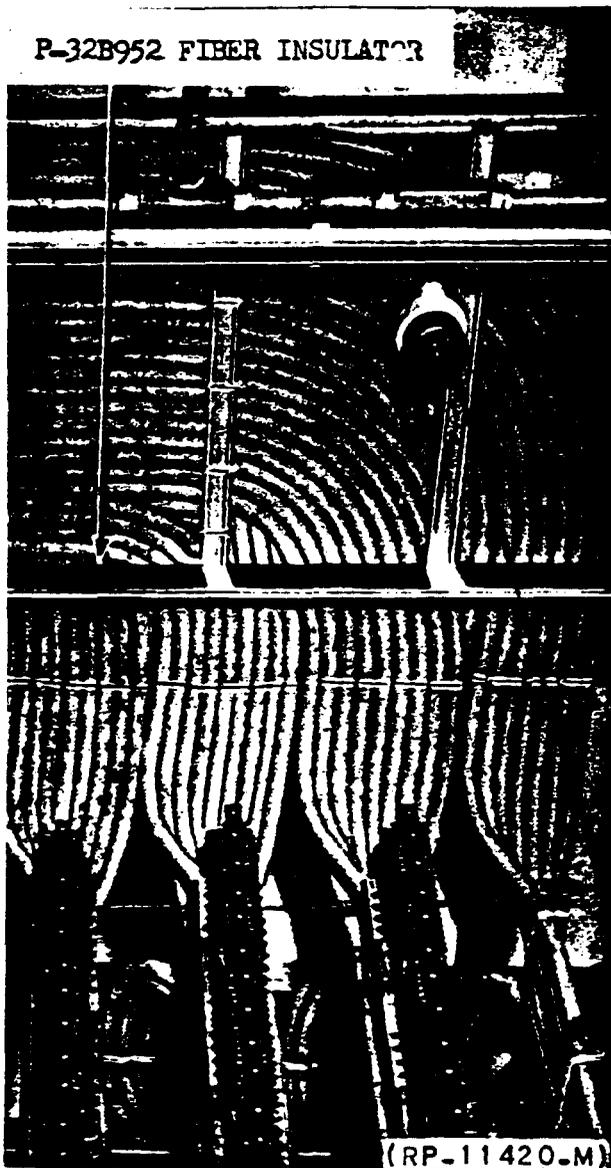


FIG. 4 TURNING CABLES FROM CABLE RACK AT DISTRIBUTING FRAMES (PAR. 3.521)

4.



FIG. 5 TURNING CABLES THROUGH CABLE RACKS (PAR. 3.522)

3.52 Requirements Applicable to Ladder Type Cable Racks

3.521 At all locations where cables turn off the cable rack across the stringer and drop 3" or more, apply P-32B952 Fiber Insulators as illustrated in FIGS. 3 & 4. Apply this protection whether or not the cables are in physical contact with the stringers initially.

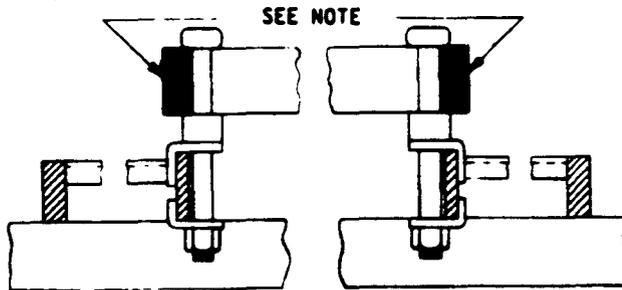
NOTE: P-32B952 Insulators are generally listed in the job specifications and furnished with the equipment. When omitted or additional quantities are required, order on requisition as for equipment items. They are not stocked as supply items nor listed in Handbook 250.

3.522 Where cables pass through the cable rack, place P-68616 Fiber Insulators on the cross straps over which the cables bend as illustrated in FIG. 5. When the exact area where cables are to be turned over the strap cannot be predetermined, place the fiber across the entire length of the strap.

3.5221 The P-68616 Fiber Insulators may be secured to the cross straps with R-4265 Nylon Ties.

3.5222 When using the R-4265 Nylon Ties to secure the P-68616 Fiber Insulators to the cross strap, position the tie so the head will appear at the underside of the cable rack.

3.523 Where cables pass over cable rack stringers, framing bars and similar narrow bars and offset to a level that is lower by 3" or more, apply protection at the points of contact at both levels. Use P-328952 or P-408642 Insulators as illustrated in FIG. 3 or 1/64" Gray Sheet Fiber (RM-583101) wrapped around the metalwork. Secure the sheet fiber as specified in PAR. 3.512.

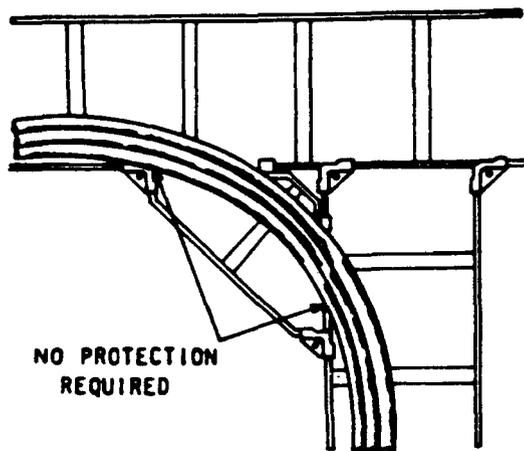


NOTE: APPLY PVC INSULATOR TO END OF STRINGER. USE R-4254 DET 1 (1-1/2" STRINGER) R-4254 DET 2 (2" STRINGER).

CROSS-AISLE RACKS RUN NON-CONTINUOUSLY OVER AISLES AT HIGHER LEVEL THAN CABLE RACKS OVER THE FRAME.

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FIG. 6 CROSS-AISLE CABLE RACKS RUN NON-CONTINUOUSLY OVER AISLES AT HIGHER LEVEL THAN CABLE RACK OVER THE FRAME (PAR. 3.526)



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FIG. 7 CABLE CROSSING NARROW STRINGERS (PAR. 3.5231)

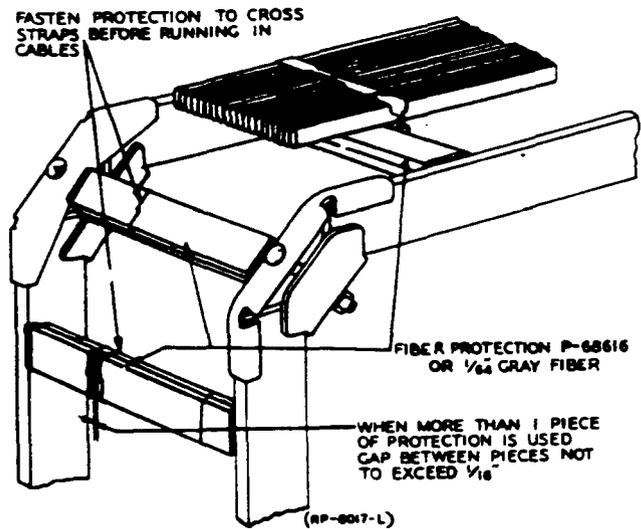


FIG. 8 PROTECTION ON CROSS STRAPS AT TURNS (PAR. 3.524)

3.5231 At cable rack intersections, when cables cross the stringers or corner clamps at the same level as illustrated in FIG. 7, protection is not required.

