

## PLACING METALLIC RISER AND BUILDING CABLE

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**1. GENERAL**

**1.01** This practice describes some of the methods, tools, and materials associated with placing and supporting metallic riser cables in multistory office and apartment buildings.

**1.02** This practice is reissued to:

- Add precautions
- Delete reference to lightguide cable (see Practice 627-610-230).

Revision arrows are used to denote significant changes.

**1.03** All installations shall be made in accordance with the NEC\* (National Electrical Code) or the local building codes. If the local codes are more restrictive, use the more restrictive code. If local codes are less restrictive, use the NEC. Metallic communications circuits are covered in the NEC, Article 800. AT&T has UL (Underwriters Laboratories) Listed cables (metallic and fiber) which meet the NEC standards.

**1.04** †The NEC requires that all cable penetrations through fire-resistance rated walls, partitions, floors, or ceilings shall be firestopped. Riser cables must have a fire-resistant covering capable of preventing the propagation of fire from floor to floor. If special circumstances require the use of polyethylene-jacketed riser cables, the cables must be placed in noncombustible conduit tubing or placed in a fire-proof shaft with firestops at each floor.

**1.05** In buildings, use a UL Classified firestop. A list of UL Classified firestop assemblies is published in the Underwriters Laboratories Building Materials Directory under "Wall or Floor Opening Protective, Multiple-Cable Devices and Wall or Floor Opening Protective, Multiple-Cable Systems." If the penetration and firestop are part of an outlet box assembly, use a UL outlet box assembly. A list of classified outlet box assemblies is published in the Underwriters Laboratories Fire-Resistance Directory under "Outlet Boxes and Fittings Classified for Fire Resistance."

**1.06** The building owner or agent is responsible for firestopping in accordance with applicable codes, laws, and ordinances. Local procedures should be established to provide appropriate documented notification to the responsible parties once outside plant facilities are in place.‡

\* Registered trademark of the National Fire Protection Association.

**2. PRECAUTIONS**

**2.01** Use of unapproved building cable can create a fire hazard. Refer to "Fire Safety Considerations of Cable in Buildings," Practice 620-100-001.

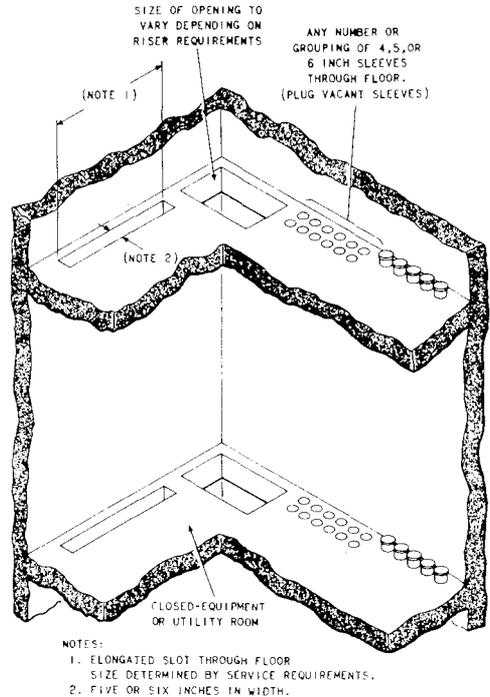
**2.02** Suitable protective clothing such as gloves and safety glasses should be worn when installing cable.

**2.03** Exercise caution when installing riser cable to prevent sheath damage (kinks, cuts, and abrasions). The metallic reels should be blocked so that they cannot roll accidentally.

**3. BUILDING CONSTRUCTION**

**3.01** The methods and hardware used to place and support riser cable in multistory office and apartment buildings are usually determined by the type of riser openings between floors and the space allocated for mounting telephone equipment. Usually, the location, the room or closet space, and the type of opening between floors are determined at meetings with the owner or agent, the architect, and communication company representatives and are incorporated into the building construction plans.

**3.02** Typical types of openings provided between floors in high rise buildings are illustrated in Fig. 1. These openings may vary from 5- or 6-inch wide elongated slots between floors to larger rectangular shaped openings. There may be a series of 4-, 5-, or 6-inch diameter sleeves through the floors or groups of sleeves in parallel. The number of sleeves varies with the service requirements of the building. Usually these types of open floor construction are aligned vertically from the basement to the uppermost or setback floors, and are located in a closet or small room on each floor. It is important to maintain separations between telephone and electric plant where both utilities use the sleeves, slots, or openings between floors.



**Fig. 1 — Typical Riser Cable Openings**

**3.03** In some new buildings, and in many of the older buildings, the area allocated for riser cables may be an open shaft similar to an elevator shaft which extends from the basement to the top floor. Space in the shaft may be allocated for all utilities, i.e., gas, water, and electric. In addition, space may also be occupied by heating pipes or ducts, air conditioning, and waste pipes. Where this condition exists in older buildings, every effort should be made to place new cables so they avoid all obstructions, sharp corners of ducts, and heat or electrical piping. In new buildings, group the riser cables in a corner of the shaft whenever practical.

#### 4. PREPARATION

**4.01** The consent of the property owner or agent is required regarding the methods and equipment to be used in placing riser cables. This matter should be discussed with the property owner or agent, following a preliminary survey of the premises as it may be the deciding factor in selecting the method and equipment to be used in placing the cable. In making the preliminary survey and in planning the job, the following items should be given careful consideration:

- (a) Location of available space for setting up cable reel and preparation of cable
- (b) Weight and length of riser cable
- (c) Available apparatus for placing riser cable
- (d) Where cable is to be placed, e.g., in utility rooms, closets, open shaft, or in conduit
- (e) Location of the backboard used for terminating riser cable pairs.

**4.02** The location of available space in a building for the reel setup and preparation of cable is important for the following reasons:

- (a) It may be advantageous to pull the cable up into the riser space if the basement or first floor is not occupied and there is sufficient space for preparing the cable and placing it in a safe manner.
- (b) Lowering of the cable into the riser space from an upper story may be necessary if the basement or first floor is occupied or is not suitable for handling, preparing, and placing the cable.



**◆ A cable reel brake must be used when lowering cable from the upper story. ◆**

(c) It may be necessary to place the cable from an intermediate floor when the top or bottom floor is not available or the conditions for handling and placing the cable are not satisfactory. The intermediate floor may have more working space and no obstructions which interfere with the cable work.

**4.03** In connection with placing riser cables, it is necessary to determine their diameter and weight. This information is included in Practice 626-107-006 which covers cable sizes and reel lengths.

**4.04** Before placing a riser cable, clear the closet or shaft of all temporary structures and any obstructions that may interfere with placing cable in a safe and satisfactory manner. If the shaft is occupied by foreign pipes, cables and wires, or similar facilities, arrange to have these obstructions moved, tied, or secured out of the way to obtain the greatest clearance for the technicians. It is advisable to obtain space for the riser cable in an inside corner, whenever practicable.

#### 5. APPARATUS FOR PLACING RISER CABLES

**5.01** Where building conditions permit and electric power is available, the riser cable can be raised satisfactorily by using a portable electric winch. This is particularly applicable when long heavy riser cables are involved and freight elevators cannot accommodate the larger size cable reels. Placing long lengths of riser cables in one piece eliminates costly splicing.

5.02 Portable electric powered winches, similar to the one shown in Fig. 2, are capable of pulling up to 5000 pounds. They operate on 110-120 volts from any convenient electrical outlet or extension cord. These portable winches are lightweight compact units that are easily disassembled, transported, and reassembled. The versatile design of electric powered winches permits setting up for almost any type of pull, including those in tight places, e.g., hallways, closets, and utility rooms.

