

SELECTION OF ROUTE FOR STATION WIRE AND CABLE

1. INTRODUCTION

- 1.01** This practice covers the general factors to be considered in running station wires or cables.
- 1.02** This section is reissued to include information and requirements pertaining to the use of false ceilings for concealing telephone plant.
- 1.03** Figure 1 shows the various points which should be considered in selecting routes for wires. Consideration should be given to the location of the telephone, protector, and ground clamp, as well as to the drop wire and point of entrance, before planning the wire route.
- 1.04** Clearances over public and private swimming pools are not covered by Safety Codes or other practices, however, for reasons of safety, sanitation, and appearance, aerial drop wire crossing over swimming pools should be avoided.

2. SELECTION OF BUILDING ENTRANCE

- 2.01** Inspect building thoroughly to locate service entrance conduit and use it if provided.
- 2.02** Where no service entrance conduit has been provided, select an entrance point from Table A.

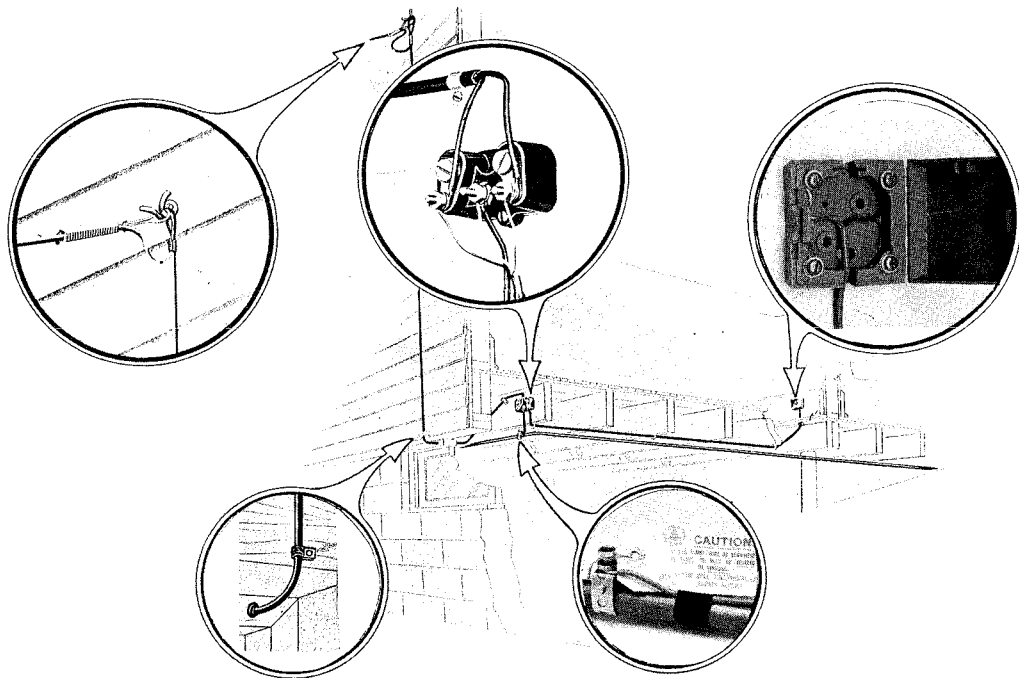


Fig. 1—Typical Wiring Routes

TABLE A

Type of Construction	Point of Entrance				
	Wooden Window Frame	Wooden Door Frame	Foundation Sill	Outside Wall*	Metal Window Frame†
Masonry or Brick	•	•			•
Wood or Stucco on Wood (basement ceiling unplastered)	•	•	•	•	
Wood or Stucco on Wood (basement ceiling plastered)	•	•		•	

* To wire direct to set or connecting block.

† See Para. 2.03.

Unusual Building Entrances

2.03 For entrances at metal frame windows and doors:

- Do not make entrance through metal door frames.
- When metal window frame is set in masonry or bricks, enter as shown in Fig. 2.

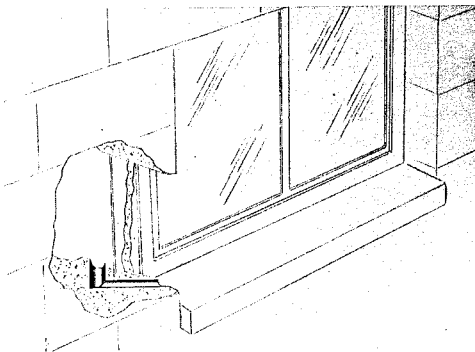


Fig. 2 — Entrance at Metal Window Frame

- Cut slot in seam of brick as shown in Fig. 3. Be sure slot is deep enough so wire is cleared when shutter or screen is operated.