3.5232 At locations where cables cross over straight clamps on cable rack stringers, protection is not required. For the portion of stringer at either side of the clamp, protection may be required as outlined in PAR. 3.523.

3.524 At outside bends or offsets in cable racks (horizontal to vertical downward), place P-68616 Fiber illustrated in FIG. 8 and as follows:

(a) For all cable types with the exception of flat-type cables run on their edges, apply the protection when the radius of the turn of the inside cables is 5" or less and the ultimate depth of the cable run will be 8" or more. If the ultimate depth is not indicated on the cable plan drawings or is not otherwise obvious, provide the protection initially.

(b) For cable runs consisting of flat-type cables on edge (232, 241, 242 and similar type), provide the protection when the turns have a radius of 12" or less.

3.525 At inverted sections of cable rack, place P-68616 Fiber Insulator on the cross straps as indicated in FIG. 9 when the ultimate depth of the cables will be 4" or more. When the ultimate depth of 4" or more is not obvious or cannot be determined, provide the protection initially.

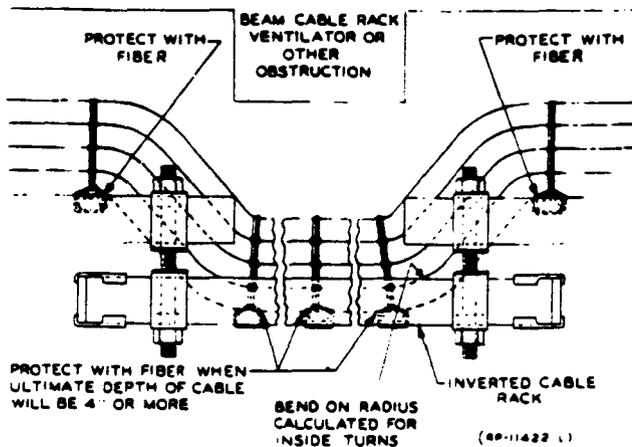


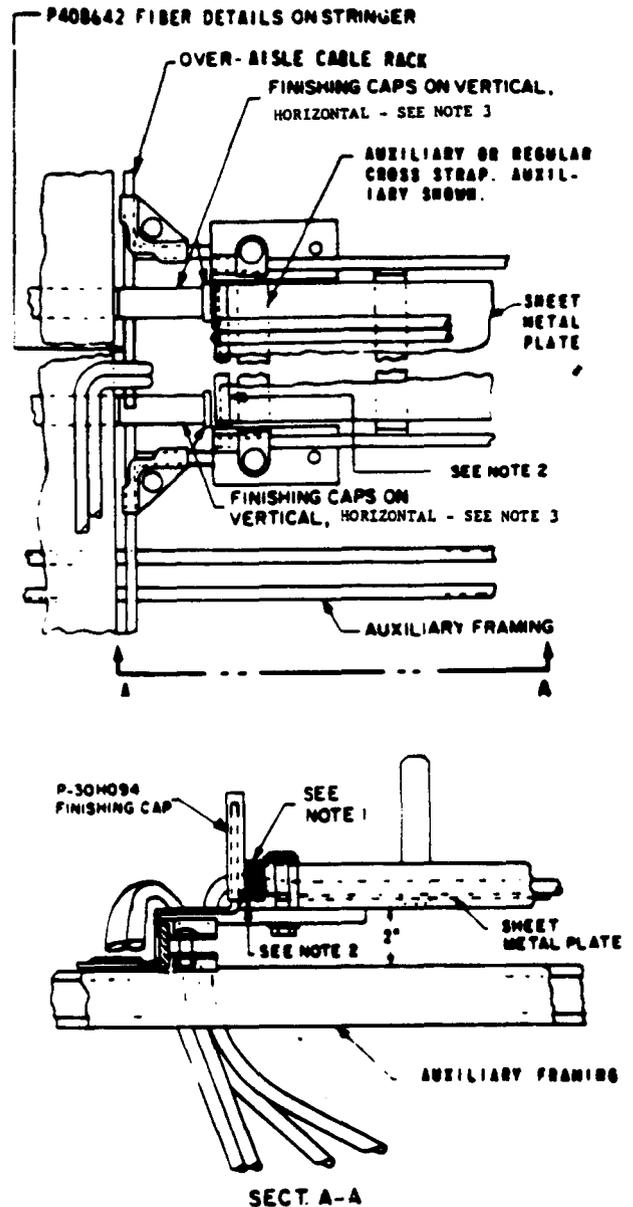
FIG. 9 PROTECTION ON CROSS STRAPS OF INVERTED SECTIONS (PAR. 3.525)

3.526 On cross-aisle cable racks run non-continuous over aisles at higher level than cable racks over the frames, apply R-4254 Detail 1 (1-1/2" Stringer) or Detail 2 (2" Stringer) PVC End Cap Insulators to the ends of the Cable Rack Stringers.

3.53 Requirements Applicable to Bar Type Cable Rack

3.531 At all locations where cables turn off the cable rack and drop 3" or more, apply protection as follows:

3.5311 Where the cables cross the stringers, apply P-408642 Fiber Insulator as illustrated in FIGS. 3, 10, 11, and 12. The protection should be applied whether or not the cables are in contact with the stringers initially. Generally, the insulators need not be tied in place.