5.03 Figure 3 illustrates the use of an electric winch for pulling riser cables through a slot-type opening between floors. Figure 4 shows a winch being used for pulling cable through interior conduit. The front sheave assembly is rigidly locked to the steel conduit for a stable pull. Most electric powered winches are equipped with both high and low speed drums for cable pulling speed. Refer to Practice 081-510-101 for working load limitations that may be placed on any size of manila rope.

5.04 Because of the long lengths of riser cable often used in high-rise buildings and slot or sleeve opening construction, block and tackle is not recommended as a means for pulling or lowering riser cables. However, for conditions that may require the use of tackle for short or light pulls, refer to Practice 081-510-203 which describes the rigging of tackle and snatch blocks.

## 6. PLACING SUPPORTING STRAND

6.01 Where the openings for riser cable between floors are vertically aligned, and hand drilling in reinforced concrete walls would be costly and time-consuming, the riser cable may be supported by and secured to a suspension strand. On open shaft building construction, safety considerations may also favor strand supported riser cable.

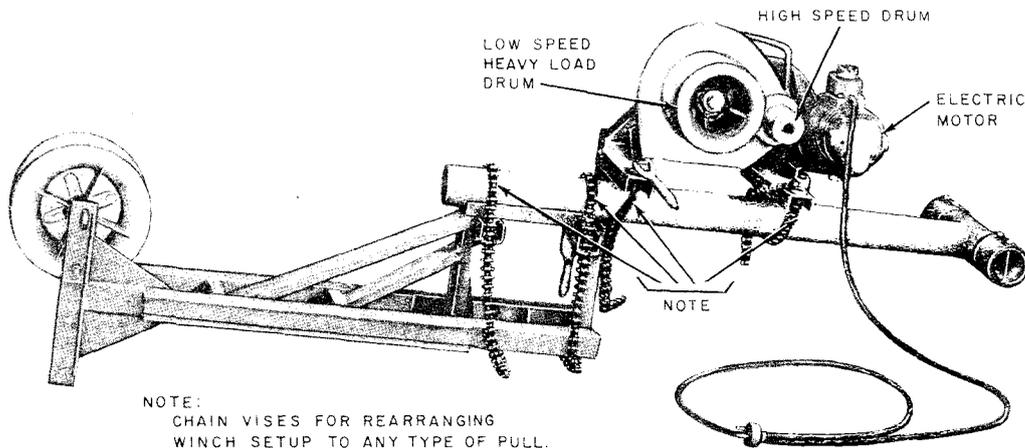


Fig. 2—Electric Power Winch

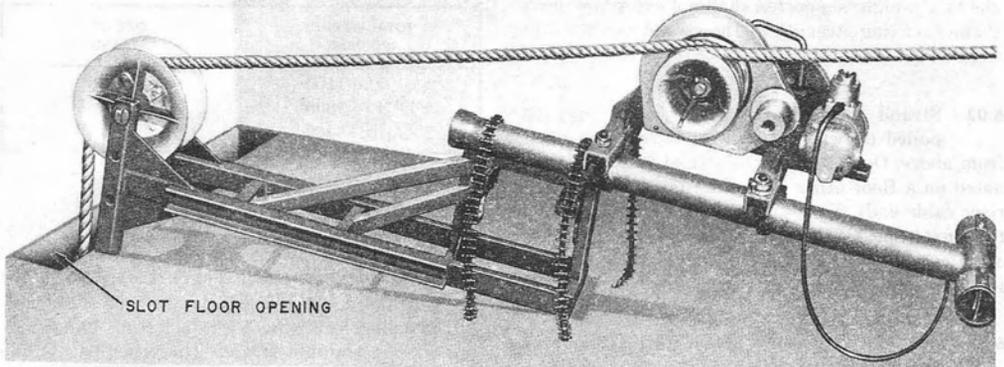


Fig. 3—Raising Cable With Winch

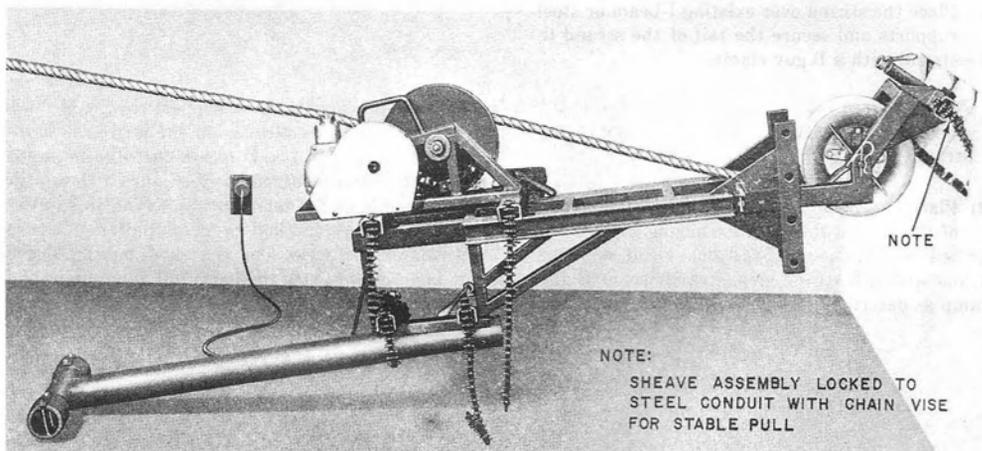


Fig. 4—Pulling Cable in Conduit

6.02 The size of strand selected to support riser cable is determined by the total weight of the riser cable, branch cables, strand, and closures used. The total weight supported shall not exceed one-half of the breaking strength of the strand as shown in Table A.

6.03 Strand for supporting riser cable may be pulled up with a winch or lowered by hand from above. Occasionally, the strand may be terminated on a floor other than the floor on which the riser cable ends. For example, the strand might be terminated on the second or third floor while the cable continues into the basement or in conduit to junction boxes on a lower floor.

6.04 Place the strand terminating attachments at or beyond the upper end of the riser cable run if possible. Take advantage of permanent building structural members such as I-beams. Although the hardware required to terminate the strand is determined by local conditions, a few approved methods for dead ending riser cable supporting strand are listed as follows.

- (1) Place the strand over existing I-beam or steel supports and secure the tail of the strand to the strand with a B guy clamp.

**Note:** Place 1/2- or 5/8-inch thimbles on the edges of the I-beam to prevent damage to the strand.

- (2) Place 1/2- or 5/8-inch wall straps at each end of the strand run with anchoring devices described in Practice 627-610-200. Dead end the strand with a B strand grip, strandwise, or B guy clamp as described in Practice 627-240-212.

TABLE A RISER CABLE STRAND LIMITS	
TOTAL WEIGHT (POUNDS)	SIZE OF STRAND
0 to 1100	2.2M
1101 to 3000	6M or 6.6M
3001 to 5000	10M

(3) Where sleeve-type openings are provided and the cable will be terminated before the end of the strand, a steel plate, U channel iron or an angle iron drilled locally for a 5/8-inch S guy bolt can be used to terminate strand. The other end of the strand may be terminated on wall straps as described in (2) above.

(4) Under the conditions described in (3) above, a steel pipe can be placed across the sleeve or slot opening and the strand looped over the pipe. Terminate the end of the strand with a B guy clamp.

6.05 For placing strand to support riser cable, it is not necessary to tension the strand to standard stringing tensions. **Tension the strand sufficiently to remove slack only.** Figure 5 shows the various methods for terminating strand to support riser cable. Any method or combination of these methods can be used. The B strand serving sleeve may be used to secure the loose tail when using the B guy clamp.