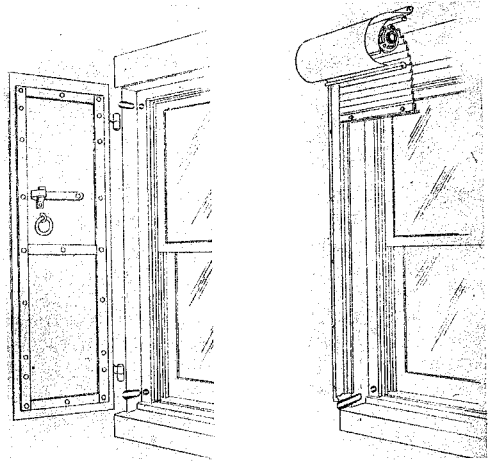


Fig. 3 — Entrance at Shutter of Fire Screen

- Locate hole as shown in Fig. 4 so as to avoid drilling through two shingles.

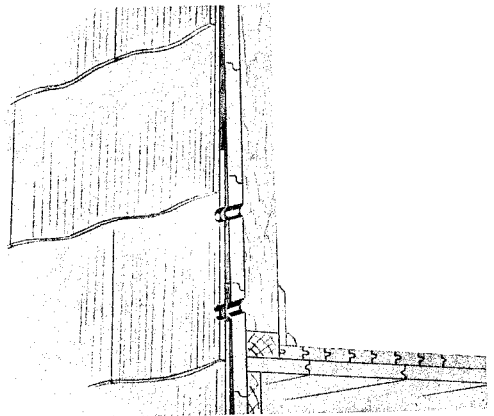


Fig. 4 — Entrance Through Composition Shingles

3. GENERAL LOCATION REQUIREMENTS

3.01 Facilities to Look For

- Are conduits or raceways provided?
- Is there wire or cable in place which can be re-used?

- Can wire or cable be concealed or run inconspicuously?
- Will wire run present a good appearance?

3.02 Follow customer's wishes, considering:

- Good safety sense.
- Minimum future maintenance.

3.03 Common Sense Factors

- Run wire or cable horizontally or vertically in a straight line.
- Choose colour of wire or cable to blend with or match surfaces.
- Use baseboards or other trim where conduit is not provided.
- Make use of wooden surfaces in preference to others where possible.
- Keep runs as short as is consistent with good appearance and minimum maintenance.

3.04 After location of first attachment has been determined, consider the following factors:

- Locate the drop or block wire run on the building with a view to permanency, accessibility, and appearance.
- On building walls finished with stucco, rigid composition shingles, brick veneer, and similar materials, locate attachments on wood trim where practicable.
- Locate preferably on the rear and side walls of a building (see Fig. 5).
- Place horizontal run above the reach of the public (see Fig. 6).
- Locate the run so as to require the minimum length of wire and as few turns as practicable.
- Do not run wires in front of signs, doors, windows, fire escapes, awnings, etc.
- Do not place wire runs on walls which are likely to be built against.
- Do not run wires diagonally on a building, except in short runs necessary to change direction of run.