SECT. A-A

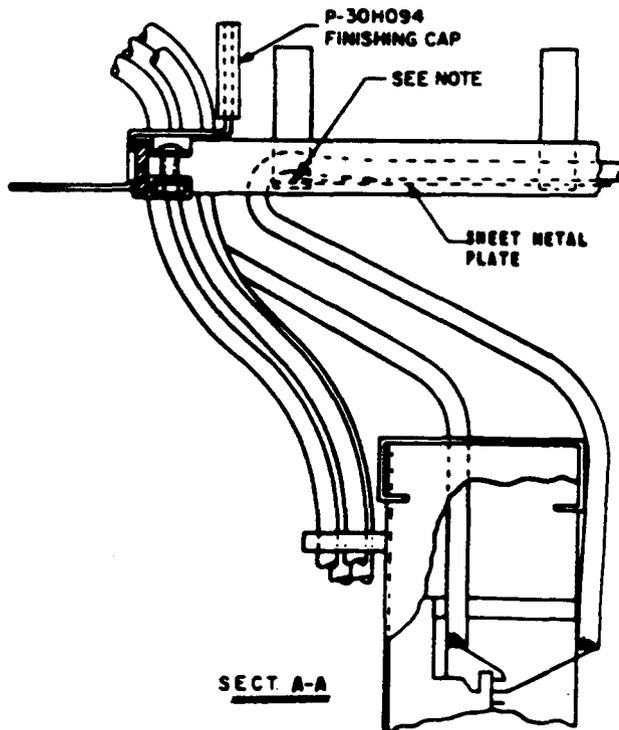
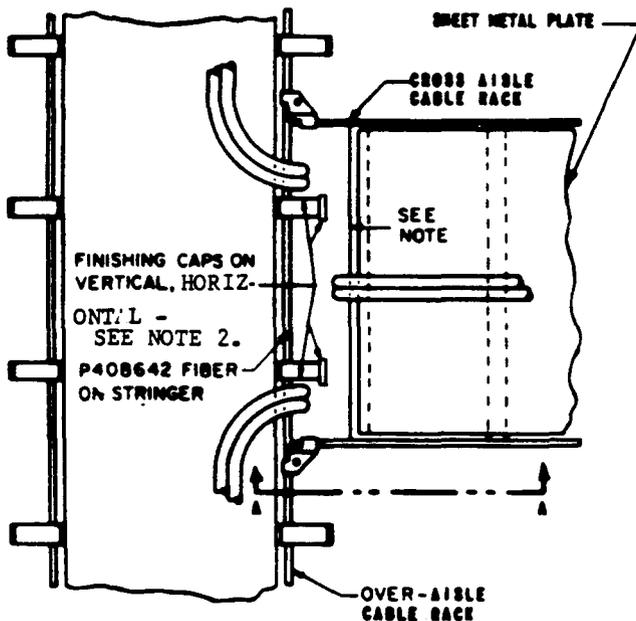
NOTE 1. APPLY PVC INSULATOR TO END OF STRINGER. USE R-4254 DET 1 (1-1/2" STRINGER) R-4254 DET 2 (2" STRINGER).

NOTE 2. WHEN CABLES DROP THROUGH CROSS AISLE RACK REMOVE AUXILIARY STRAP. APPLY R-4254 DET 4 (CUT TO FIT) TO FIRST REGULAR STRAP. SLIP 1/2" LIP OVER TOP EDGE OF STRAP (SIDE TOWARDS INTERSECTING RACK). APPLY SCREWDRIVER BETWEEN BACK EDGE OF STRAP AND INSULATOR. APPLYING PRESSURE WITH FINGERS, SNAP 1/8" LIP OVER THE STRAP WHILE SLIDING SCREWDRIVER FROM ONE SIDE OF STRAP TO OTHER SIDE. CUT AND SLIDE SHEET METAL PLATE UNDER THE 1/2" LIP OF STRAP.

NOTE 3. APPLY FINISHING CAP DET. 3 AT SCREWDRIVER APPLY SNAPDRIVER TOWARDS STRINGER.

CROSS-AISLE CABLE RACK 2 HIGHER THAN OVER-AISLE CABLE RACK

FIG. 10 CABLES PASSING THROUGH CROSS AISLE CABLE RACKS (PARS. 3.5311, 3.5315, 3.541)



NOTE 1. WHEN CABLES DROP THROUGH CROSS AISLE RACK REMOVE AUXILIARY STRAP. APPLY R-4254 DET 4 (CUT TO FIT) TO FIRST REGULAR STRAP. SLIP 1/2" LIP OVER TOP EDGE OF STRAP (SIDE TOWARD INTERSECTING RACK). APPLY SCREWDRIVER BETWEEN BACK EDGE OF STRAP AND INSULATOR, APPLYING PRESSURE WITH FINGERS SNAP 1/8" LIP OVER THE STRAP WHILE SLIDING SCREWDRIVER FROM ONE SIDE OF STRAP TO OTHER SIDE. CUT AND SLIDE SHEET METAL PLATE UNDER THE 1/2" LIP OF STRAP.

NOTE 2. CUT THE R-4254 DET. 3 FT SCORING APPLY SMALLER PORTION TO HORIZONTAL.

CROSS AISLE AND OVER - AISLE CABLE RACKS ON SAME LEVEL

RP-15455

FIG. 11 CABLES PASSING THROUGH CROSS AISLE CABLE RACKS.

(PARS. 3.5311, 3.5315)

3.5312 At over-aisle cable racks:

When cables drop off the rack over the cable racks straps (horns), apply protection to the horizontal and vertical portions of the straps over which the cables drop. Apply R-4254 Detail 3 formed PVC Insulator by bending the detail at the scoring near the center to form a 90 degree angle; place the lower end of the long part of Detail 3 over the end of the vertical horn and slide it down as far as possible. Snap the other portion of the detail over the horizontal part of the horn. See FIG. 13.

NOTE: Where P-30A018 Extension Sleeves are placed on the straps, the horizontal portion should be protected by cutting the R-4254, Detail 3 at the scoring near the center. Snap the short length on the horizontal portion of the horn.

3.5313 When installing P-30A018 Extension sleeves, always apply an 840372304 Finishing Cap to the sleeve.

3.5314 At over-frame cable rack:

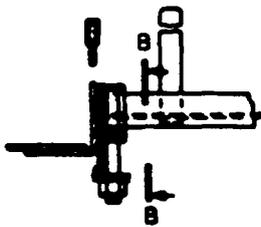
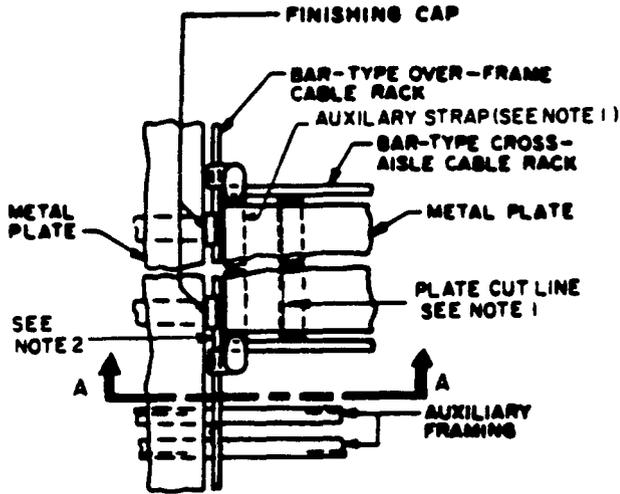
When cables turning off the cable rack are in contact with the vertical portion of the cable rack straps, particularly at the juncture of the stringer bar and the vertical strap, place a section of R-4254, Detail 4, PVC Insulation, to the approximate full length of the vertical portion of the strap.

NOTE: The above protection may be omitted when the position of the vertical cable rack straps with respect to the vertical drop of the cables is such that the cables to this location will not contact the edge of the strap, and protection may be added at a later date when additional cables might make it necessary to do so.