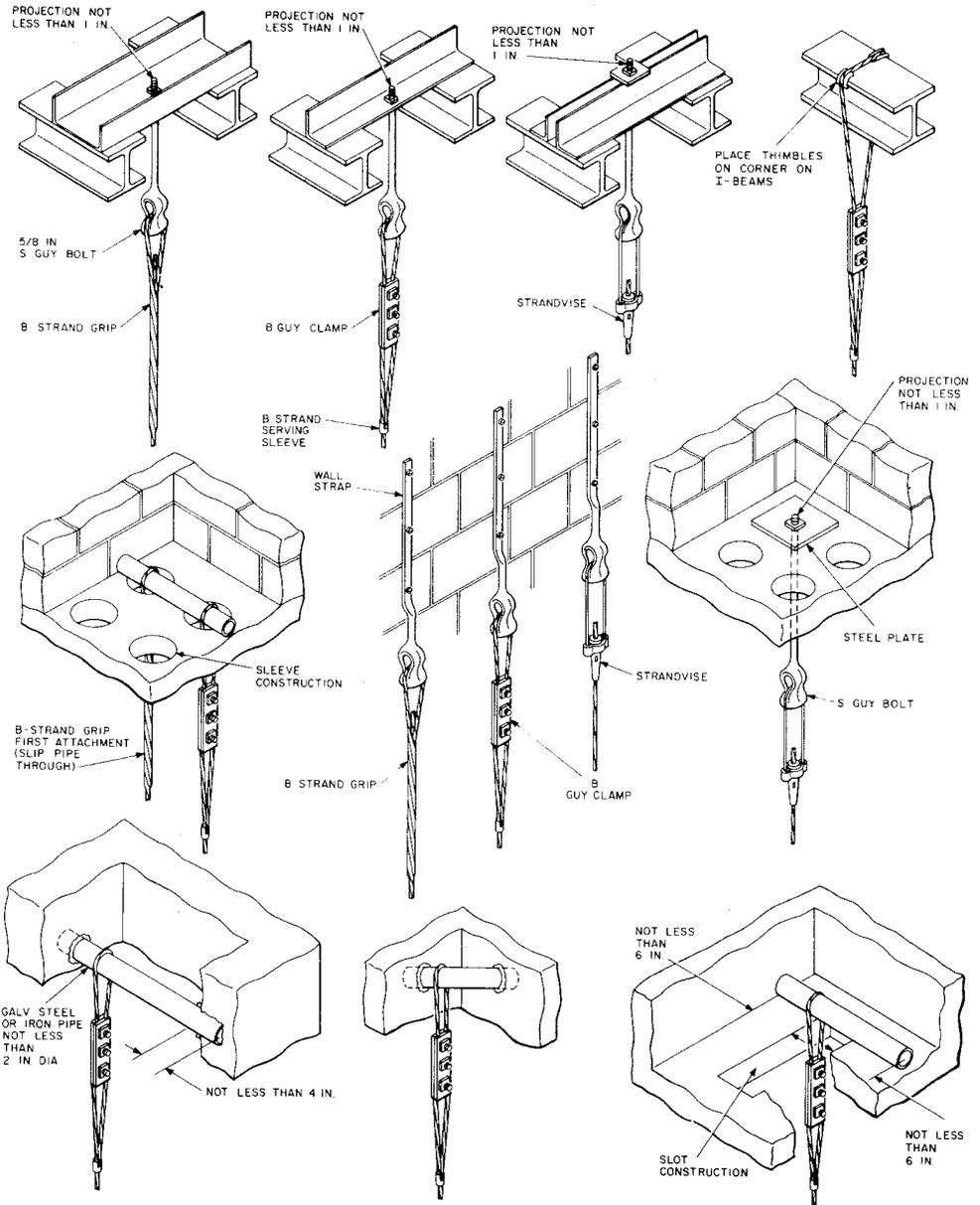


Fig. 5—Terminating Support Strand

6.06 To distribute the weight of the riser cable equally on the suspension strand, intermediate supports should be placed at each third floor of the riser cable run. Figure 6 illustrates three meth-

ods for providing the intermediate supports. Practice 627-240-213 describes the placing of B false dead ends.

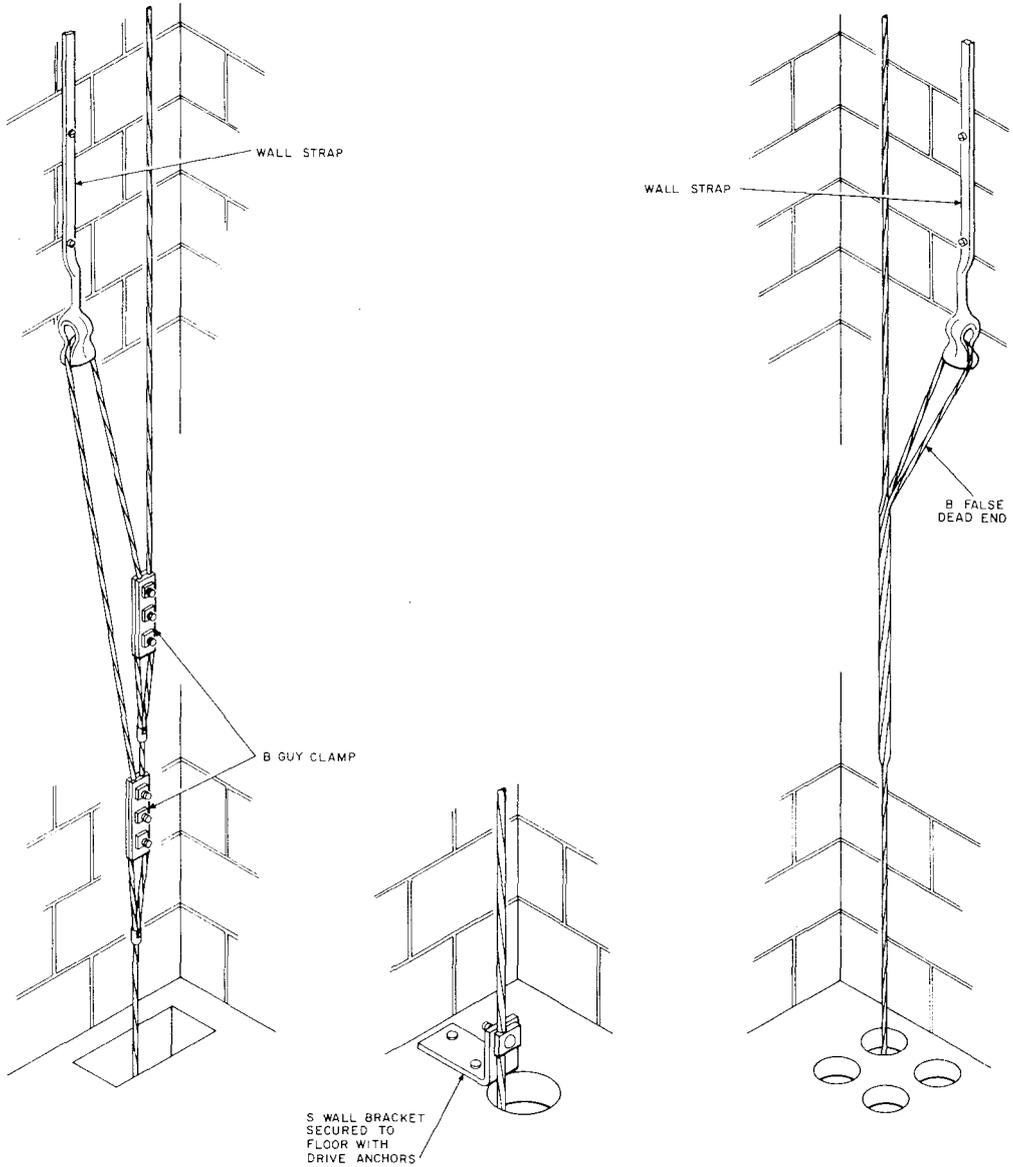


Fig. 6—Intermediate Strand Supports

## 7. METALLIC CABLE

### A. Placing

7.01 Depending on the type of floor openings provided (Fig 1) and existing conditions at the construction site, the riser cable may be pulled up to the top floor using a suitable winch (Part 5) or lowered by hand from the top floor using a cable shoe or cable sheave.