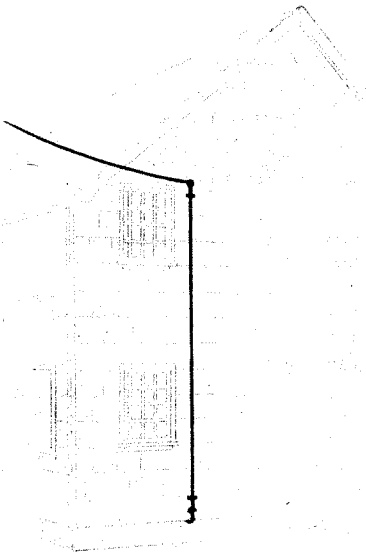


Fig. 5 — Typical Drop Run

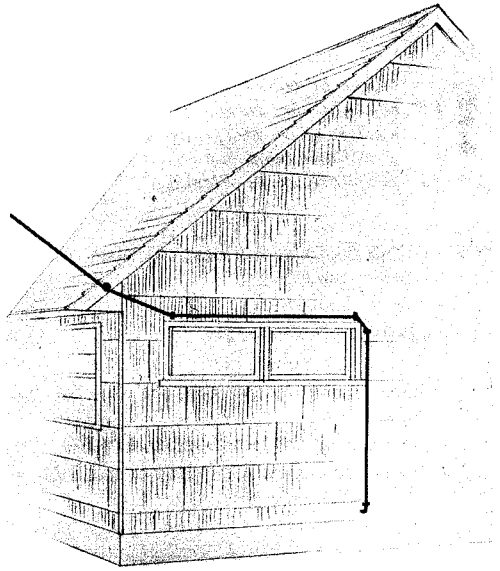
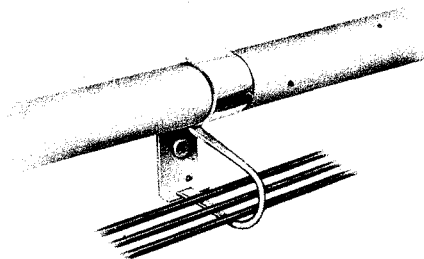


Fig. 6 — Horizontal Drop Run

- Avoid attachments on tin, sheet metal, or other materials requiring frequent repairs or renewals.
- Avoid locating on intermediate structures of a deteriorated or temporary construction. Select alternate route.
- When making a wire run on a building wall near cable, proceed in one of the following ways:
 1. Use rings installed with cable clamps as shown in Fig. 7.
 2. Remove nails or screws that hold cable clamps and replace with drive rings.
 3. Install separate wire run paralleling cable.



■ Fig. 7 — Drop Wire and Cable



Wires or cables shall not be placed in conduits or raceways which contain electric wires not properly separated by partitions from the space provided for telephone wires or cables.

3.05 AVOID the following locations when placing wire or cable:

- Damp locations.
- Locked storerooms, etc.
- Temporary structures.
- Runs that provide support for foreign objects.
- Excessively hot locations, steam pipes, etc.
- Locations where wires and cables will be subjected to abrasion.

3.06 In explosive atmospheres, locate and install wiring as covered by specific instructions in accordance with the equipment being installed.

■ NOT BELL CANADA STANDARD

3.07 Requirements for Ground Wire Runs

- Make runs as short as possible.
- Locate wire where it is least likely to be disturbed.
- Run protector ground wire exposed, except where conduit has been provided.
- Do not place protector ground wire in ring runs.
- Signal ground wire may be placed in rings.
- When existing protector ground wire has become enclosed by a ceiling or partition, re-use if continuity can be checked and ground clamp is accessible.

4. MAKING USE OF WIRE DISTRIBUTING SYSTEMS

4.01 Distributing Systems in Office Buildings

- Office buildings are generally provided with an exchange cable terminated in a main terminal on the ground floor and distributed to each floor through a building or house cable.
- In some cases, the exchange cable may be distributed directly to each floor.
- For information regarding the building conduit system, consult the plan at the main terminal or contact the building superintendent.

4.02 Various Types of Wire Distributing Systems

- Steel underfloor duct system.
- Fiber underfloor duct system.
- Conduit underfloor wall system.
- Metal base raceways.
- Wood base raceways.
- Molding raceways.
- Cable.

4.03 Distributing Systems in Apartment Houses, Hotels, and Hospitals

- Generally, these buildings provide a main terminal location in the basement or ground floor and a wall conduit system to each apartment or room.
- In large buildings, there may be house cable from the main terminal to each floor with a terminal on each floor and conduits to the various apartments or rooms from the floor terminal.

4.04 Wiring Systems in Private Residences

- Some homes are equipped with a built-in protector cabinet and/or conduit to the proposed location of the telephone.

- Conduit may be provided to a service entrance head from the protector cabinet.
- Pull-wires or specially built wiring channels may be provided.
- Telephone outlets may have been placed and wired during construction of building.
- Always inspect for or inquire about these facilities and make use of them wherever possible.

- Where trim cannot be followed, run wires horizontally or vertically but not diagonally.
- Choose colour of wire and fasteners to match or blend with colour of surface where wires are attached.

5. SELECTION OF EXPOSED WIRING ROUTE

5.01 In general, an exposed wire route should be used only where no concealing facilities are available.

5.02 *Wiring in Finished Rooms and Offices*

- Run wires along baseboards, on top of picture moldings, or on door or window casings, so that they will be as inconspicuous as possible (see Fig. 8, 9, and 10).