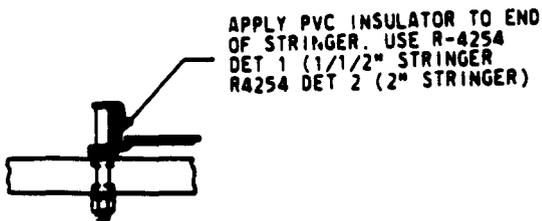
3.5315 At cross-aisle racks: When the cables drop through the rack over a strap or the sheet metal plate, apply protection to the strap or the plate as follows:

- (a) For cross-aisle and over-aisle racks at the same level, see FIG. 11.
- (b) For cross-aisle racks 2" higher than the over-aisle rack, see FIG. 10.
- (c) For cross-aisle racks 2" higher than the over-frame rack, see FIG. 12.

3.54 At "T" intersections of cross-aisle to over-aisle or over-frame racks:
Apply protection to the stringers and to the vertical portion of the over-aisle or the over-frame rack straps within the intersection as follows:



SECT. A-A



SECT. B-B

NOTE 1: WHEN CABLES DROP THROUGH CROSS AISLE RACK REMOVE AUXILIARY STRAP. APPLY R-4254 DET 4 (CUT TO FIT) TO FIRST REGULAR STRAP. SLIP 1/2" LIP OVER TOP EDGE OF STRAP (SIDE TOWARDS INTERSECTING RACK). APPLY SCREWDRIVER BETWEEN BACK EDGE OF STRAP AND INSULATOR, APPLYING PRESSURE WITH FINGERS SNAP 1/8" LIP OVER THE STRAP WHILE SLIDING SCREWDRIVER FROM ONE SIDE OF STRAP TO OTHER SIDE. CUT AND SLIDE SHEET METAL PLATE UNDER THE 1/2" LIP OF STRAP.

NOTE 2: WHEN CABLES DROP OVER THE OVER-FRAME RACK STRINGER THROUGH CROSS AISLE RACK, APPLY P-408462 INSULATORS TO THE STRINGER.

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FIG. 12 CABLES PASSING THROUGH CROSS-AISLE CABLE RACKS (PARS. 3.5311, 3.5315, 3.541)

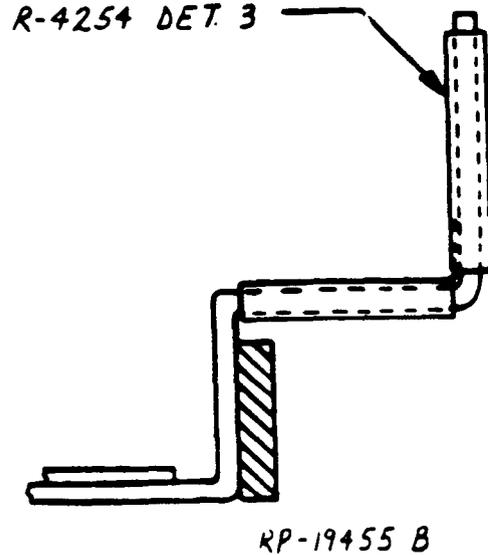


FIG. 13 PROTECTION AT OVER-AISLE CABLE RACK STRAPS (HORNS) (PAR. 3.5312)

3.541 When the cross-aisle rack is located 2" higher than the over-aisle or over-frame rack, apply R-4254, Detail 1 or 2 to the cut ends of the cross-aisle rack as illustrated in FIGS. 10, 12, and 14.

3.542 When the cross-aisle rack is located at the same height as the over-aisle rack, apply P-408462 Insulators to the portion of the over-aisle cable rack stringer within the "T" intersection as illustrated in FIG. 15.

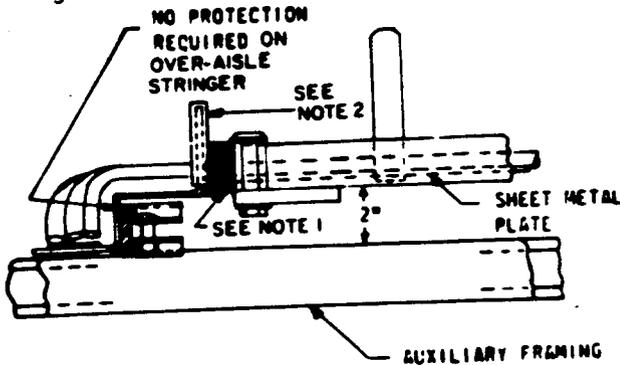
3.543 Apply P-30H094 Finishing Caps to the cable rack straps within the "T" intersection as follows.

(a) At over-aisle racks, apply the finishing caps as illustrated in FIGS. 14 and 15.

(b) At over-frame racks, place a piece of RM-552417, 3/4" rigid plastic tube approximately 3" long over the lower part of the straps not covered by the finishing caps. Then apply the finishing caps to the upper portion of the straps.

3.544 Apply 401682380 Adhesive Cement to P-30H094 and 840372304 Finishing Caps before installing. Refer to Handbook 30, Section 138 for complete instructions.

3.55 At cable rack hanger rods: Where cables turn off the cable rack adjacent to hanger rods, place 3/4" rigid plastic (PVC) tubing, RM-552417 on the hanger rods. The tubes should be long enough to adequately protect the cabling to the ultimate height of the rack; and, as far as practicable, the tubes on the same run should be of uniform length.



NOTE 1: APPLY PVC INSULATOR TO END OF STRINGER
USE R-4254 DET 1 (1-1/2" STRINGER)
R-4254 DET 2 (2" STRINGER)

NOTE 2: THE OVER-AISLE CABLE RACK STRAPS WITHIN THE "T" INTERSECTION SHALL BE EQUIPPED WITH P-30M094 FINISHING CAPS.

CROSS-AISLE RACK 2" HIGHER THAN OVER-AISLE RACK

RP-19339 A

FIG. 14 PROTECTION AT "T" INTERSECTIONS (PARS. 3.541, 3.543)

3.56 Protection at Modified Ladder Type and Wide Cable Rack and Miscellaneous Cable Rack

3.561 Modified Ladder Type Cable Rack (P-33B202) and Wide Cable Rack (ED-97760-70) consist essentially of ladder type cable rack with bar type horns.

3.562 Insulation requirements for the horns, straps, stringers, etc., are identical to applicable bar or ladder type cable racks.

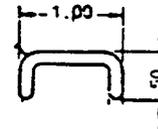
3.563 The insulating details used for bar and ladder type cable rack can be utilized for modified, wide, or roll formed channel (lightweight) type cable rack.

3.564 For locations not covered by specific methods, apply 1/64" Gray Sheet Fiber (RM-583101) to the metalwork.

3.565 Tubular cable rack has been installed in some areas. Since this tubular configuration has 1/8" rounded edges, it is permissible to omit cable protection at the tubular straps and tubular stringers.

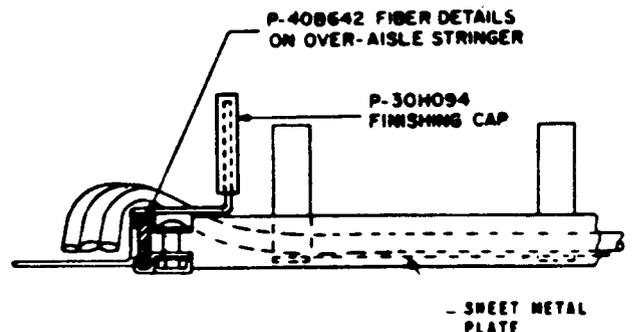
NOTE: In many cases, tubular straps and stringers are intermixed with bar and channel type straps and stringers. It should be noted that cable protection is still required on the bar and channel portions of cable rack.