7.02 To raise the riser cable with a winch, attach the winch line to the pulling eye (if provided as shown in Fig. 7), or pull the riser cable up using a cable grip or a core hitch. To ensure a firm grip on the sheath of the cable, interlace the end of the cable grip to the cable sheath at one or two points with 049 steel construction wire (Fig. 8). Two tightly wrapped layers of vinyl tape placed over the end of the cable grip and the cable sheath will also provide a firm pulling grip.

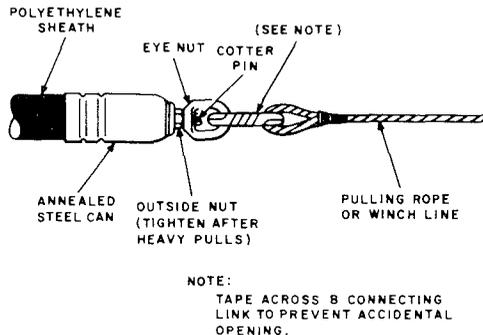


Fig. 7—Attaching to Pulling Eye on Metallic Cable

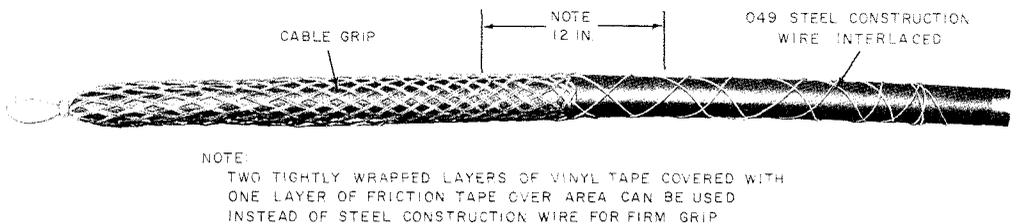
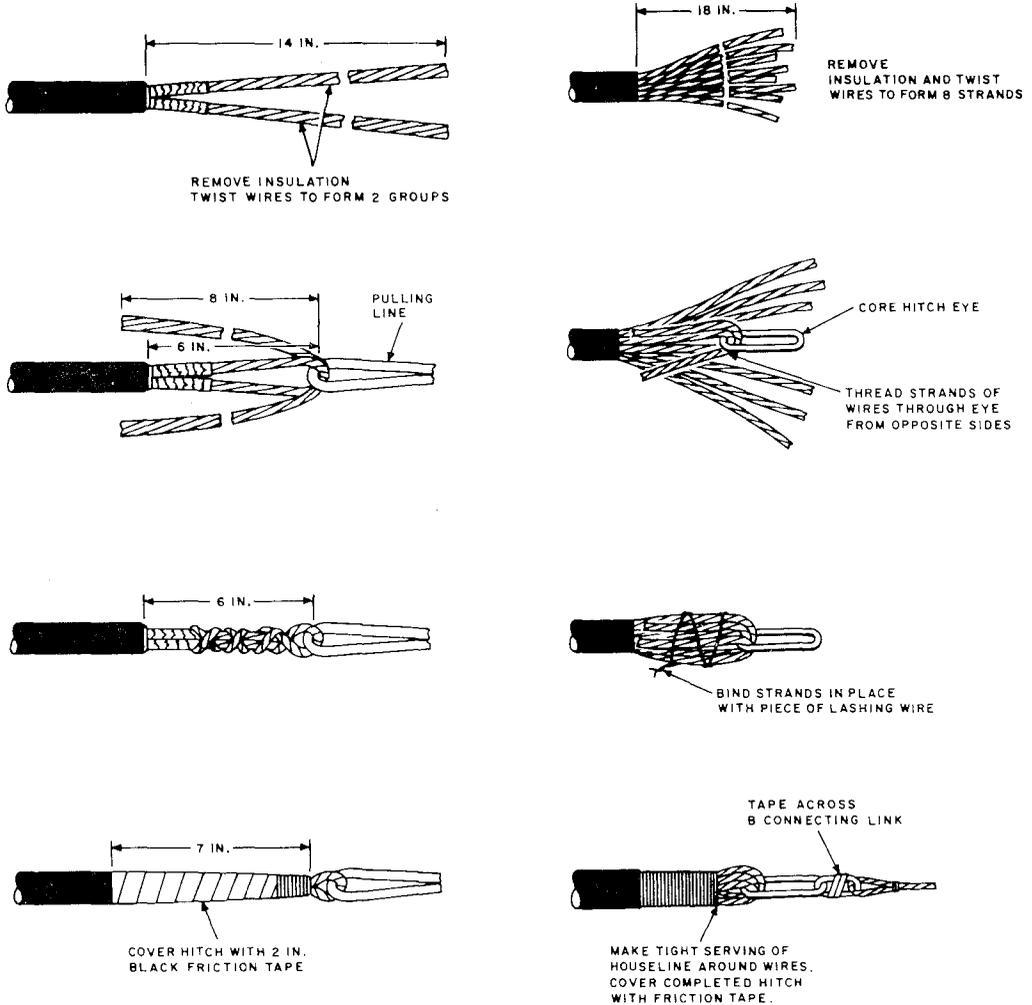


Fig. 8—Reinforced Cable Grip for Metallic Cable

**7.03** For long lengths of riser cables which would result in heavy strains being placed on the cable sheath, a core hitch should be used if a pulling eye is not attached. The core hitch applies the load

directly on the conductors of the cable instead of on the cable sheath. Figure 9 illustrates two methods for constructing core hitches.



◆Fig. 9—Types of Core Hitches for Metallic Cables◆

7.04 To lower the riser cable in a building, the reel of cable must be delivered to the upper floors. If possible, the inside end of the cable on the reel should be securely tied to the reel itself to prevent the cable from leaving the reel. When the cable has been lowered to the bottom of the run, temporarily suspend and secure the cable with rope or block and tackle. Then remove the remaining coils of cable on the reel and pull the cable back up to its final location by hand. Secure the cable to the strand or building walls by any method described in this practice.

7.05 Figure 10 shows a *cable sheave* used while lowering a riser cable. Technicians will direct the end of the cable through the openings or sleeves at each floor as the cable is lowered. When the cable is lowered three or four floors, block the movement of the sheave with a steel bar or bolt to provide a drag on the cable being lowered. Once the sheave is blocked, only a slight hand restraining pressure is required on the cable to overcome the pull created by the weight of the cable. The riser cable is thus lowered smoothly floor by floor until the end of the cable run is reached.

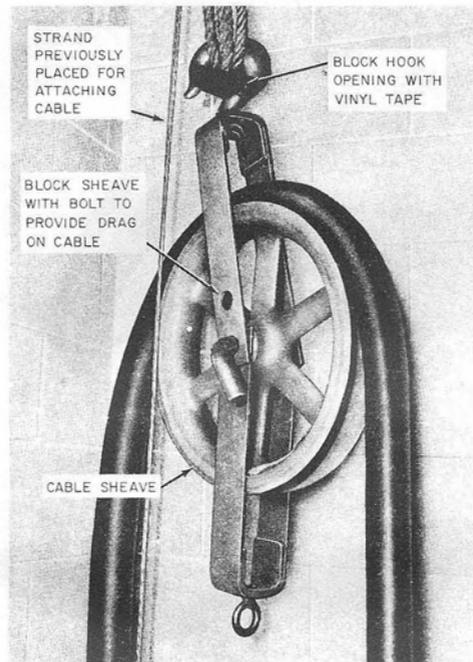


Fig. 10—Lowering Metallic Cable With Cable Sheave

7.06 The *cable shoe* (Fig. 11) may also be used to lower a riser cable by hand. Place the reel of cable on a reel platform or reel jacks about 30 or 40 feet from the sleeve opening (Fig. 12). The pull of the weight of the cable is offset by the drag of the cable along the floor and by controlling movement of the reel by hand. The area where the cable passes across the floor should be swept clean to prevent abrasion of the cable sheath. The drag of the cable

passing over the cable shoe has a similar effect as use of a blocked sheave. However, the shoe can only be used at building sites where sleeves are provided between floors.