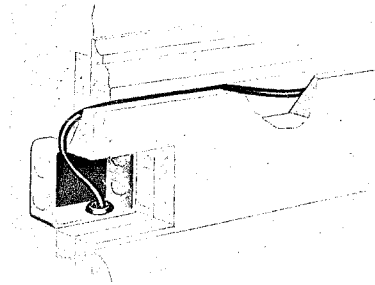


Fig. 8 — Wiring from Conduit to Baseboard

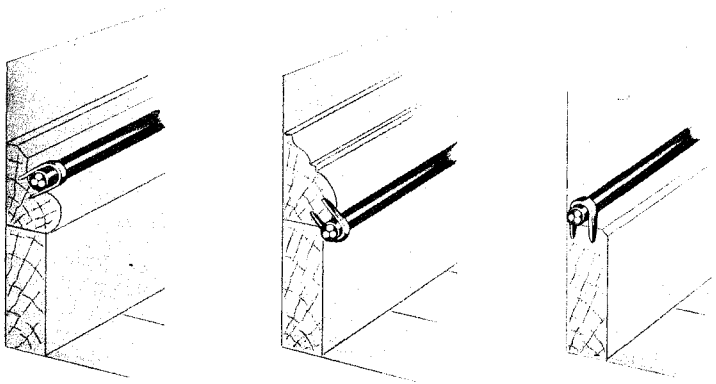


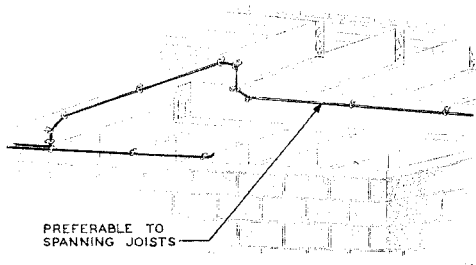
Fig. 9 — Wiring on Baseboards



Fig. 10 — Wiring in Picture Moldings

5.03 Wiring in Cellars, Factories, Storerooms, etc

- Place wire and cable where they will be least likely to be broken or detached. Provide protection if necessary.
- Consider the shortest, most direct right-angle route unless otherwise specified.
- Select a wire route which will be safe and accessible.
- Follow the ceiling line rather than baseboard in heavily travelled passageways.
- If necessary to follow chair rails, use the underside.
- When possible, follow joists.
- If necessary to span joists, run wiring not more than 3 inches from wall (see Fig. 11).

**Fig. 11 — Spanning Joists****6. USING CONCEALED AND OVERFLOOR CONDUITS****6.01 Consider the following factors when using conduits:**

- Whenever conduit is provided for telephone wires and it meets the prescribed specifications, it should be used.
- Check to be sure conduit does not contain electrical wires not associated with telephone equipment. If it does, follow local instructions.
- Place sufficient number of wires for possible future use in accordance with local procedures.
- Conduit systems are part of the permanent installation and are furnished, installed, and maintained by the building people.

- Consult the building people before extending wiring beyond the provided system.
- When necessary to provide wiring through concrete floors or similar construction from floor-to-floor and conduit is not provided, inspect premises for pipes through floor which may be provided for such use.

7. PLACING STATION WIRE AND CABLE IN BUILDING RISER SHAFTS**7.01 Building riser shafts are generally of two types:**

- **Closed riser shafts** consist of a series of closets, aligned vertically one above the other, usually beginning in the basement and extending throughout the height of the building. The closets are interconnected by a cable slot or pipe sleeves through the floors.
- **Open riser shafts** usually extend from the basement to the roof of the building with no floor separations. They are similar in construction to elevator shafts.

7.02 To conform with the National Building Code and the Canadian Electrical Code, observe the following when placing wire and cable in building riser shafts:**Closed Riser Shafts**

- Any cable may be placed if fire stops are placed in the slots or floor sleeves at each floor. Fire stops should consist of a packing of asbestos or fibre glass with a thin topping of water seal or equivalent. The individual who places a cable through a sleeve or slot should ensure the fire stops are placed.

Open Riser Shafts

- The use of polyethylene sheath cable is restricted unless it is enclosed in a non-combustible conduit.
- Lead sheath cable and PVC jacketed station wire and inside wiring cable may be placed with no restrictions.