3.566 Roll formed channel straps and stringers are also being used in Central Offices. Protection is not necessary for cables dropping through the cable rack over the roll formed channel straps. Protection IS required for cables breaking off the rack over the roll formed channel stringers.



Roll Formed Channel Strap Configuration

NOTE: Roll Formed Channel Type Stringers are normally furnished with Roll Formed Channel Type Straps. However, the Roll Formed Stringers may at times be furnished with channel or bar type straps. In these cases, cable protection is required on the channel or bar type straps for the above application.



OVER-AISLE RACK AND CROSS AISLE RACK ON THE SAME LEVEL

RP-19339 C

FIG. 15 PROTECTION AT "T" INTERSECTIONS (PARS. 3.542, 3.543)

3.6 Placing of Cable Guides

3.61 Place Cable Guides (R-4397 or R-4321) over equipment, at turns, and along the cable runs at frequent enough intervals to prevent the cables from rubbing on the framework, cable racks, threaded rods and other cables as they are being pulled in. Use Cable Guide Brackets (R-2062) as required to support guides above existing cable runs. These brackets are required to provide additional height on cable runs where additional cable is being added to existing runs. A typical arrangement of cable guides is shown in FIG. 16.

3.611 In working offices, place the guides, where possible, over non-operating equipment. Dirt is most likely to fall from the cables where they pass through the guides and may cause service interruptions if the guides are located over equipment which is in operation. Secure the guides to the cable rack after they have been securely mounted.

3.6111 Cable guides and brackets are heavy. Care is, therefore, necessary when placing, changing, or removing them as they may cause injury to personnel or serious damage to the equipment and wiring if dropped.

3.62 The method of assembling R-4397 Cable Guides on cable racks is shown in FIGS. 17 and 18. For securing these guides on auxiliary framing, see FIG. 19. Similar arrangements should be used for other types of auxiliary framework. Secure the guides and brackets, using a wrench to tighten the nuts.

3.621 A method for using the R-4397 Cable Guides without the R-2062 Bracket is to clamp the guide onto threaded hanger rods. The guide may also be used by improvising a bracket in this manner; remove the clamping detail from the guide and secure it on to the cable rack; then, screw a piece of threaded rod, to which a P-164490 Splice Coupling has been attached, into the clamp. The cable guide is then secured to the top of the splice coupling. See FIG. 18.

NOTE: When the cable guides are to be mounted on channel auxiliary framing, remove clamp details from guides and store them with tool kit so that they will not become mislaid.

3.63 The R-4321 Cable Guide is an adjustable bracket mounted sheave that is secured to cable rack stringers or auxiliary framing bars. The R-4321 Cable Guide can replace the R-4397 Cable Guides.

3.631 When mounting the guides on 1-1/2" cable rack stringers, the sliding adjustable spacer should be pulled in the direction away from the stringer. For mounting on 2" cable rack stringers, the sliding spacer should be pushed toward the stringer. The markings on the spacer indicate the direction of travel for 2" and 1-1/2" stringers (see FIG. 21).

3.632 The bracket can then be mounted on the cable rack stringer in either the inner or outer notch position by lifting the sliding spacer slightly and rotating 180 degrees (see FIG. 21). Place the notches in the bracket over the top and bottom of the stringer and tighten the adjusting handle.

3.633 Adapters are provided with the TS-526 to allow mounting of the brackets on auxiliary framing bars. These adapters are illustrated in FIG. 24.

3.634 The guides must be adjusted in height (FIG. 22) to keep the sheave above existing cable and framework to reduce friction and prevent damage to cables. It is recommended that this vertical height adjustment be made before placing on cable rack.

3.635 When the guide is used in the fully extended position at cable turns, the R-4321 Group 4, Support Adapter, shall be mounted on the guide. Trunk straps will be threaded through the adapters and fastened to adjacent cable rack stringers, threaded rods, or framing bars, to prevent bending or twisting of the guide. See FIG. 23 for illustration.

3.636 Each cable guide is equipped with a safety harness (FIG. 22) which must be attached when the cable guides are mounted. The clip shall be slipped over the cable rack stringer, horn, or the auxiliary framing bar.

3.637 Use the guide cable retainer to hold the cable from slipping out of the sheave. The retainer can be released by pushing in toward the sheave and rotated 90 degrees (see FIG. 21).

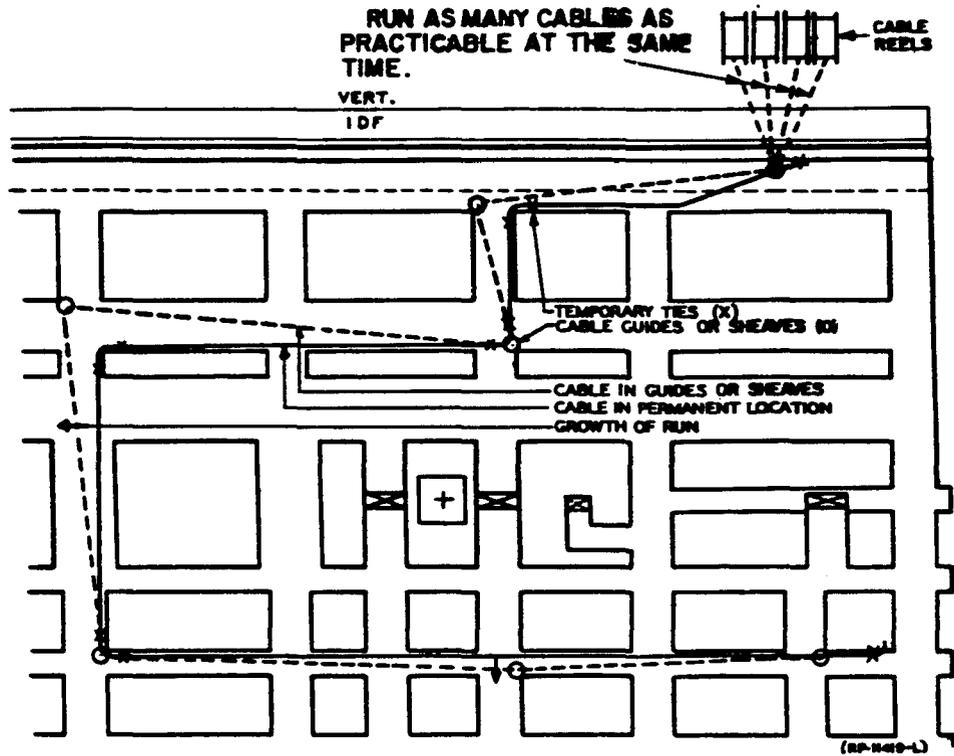


FIG. 16 TYPICAL ARRANGEMENT OF CABLE GUIDES (PAR. 3.61)