◆**Note:** A technician should be positioned close to the cable reel to assist in payout while installing cable and to observe cable reel in rollers.◆

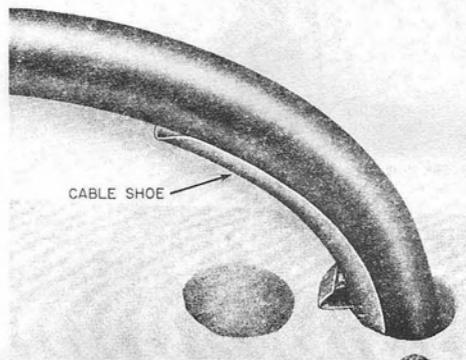


Fig. 11—Lowering Metallic Cable With Cable Shoe

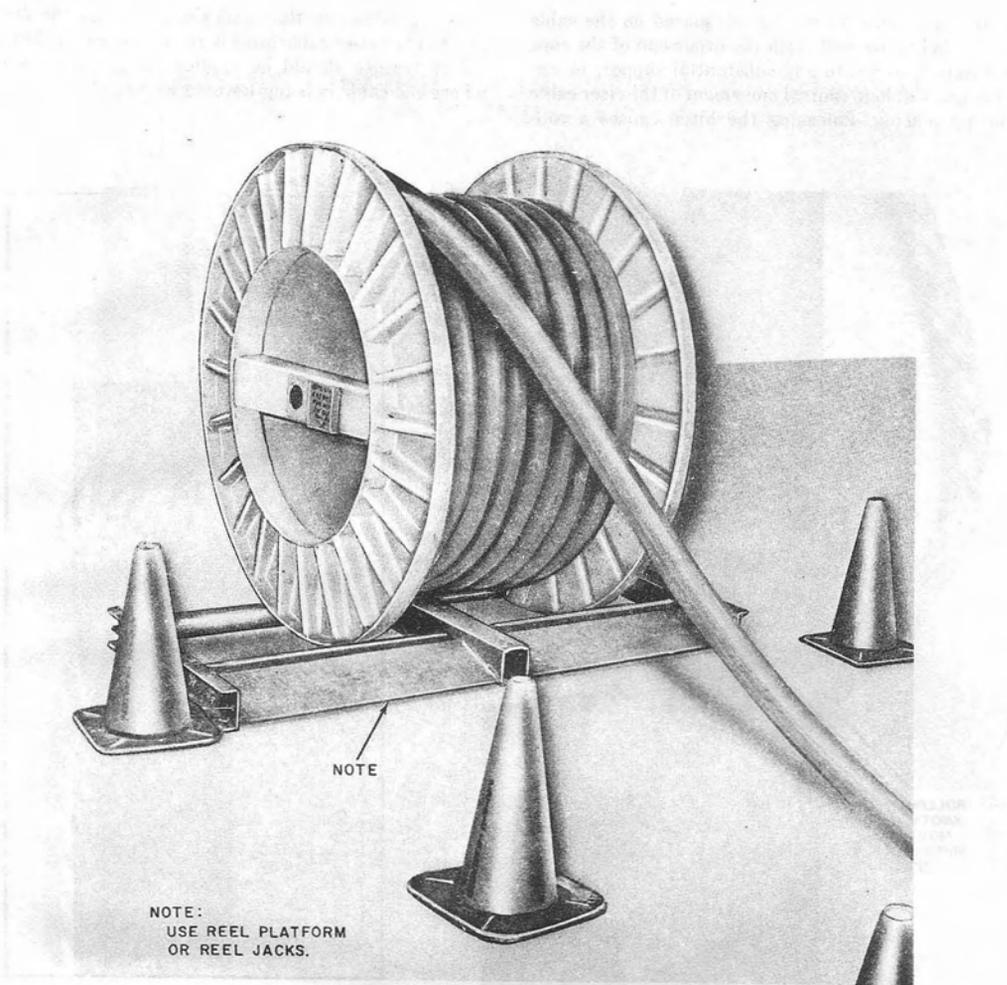


Fig. 12—Using Reel Platform for Metallic Riser Cable

7.07 A rolling hitch (Fig. 13) placed on the cable being lowered, with the other end of the rope securely fastened to any substantial support or anchorage, will help control movement of the riser cable during placing. Releasing the hitch causes a con-

stricting action on the cable thus stopping the descent of the riser cable quickly in an emergency. This safety feature should be applied (sheave or shoe) where the cable is being lowered by hand.

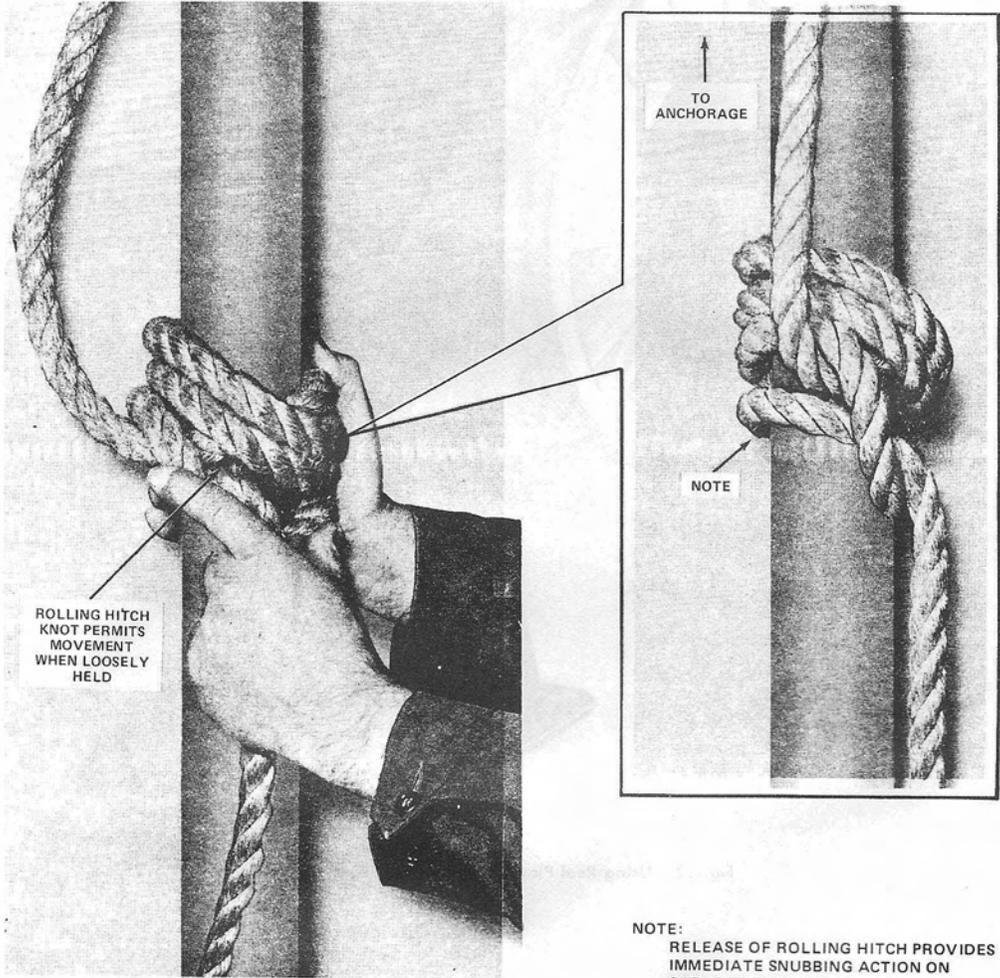


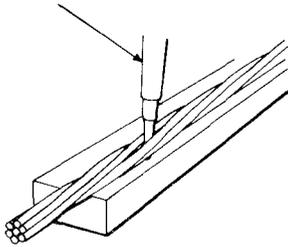
Fig. 13—Rolling Hitch for Metallic Riser Cables

**B. Attaching to Strand**

**7.08** When the suspension strand is placed and tensioned for supporting metallic riser cable as described in Part 6, tie the cable to the strand with 049 steel construction wire (Fig. 14).