8. CEILING DISTRIBUTION SYSTEMS

8.01 *Precautions To Be Taken When Working in False Ceilings*

- Have the customer remove and replace ceiling tiles.
- Take the necessary precautions when using stepladders as covered in Section 081-740-921.
- Avoid working over desks, furniture and other objects.
- Be careful not to damage the finished surfaces of the adjacent tiles.
- Do not exert downward pressure on the tiles when working.
- Avoid placing tools or material in false ceiling space.
- Take extreme caution when working above light fixtures.
- Do not strain the conduit or ceiling supports when pulling in cable.
- Wear insulating gloves if power contact is suspected.
- Wear a helmet if the headroom is limited.

8.02 *Placing Wire and Cable in False Ceilings*

- Normally the customer will provide conduit, cable trays or wire loops to support the cable or inside wire. In some locations it may be necessary to support the inside wire or cable on the main runners and/or cross runners (T Bars) of the false ceiling hardware.
- The end of the conduit will normally be found by removing the centre tile within the zone. (See Telephone Zones Part 9).
- Place a key cable for each 100 sq. ft. of floor space.
- Leave sufficient slack in each cable for the amphenol connector to reach any telephone set within the zone. (See Telephone Zones Part 9).
- Spare cable or cables should be coiled and supported at the end of the zone conduit.

- Spare cables should have sufficient slack for the amphenol connector to reach any location within the zone.
- Cable runs supported by the ceiling hardware should be placed as close as possible to the hangar wires.
- Where zone conduits are not provided, all cables will run to the centre point of their respective zones and from there distributed to the telephone set location within the zone. At the centre point in the zone, support all cables with a cable tie or equivalent.
- Cables supported by runners should not exceed 500 prs. (20 cables of 25 prs) within a 4 foot section of the ceiling.
- Avoid placing cables on or against light fixtures.

9. TELEPHONE ZONES IN FALSE CEILINGS

9.01 The floor area to be served shall be divided into telephone zones consisting of not more than 400 to 600 square feet. (See Fig. 12).

9.02 To feed the telephone zone, the building will usually have a continuous length of 2-inch conduit in the ceiling space, properly supported to permit the pulling-in of cables. This conduit should extend from the nearest telephone terminal or apparatus closet and left open-ended at the midpoint of each telephone zone as illustrated in Fig. 12.

9.03 The length of cable required to be placed in the conduit to reach any telephone set location in a respective zone should be marked on the end of the conduit with the zone number (as per Para. 10.01 (a) in the appropriate closet.

9.04 For floor areas where the 2-inch conduit to the telephone zones is not available and where a number of inside wiring cables are to be placed loosely in the ceiling, cable supports may be required. These cable supports should be located on 5-foot centres and must be provided by the building owner to avoid damage to the ceilings because of cable weight.