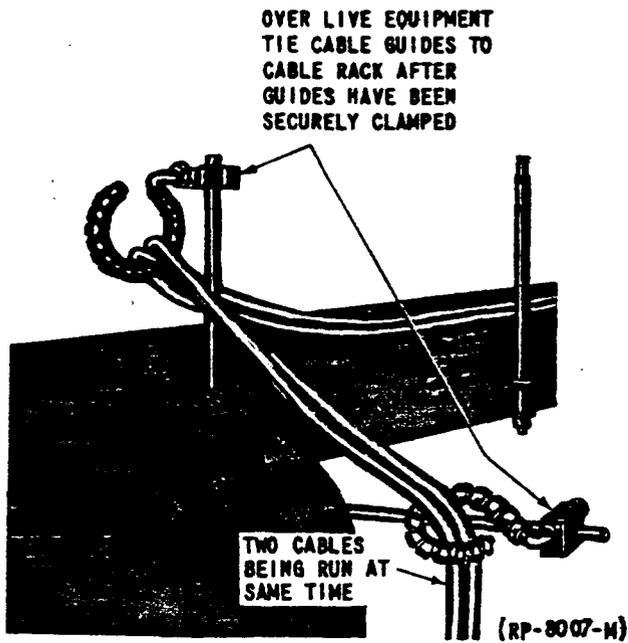


FIG. 17 METHOD OF MOUNTING CABLE GUIDES AND BRACKETS (PAR. 3.62)

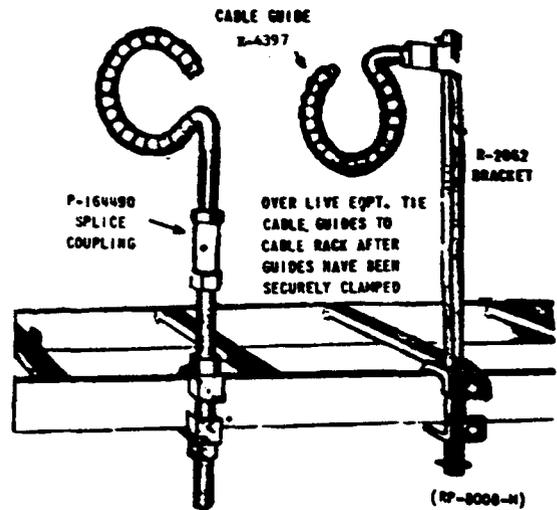


FIG. 18 METHOD OF MOUNTING CABLE GUIDES AND BRACKETS (PAR. 3.62)

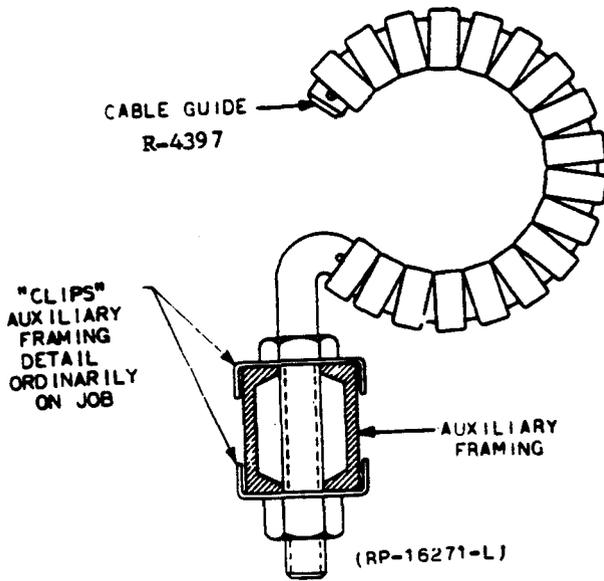


FIG. 19 METHOD FOR SECURING CABLE GUIDES ON CHANNEL AUXILIARY FRAMING (PAR. 3.62)

3.7 Cable Support at Turns

3.71 At turns and junctions of horizontal resting runs where the turn of the cables is such that proper support is not provided for the cables by the cable rack cross straps, place 1/8" x 1" bars diagonally across the racks to support the cables, as shown in FIG. 20.

3.8 Preliminary Planning and Temporary Talking Circuit

3.81 Before running cables on ladder type cable racks, determine the clipping or securing arrangement so that anchor clips or cabling retaining brackets may be assembled on the racks before cabling is started. Refer to Section 300 for cable securing and clipping requirements and for cable retaining bracket requirements when they are specified.

3.82 Talking Circuit Between Floors:

For long runs of cable between floors, it is recommended that a talking circuit be established. Refer to Handbook 50 for method of setting up the talking circuit.

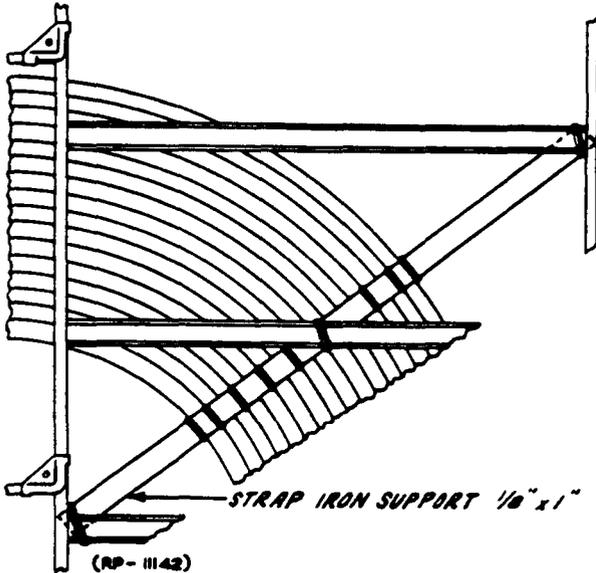


FIG. 20 METHOD OF SUPPORTING CABLES AT HORIZONTAL TURNS (PAR. 3.71)