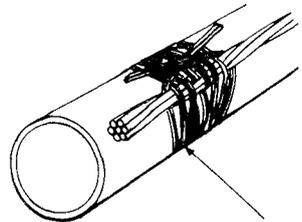
*Note:* The tie wires should be inserted between the lays of the strand before tensioning the strand.

SEPARATE WIRES OF STRAND BY MEANS OF A CENTER PUNCH OR APPROVED TOOL IN THE MANNER SHOWN BEFORE STAND IS INSTALLED



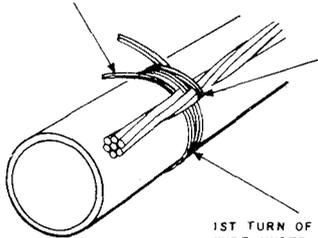
NOTE:

FOLD TWISTED PIGTAIL FLAT AGAINST STRAND AND COVER SHARP EDGES OF LASHED CABLE SUPPORT WITH VINYL TAPE AFTER TIE IS COMPLETE.



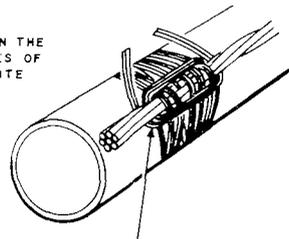
3RD TURN OVER STRAND  
4TH TURN UNDER STRAND

049 STEEL CONSTRUCTION WIRE

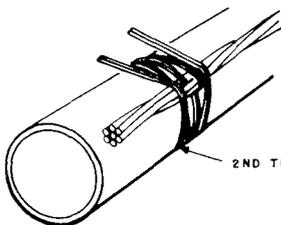


5 WIRES OF STRAND ON THE CABLE SIDE AND 2 WIRES OF STRAND ON THE OPPOSITE SIDE

1ST TURN OF DOUBLE TIE WIRE UNDER STRAND

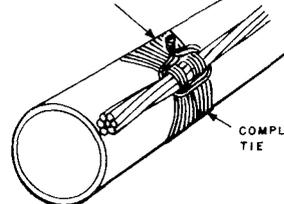


INSERT EACH END OF DOUBLE TIE WIRE BETWEEN STRAND AND CABLE FOR ONE COMPLETE TURN AS SHOWN



2ND TURN OVER STRAND

(SEE NOTE)



COMPLETED TIE

METHOD OF TYING CABLE TO SUPPORT STRAND

Fig. 14—Placing Cable Tie on Metallic Riser Cable

7.09 Begin tying the riser cable to the strand at the top floor or upper end of the cable. Work down each floor progressively to the lowest point of the cable. Place the ties approximately 3 feet apart with a **minimum of 3 ties per floor**. Straighten out any small kinks or bends in the cable before the tie is made.

7.10 Another method for securing the riser cable to the supporting strand is to use a B lashed cable support and D cable lashing clamp (Fig. 15) as follows:

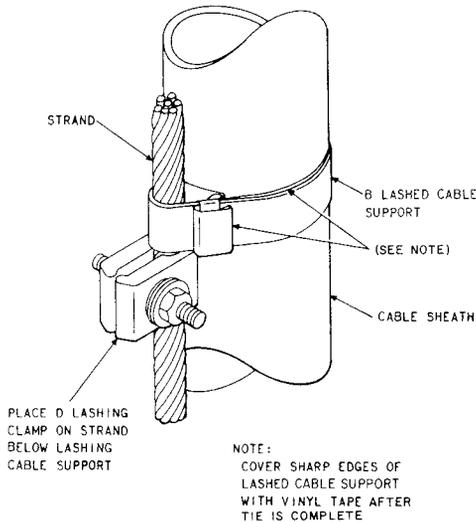


Fig. 15—B Lashed Metallic Cable Support

(1) Select a B lashed cable support that is long enough to make three complete turns around the riser cable and strand involved (Practice 627-340-101).

(2) Make the first wrap of the lashed support around the cable sheath **only** and thread the end through the buckle loop of the support.

(3) Make two additional wraps around **both** the cable and supporting strand passing the end of the strap through the buckle loop each time. Each wrap should be pulled up snugly with pliers.

(4) Before passing the third wrap through the buckle loop, lay the strap on the outside of the loop and pull the strap snug. Mark a point on the strap about 1-1/2 inches beyond the buckle loop and cut off the excess with splicing shears. Fold the strap under itself as shown in Fig. 15 and pass the folded end through the loop, thus completing the third wrap.

(5) **DANGER: To avoid injury, use pliers to pull the support tight.** Pull the support tight with pliers and bend the folded end back over the buckle loop. Place two turns of vinyl tape over the completed support to cover the sharp edges of the B lashed cable support.

**C. Supporting Without Strand**

7.11 Riser cable may be installed in high-rise buildings without a supporting strand by providing intermediate supports at every third floor or about every 35 feet along the cable run using split cable grips as described in paragraphs 7.13 and 7.14. Or the riser cable can be **fastened directly to the building walls** by placing cable ties or cable straps. Space the supports at the intervals indicated for each type of strap or tie in paragraphs 7.15 through 7.19. The latter method does not require intermediate cable supports because of the extensive use of ties or straps.

7.12 Install split cable grips (Table B) on the riser cable at every third floor or at every 35 feet or so in open shaft construction so the weight of the cable is distributed equally among the supports. After installing the intermediate cable supports as described in paragraph 7.14, place two cable ties or cable straps at each floor to dress the cable against the wall and to provide a neat appearance.

TABLE B SINGLE EYE — SPLIT GRIPS		
CABLE DIAMETER (INCHES)	CATALOG NUMBER	LENGTH (INCHES)
3/4 — 1	022-03-15	10-1/2
1 — 1-1/4	022-03-17	12-1/2
1-1/4 — 1-1/2	022-03-18	14-1/2
1-1/2 — 1-3/4	022-03-19	15-1/2
1-3/4 — 2	022-03-20	16-1/2
2 — 2-1/2	022-03-21	19-1/2
2-1/2 — 3	022-03-22	21-1/2
3 — 3-1/2	022-03-23	23-1/2

### Split Cable Grips

7.13 Single eye split cable grips, obtained commercially from the Kellems Company, Stonington, Connecticut, can be used to provide the intermediate riser cable supports. Refer to Table B for the size and catalog number of the split cable grip required for the various cable diameters. Figures 16 and 17 illustrate the materials and hardware used in conjunction with split cable grips and the methods for terminating the grips.