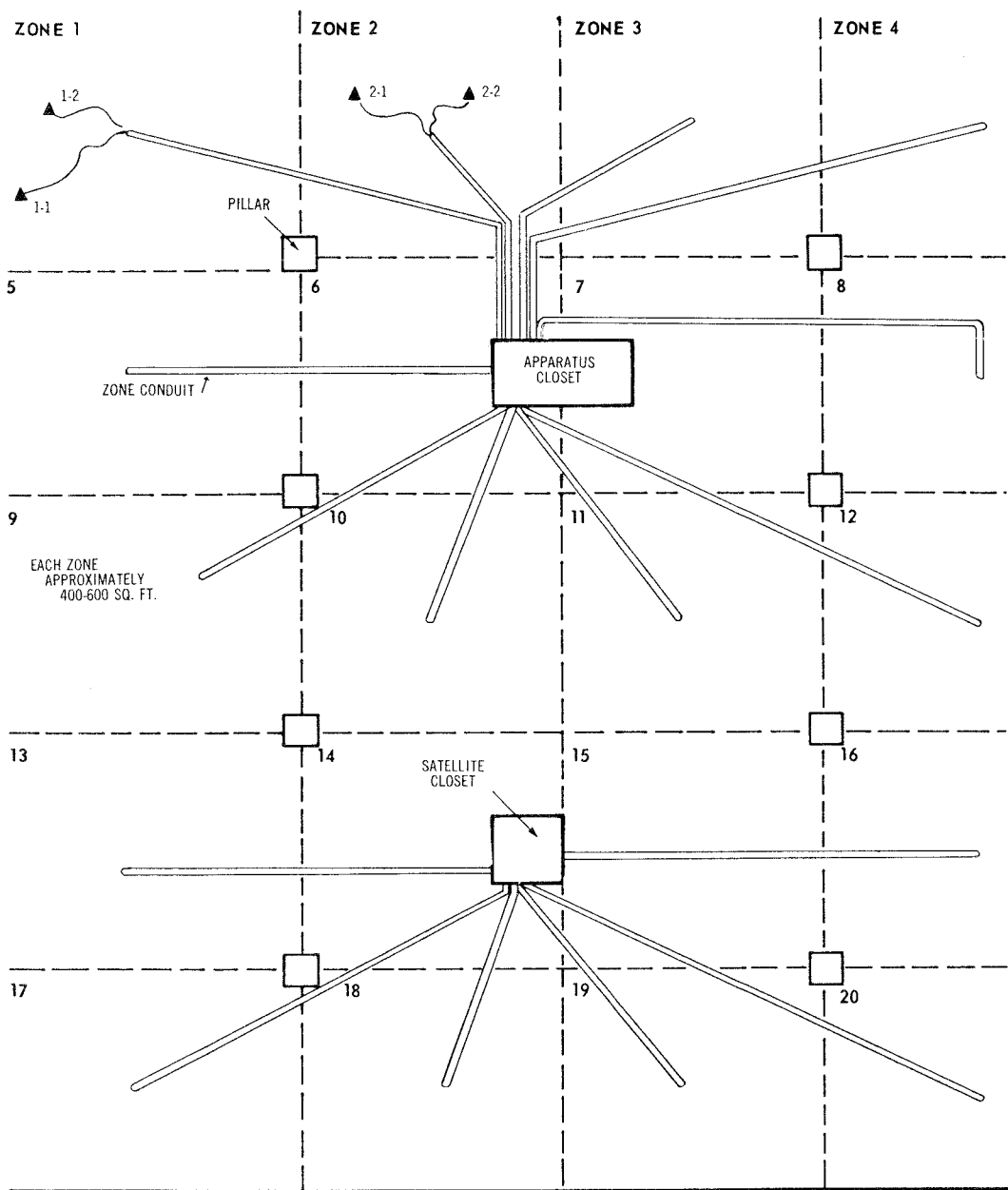


Fig. 12 — Typical Zone Layout Hung Ceiling System

10. DESIGNATING CABLES AND CONDUITS IN FALSE CEILINGS

10.01 On hung ceiling distribution systems, zoning concepts should be employed regardless of whether or not zone conduits are provided by the customer. The following designating procedures should be used:

- (a) A number should be assigned to each zone (see Fig. 12).
- (b) Zone conduits (when provided) shall be numbered in the ceiling and at the riser end with the appropriate zone number. With the customer's permission, a marker unit cable or facsimile should be placed on the "T" rail directly beneath the conduit end so that the zone may be readily identified from the floor.
- (c) Each cable and wire should be assigned a number within its zone and will be labelled with the zone number and the specific cable number. (e.g.: 3-1 indicates that the cable appears in Zone 3 and that it is cable No. 1 in that zone.) These numbers should be placed on the amphenol or wire at the set end and on the 66-type block at the riser end.

10.02 When dedication of cables to connecting blocks is not possible due to lack of space, cables, wires, amphenols and service fittings are still numbered.

10.03 Designation numbers used on service fittings, amphenols, cable and connecting blocks are called "marker unit cable."

10.04 To facilitate future rearrangements and changes, plan layouts, and associated documents should be stored in manilla envelopes (Form 2019) or a similar container, affixed to the apparatus mounting or backboard, at the equipment location.

11. WIRING METHOD, CEILING TO DESK LOCATION Utility Column

11.01 A utility column is a post placed between the ceiling and floor in conjunction with the ceiling distribution system as shown in Fig. 13. It is used for the concealment of communications wiring from the ceiling to the desk. It can also be used as an extension of electrical outlets for the same purpose.

11.02 The utility column is a commercial product and if used must be supplied and installed by the customer. Utility columns with power facilities will require C.S.A. approval.