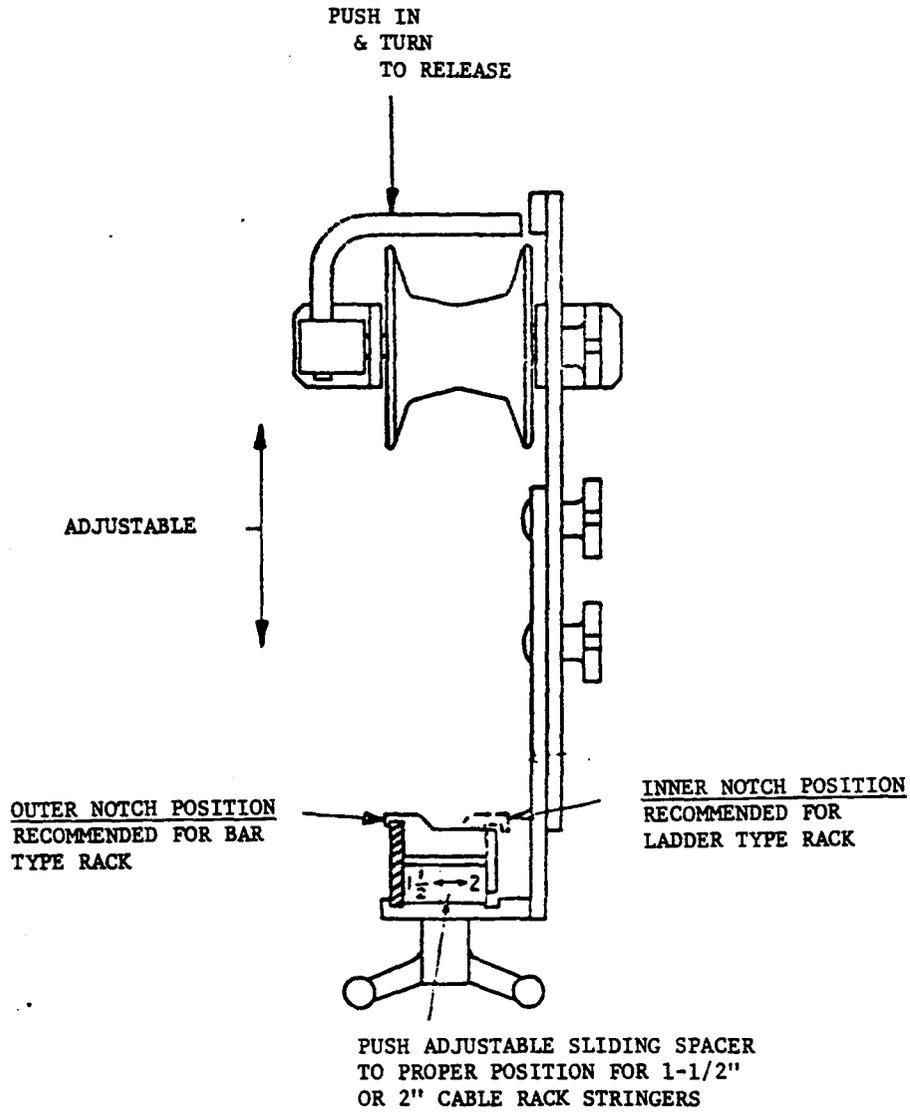


FIG. 21 HORIZONTAL ASSEMBLY R-4321
(PARS. 3.631, 3.632)

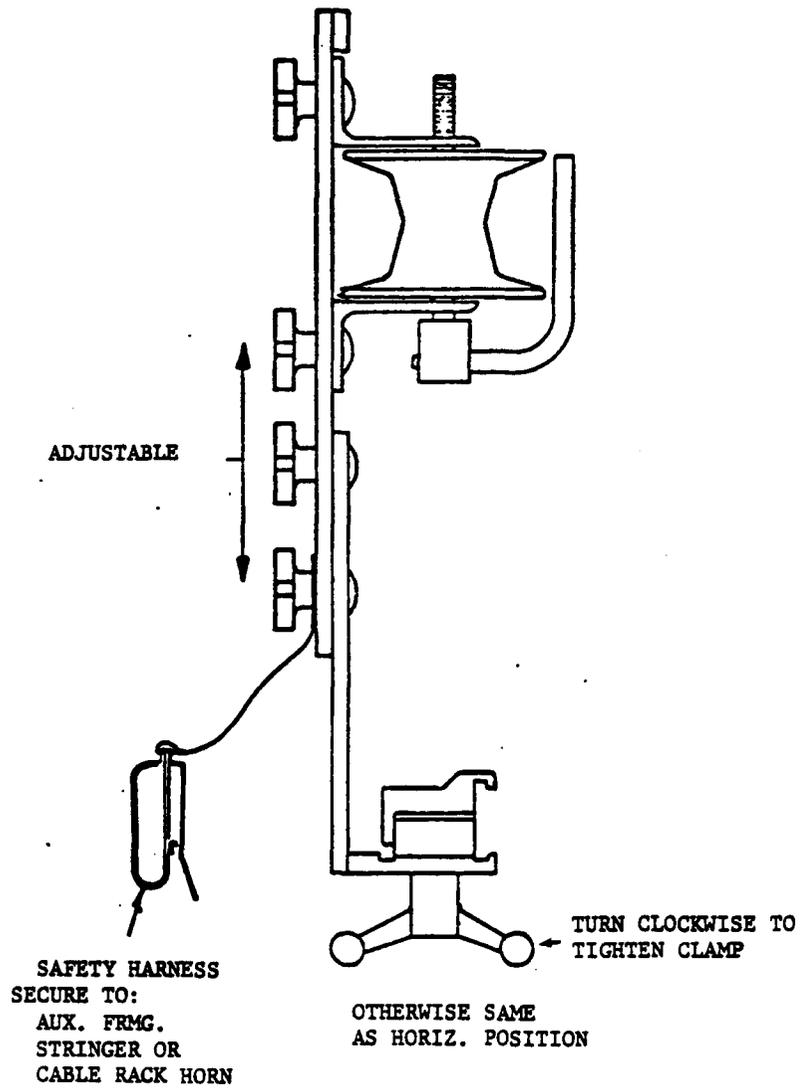


FIG. 22 VERTICAL ASSEMBLY R-4321
(PARS. 3.634, 3.636)

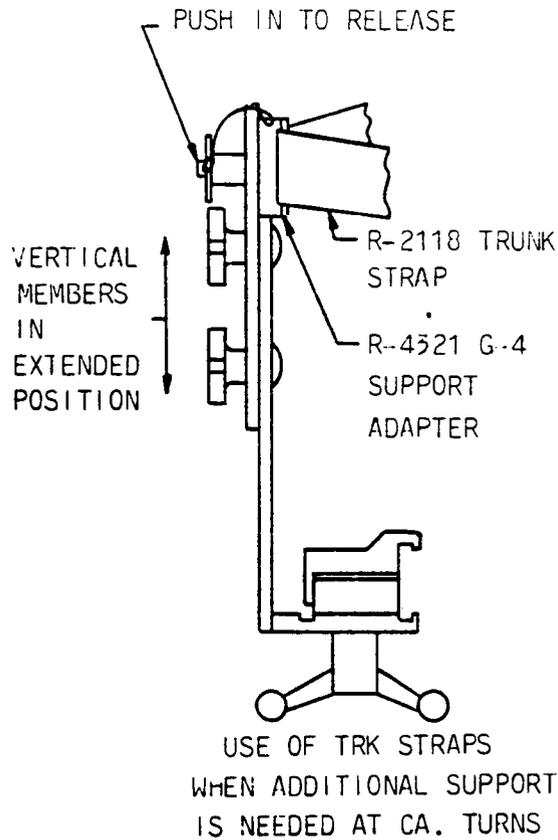
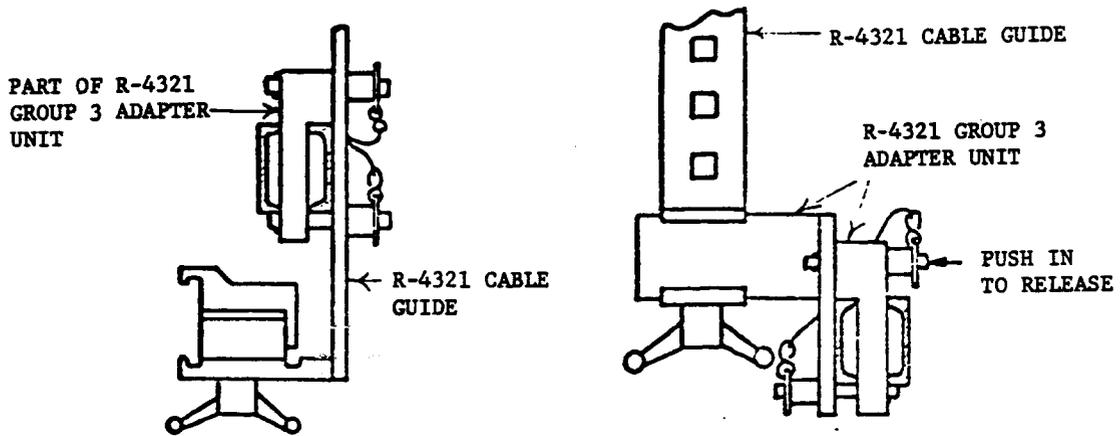