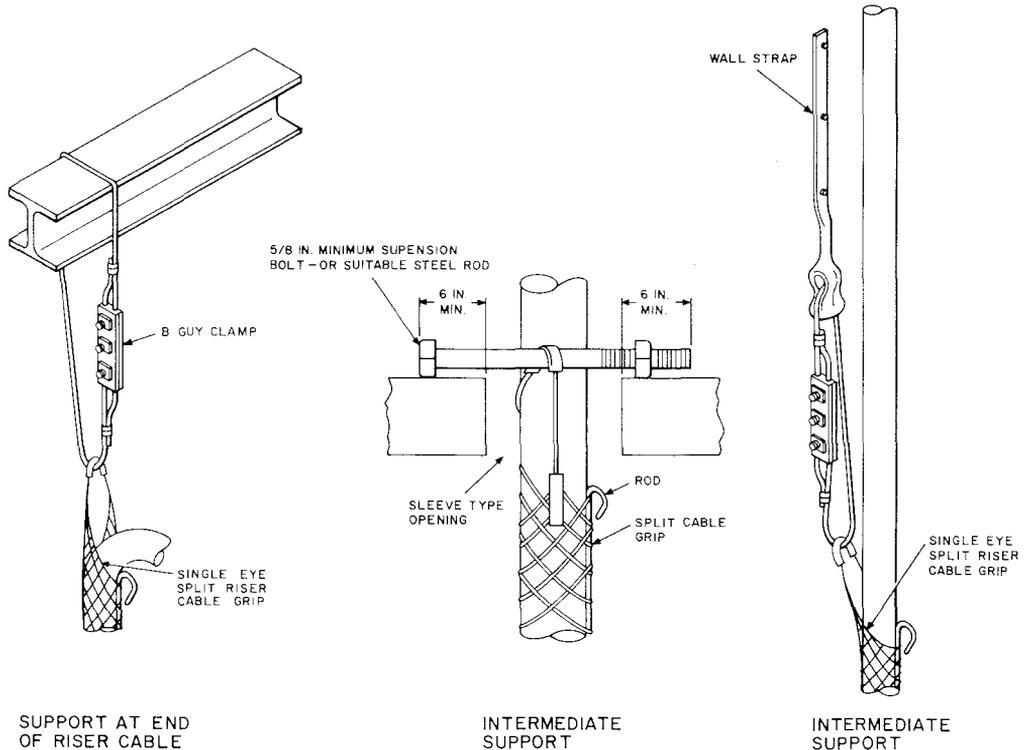


Fig. 16—Split Intermediate Cable Grip Supports for Metallic Riser Cable

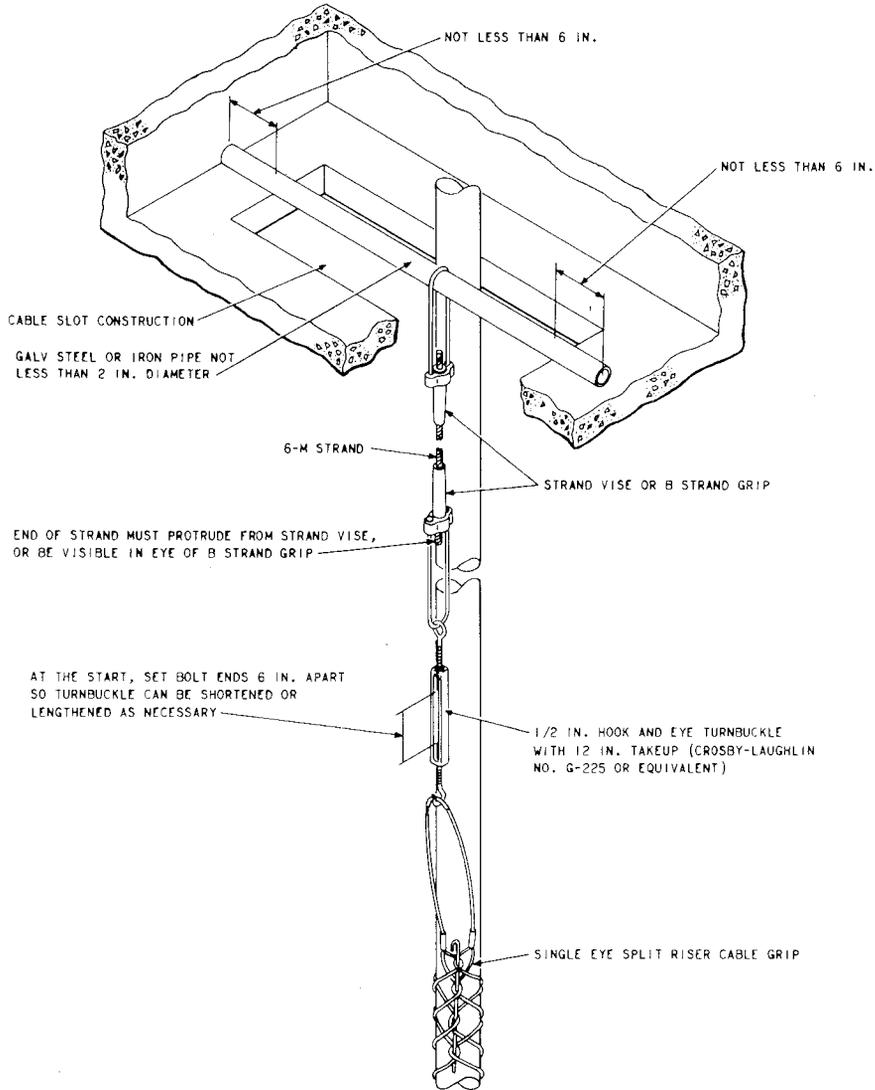


Fig. 17—Intermediate Cable Grip Supports for Metallic Riser Cable

7.14 To place the split cable grips, proceed as follows:

- (1) Obtain the proper size split cable grip for the riser cable being supported. (See Table B.)
- (2) Raise the riser cable above the actual terminating point and hold it at this position. Use a block and tackle to hold the cable at this position.
- (3) Starting three floors or about 35 feet from the bottom of the riser cable, install the hardware and position the split grip. Interlace and lock the split cable grip around the cable sheath with the steel rod provided with the grips.
- (4) Lower the riser cable to cause the grip to constrict and hold the cable firmly. Attach the cable grip to a suitable mounting surface.
- (5) Repeat Steps (1) through (4) at every third floor or 35 feet until the cable is equally supported along its entire length.
- (6) At splice locations, lower the required slack cable as described in Step (4).
- (7) When the cable has been properly supported at each location, place two ties or cable straps at every floor to dress the cable to the wall as indicated in paragraph 7.12. For best results, place one tie or strap near the floor opening and one near the ceiling opening.

7.15 The type of wall construction will determine which type of tie or strap is best suited for securing the riser cable directly to the walls. Start fastening the riser cable to the building walls at the top of the cable run using the type of tie or strap selected. Working downward, place the ties at the intervals indicated for that particular tie or strap. Continue to place the ties until the entire length of the riser cable is securely fastened. Remove kinks or bends in the cable during the tying operations.

#### Cable Ties—Reinforced Concrete Walls

7.16 To make a wire tie, double a 24- to 30-inch

the center securely to a round head screw or drive anchor nail. The screw or nail is then firmly affixed to the concrete wall with lead or plastic anchors or drive anchors. See Practice 627-610-200 for the anchoring devices that are presently available. Wrap the two ends of the doubled wire around the cable sheath in opposite directions and form a pigtail as shown in Fig. 18. **Do not tighten excessively** as the wire may cut into the plastic cable sheath. Cut and dress the resulting pigtail of the tie toward the wall or the rear of the cable to prevent serious injury from the sharp ends. Space the ties not more than 20 inches apart. Cover sharp edges of ties with vinyl tape.