11.03 Inter-connection with customer-owned wiring in utility columns is *not* permitted.

11.04 The utility columns should be attached, or supported, by the main "T" rails in the ceiling as shown in Fig. 14.

11.05 Usually when the utility columns are being placed or have been placed, they are subjected to being slightly shifted. Such movement invariably causes the "T" rail to become warped, marred or bent. Excessive bending of rails may cause tile to fall down.

11.06 There are several different models of utility columns available to the customer: (Figs. 13 to 15)

- (a) Some models have to be fished from the floor to the ceiling when the cable is equipped with an amphenol connector, as the space in the column is not large enough for the amphenol connector.

- (b) Other models allow the amphenol connector to be pushed down the column from the ceiling to the outlet on the column. Cover plates may be equipped with knock-outs to fasten the amphenol connectors or may be capable of housing amphenol connectors in the column, exposing the mounting cord only.

- (c) Some models of the utility columns have removable sides which allows the cable to be placed without fishing. It is simply laid in the column and the side cover replaced. Adapters are available for these columns to house up to 5 amphenol connectors.

12. USE OF WALLS OR PARTITIONS

12.01 The following conditions apply if hollow core walls or partitions are used for concealing telephone wire and cables:

- (a) The hollow core walls or partitions must be clear and unobstructed.

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(b) Opening of walls and partitions and the installation of outlet boxes are the responsibility of the building owner or subscriber.

(c) A pull wire is required from all outlet boxes to the approved supporting structure above the suspended ceiling.

(d) Use only vertical pull wire runs. If bends or horizontal runs are necessary, conduit is required.

Note: Fulfilling the above items shall not be at the expense of the Telephone Company.

12.02 Inside wire and cable will have to be exposed where the customer does not follow the requirements outlined in Para. 12.01.

12.03 If fire blocks, sound deadening materials, or insulation is used in the construction of walls or partitions, conduit must be run from the

outlet to the approved supporting structures above the suspended ceiling.

12.04 Where it is planned to use walls or partitions to conceal inside wiring cables down from ceilings, a minimum of 1-1/2 inch diameter space is required to permit the connector end of the cable to pass from the top of the wall to the outlet box above floor.

12.05 The following are recommended:

(a) 1-1/2 inch conduit in wall or partition to outlet box (Fig. 16).

(b) 1-1/2 inch square clear space between partition sections with snap-on panel or cover (Fig. 17).