FIG. 23 R-4321 G4 SUPPORT ADAPTER (PAR. 3.635)



ADAPTER UNIT FOR RUNNING CABLE PARALLEL TO AUXILIARY FRAMING. (AS ON CROSS-AISLE RACKS)

ADAPTER UNIT FOR RUNNING CABLE PERPENDICULAR TO AUXILIARY FRAMING. (AS ON OVER-FRAME OR OVER AISLE RACKS)

FIG. 24 R-4321 G 3 ADAPTERS FOR MOUNTING BRACKETS ON AUXILIARY FRAMING BARS (PAR. 3.633)

4. VERIFICATION

VERIFICATION ITEMS AND BRIEF STATEMENT REQUIREMENTS		REFERENCE	
		Par. No.	Fig. No.
4.1	<u>Protection to Prevent Injury to Cables</u>		
	<u>General</u>		
4.11	Cables shall be protected at all locations where they bend sharply around or run across edges of metalwork. (Exceptions: tubular cable rack and roll formed straps).	3.511 3.565 3.566	
4.12	Specific fiber details or 1/64" vulcanized gray fiber used for protection.	3.5111, 3.5112 & 3.512	
	<u>At Ladder Type Racks</u>		
4.13	When cables cross stringers and drop 3" or more, P-328952 Insulators applied.	3.521	3, 4
4.14	Where cables pass through cable racks, P-68616 Fiber Insulators applied.	3.522	5
4.141	The heads of R-4265 Nylon Ties used to secure P-68616 Insulators shall be positioned at the underside of the cable rack.	3.5222	5, 8, 9
4.15	Where cables pass over cable rack stringers, framing bars and similar narrow bars and offset to a level 3 or more inches lower, apply protection at points of contact of both levels.	3.523	3
4.16	At outside bends or offsets in cable racks (horizontal to vertical downward), P-68616 Fiber Insulators on cable rack straps as follows:	3.524	8
	(a) For all cable types except flat-type on edge, when the radius of the inside cables is 5" or less and ultimate depth is 8" or more.		
	(b) For cable runs consisting of flat-type on edge (232, 241, 242, and similar types), provide the protection when the turns have a radius of 12" or less.		
4.17	At inverted sections of cable rack, P-68616 Fiber Details on last regular straps and when ultimate height of cabling will be 4" or more.	3.525	9
4.18	Ends of stringers on cross-aisle cable racks run non-continuously over aisles at higher level than cable racks over the frame.	3.526	6

4. VERIFICATION (Cont'd)

VERIFICATION ITEMS AND BRIEF STATEMENT OF REQUIREMENTS		REFERENCE	
		Par. No.	Fig. No.
<u>At Bar Type Cable Racks</u>			
4.19	At all locations where cables turn off cable rack and drop 3" or more, apply protection as follows.	3.531	
4.191	Where cables cross cable rack stringers, apply P-408642 Fiber Insulators whether or not cables are in contact w'th the stringers initially.	3.5311	3,10,11 12
4.192	<u>At over-aisle cable racks:</u> When cables drop off rack over cable rack straps (horns), apply R-4254, Detail 3 Insulator to the horizontal and vertical portions of the straps over which cables drop.	3.5312	13
4.193	Newly installed extension sleeves equipped with 84032304 Finishing Caps.	3.5313	
4.194	<u>At over-frame cable racks:</u> When cables turning off cable rack are in contact with the vertical strap, R-4254, Detail 4, PVC Insulation applied to the vertical portion of the strap. <u>NOTE:</u> Not required when original cables are not close to straps and protection can be added for future cabling when required.	3.5314	
4.195	<u>At cross-aisle racks:</u> When cables drop through rack over a strap or sheet metal plate, protection applied as follows: (a) For cross-aisle and over-aisle racks at the same level. (b) For cross-aisle 2" higher than over-frame rack. (c) For cross-aisle racks 2" higher than over-frame rack.	3.5315	11 10 12
4.196	At "T" intersections of cross-aisle to over-aisle or over-frame racks, protection applied to the stringers and the vertical portion of the over-aisle or the over-frame cable rack straps within the intersection as follows. (a) When cross-aisle rack is 2" higher than over-aisle or over-frame rack, R-4254, Detail 1 or 2 Insulator on the cut ends of the cross-aisle rack. (b) When the cross-aisle rack is at same height as over-aisle rack, P-408642 Insulators on the over-aisle cable rack stringer within the intersection. (c) P-30H094 Finishing Caps on cable rack straps within the intersection as follows: (1) At over-aisle racks (2) At over-frame racks, on the exposed portion of the strap below the finishing cap 3/4" rigid plastic tubing (RM-552417).	3.54 3.541 3.542 3.543 3.543 3.543	 10,12,14 15 14, 15 10

4. VERIFICATION (Cont'd)

VERIFICATION ITEMS AND BRIEF STATEMENT OF REQUIREMENTS		REFEPE NCE	
		Par. No.	Fig. No.
4.197	Rigid PVC 3/4" Tubing, RM-552417, on all hanger rods at locations where cables turn off the rack. The tubes should be long enough to adequately protect the ultimate cabling; and, as far as practicable, tubes on the same run should be uniform.	3.55	
4.2	<u>Cable Support</u>		
4.21	At turn and junctions of horizontal resting runs, 1/8" x 1" bars are provided, as required.	3.71	20

→Indicates new or changed information

┌Vertical lines at side of paragraphs
└indicate requirements

Engineering Planning Manager
(Installation)

Reason for Reissue:
General Revisions.