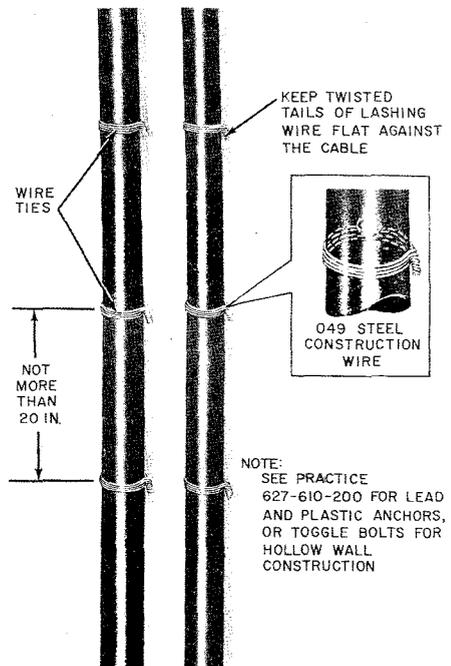


Fig. 18—Cable Ties to Wall

**Cable Ties—Hollow Walls**

7.17 On hollow building walls such as tile, cinder, or concrete block, or plaster over metal lath, use toggle bolts to support the cable wire ties. Complete the tie and dress the pigtail as described in paragraph 7.16. Space the ties not more than 20 inches apart.

**Cable Straps—Wood or Masonry Walls**

7.18 Where wood backing (3/4-inch plywood) is provided by the building contractor or AT&T backboards are used, the riser cable can be satisfac-

torily fastened with cable straps and 1-inch galvanized round head No. 14 wood screws (Fig. 19). If the available cable straps do not fit snugly around the cable sheath, spreading the ears of the strap slightly will provide adequate pressure to maintain a secure hold on the cable. Use caution to prevent cutting the plastic cable sheath when tightening the cable straps. If necessary, use tape to protect the riser cable at each strap.

7.19 For placing and anchoring cable straps on concrete walls, refer to Practice 627-610-200. Place a minimum of three straps per floor with spacings of not more than 30 inches between straps.

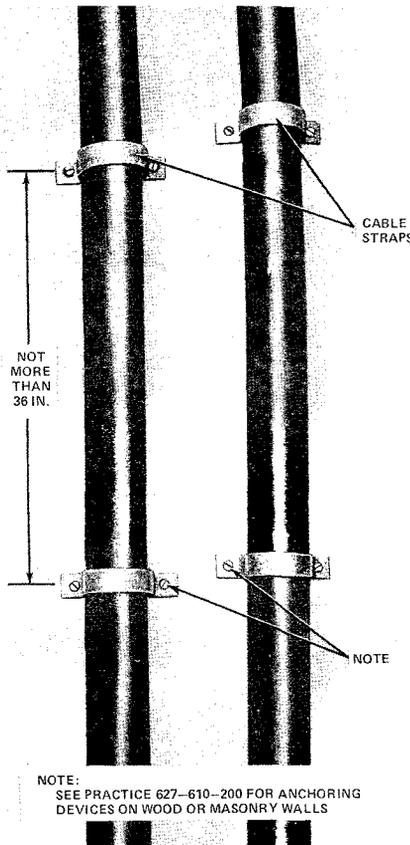


Fig. 19—Cable Straps

**7.20** Upon the completion of placing, supporting, and fastening the riser cable, place firestops at each floor.

#### D. Placing in Conduit

**7.21** Conduit may be provided for telephone riser cables in high-rise buildings. This conduit may extend between floors or even extend for long distances to reach structural setbacks. Riser cables placed in conduit must be supported to equally distribute the weight of the cable as described for cables placed in open shafts or sleeve construction.

**7.22** Riser cables may be placed by hand in short conduit runs if no severe bends are encountered which might cause a hard pull. However, for hard pulls or longer lengths of conduit, use a suitable winch.

**7.23** Since the short conduit runs between floors do not pose any serious problems for placing or supporting riser cable, the primary concern is long riser cable conduit runs which require additional supports for the cable at some point along the conduit run.

**7.24** On long runs, the conduit must be fished and a pulling rope placed inside the entire length of the conduit. See Practice 081-510-101 for the maximum load limits that may be applied to any size of manila rope.

**7.25** Make sure the conduit is clear of any obstructions. If necessary, a test mandrel consisting of about 3 feet of cable of the same size as the riser cable to be placed should be pulled through the conduit.

**7.26** The riser cable can be fed into the conduit from either end of the run. Where the pull is straight and no obstructions are anticipated, the

pulling eye (if provided) on the riser cable or a cable grip can be used. If the pull is expected to be hard because of sharp bends in the conduit run, a core hitch should be constructed on the end of the cable as shown in Fig. 9. A coating of B cable lubricant on the sheath of the cable will reduce the pulling effort significantly.

**Note:** Because of the inconvenience of opening a 40-pound pail of B cable lubricant for relatively small operations, a 2-1/2 pound polyethylene bag of B cable lubricant is packaged and available from local distributing houses. Polywater Hydrolube Blue is also available in quantities as small as 1 gallon cans for lubricating cable. **Do not lubricate cables being lowered from above.**

**7.27** The weight of long lengths of riser cable in conduit must be supported. If openings in the conduit run are not available for placing auxiliary supports, the cable should be lashed to a supporting strand, before installation, with 049 steel construction wire ties. The ties should be made as shown in Fig. 14 at 3-foot intervals along the entire length of the conduit run.

**7.28** When the lashed cable has been placed, terminate the strand by any method or combination of methods described in this practice.

**7.29** Where the cable is accessible at various locations in the conduit run, the auxiliary supports required to support the weight of the riser cable may be provided by single eye split grips as described in paragraph 7.14. Terminate the grips by any method described in this practice. Ring type cable grips described in paragraph 7.30 may also be used.

**7.30** The split ring type cable grip, available commercially from Kellems Co., is similar in construction to the single eye split grip except that it requires no terminating hardware. The split ring type cable grip, illustrated in Fig. 20 is designed to be supported by the rim of the conduit or sleeve. The step-down shoulder of the ring fits on the inside of the conduit and locks the ring in place. The projecting shoulder of the ring rests on the rim of the conduit and is the main support of the cable grip. No other terminating hardware is necessary. The split mesh grip is wrapped around the cable sheath and interlaced with the steel rod furnished with the grip. Install the split ring cable grip as described in paragraph 7.14, Steps (1) through (4). Refer to Table C for the size and catalog number of the split ring type cable grip required for use with the various sizes of conduit and cable.

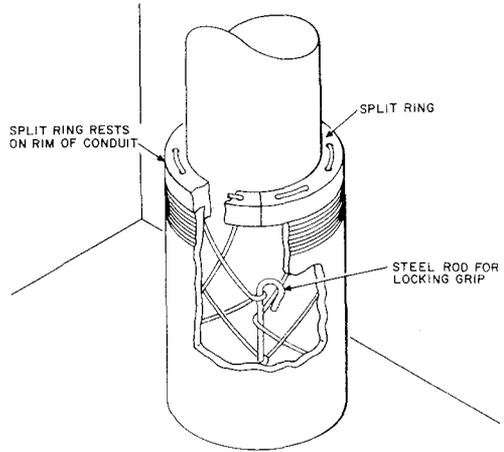


Fig. 20—Split Ring Cable Grip

**8. ISSUING ORGANIZATION**

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TABLE C				
SPLIT RING TYPE CABLE GRIPS				
CABLE DIAMETER (INCHES)	CATALOG NUMBERS			LENGTH (INCHES)
	3 INCH CONDUIT	3-1/2 INCH CONDUIT	4 INCH CONDUIT	
3/4 — 1	022-13-020	022-13-27	022-13-35	13
1 — 1-1/4	022-13-022	022-13-29	022-13-37	13
1-1/4 — 1-1/2	022-13-023	022-13-30	022-13-38	14
1-1/2 — 1-3/4	022-13-024	022-13-31	022-13-39	15
1-3/4 — 2	022-13-025	022-13-32	022-13-40	16
2 — 2-1/2	022-13-026	022-13-33	022-13-41	18
2-1/2 — 3		022-13-34	022-13-42	19
3 — 3-1/2			022-13-43	21