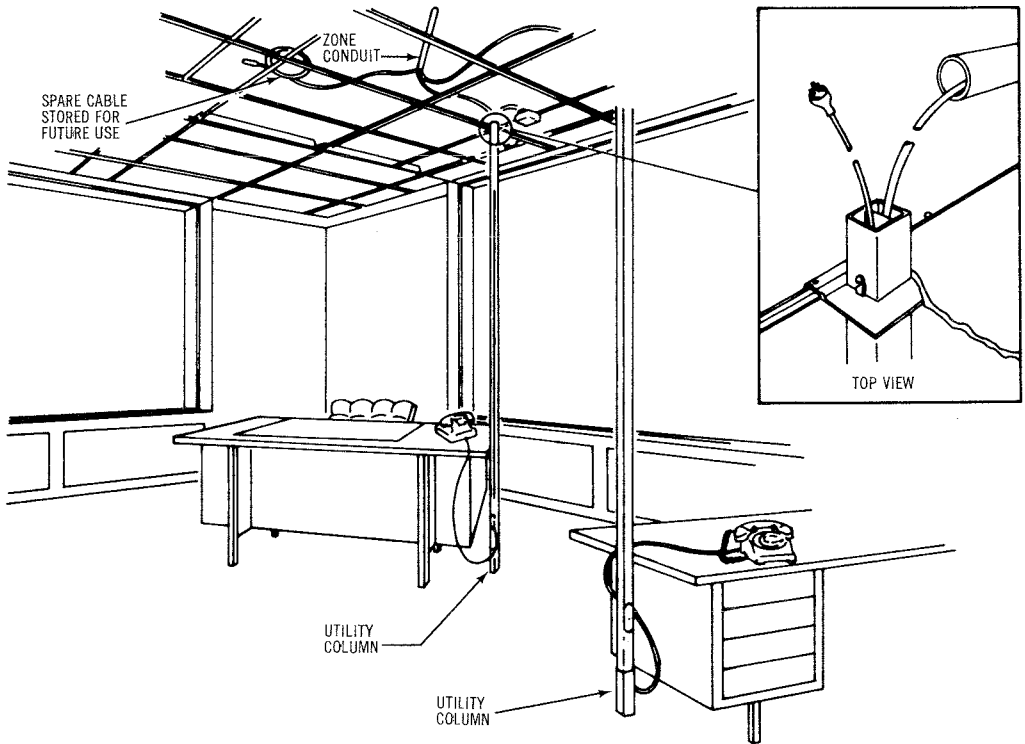


Fig. 13 — Wiring Method With Utility Columns

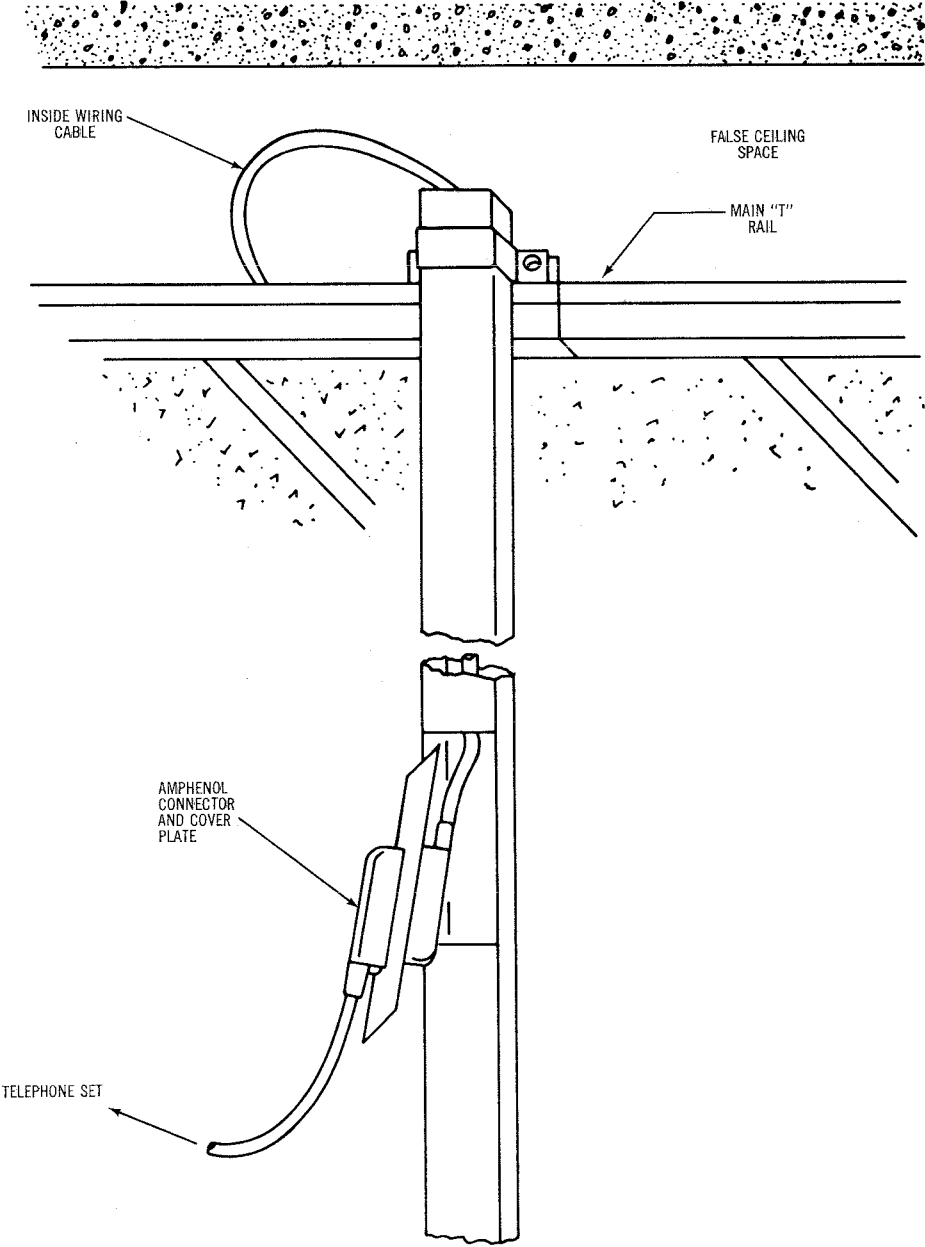


Fig. 14 — Utility Column Installation

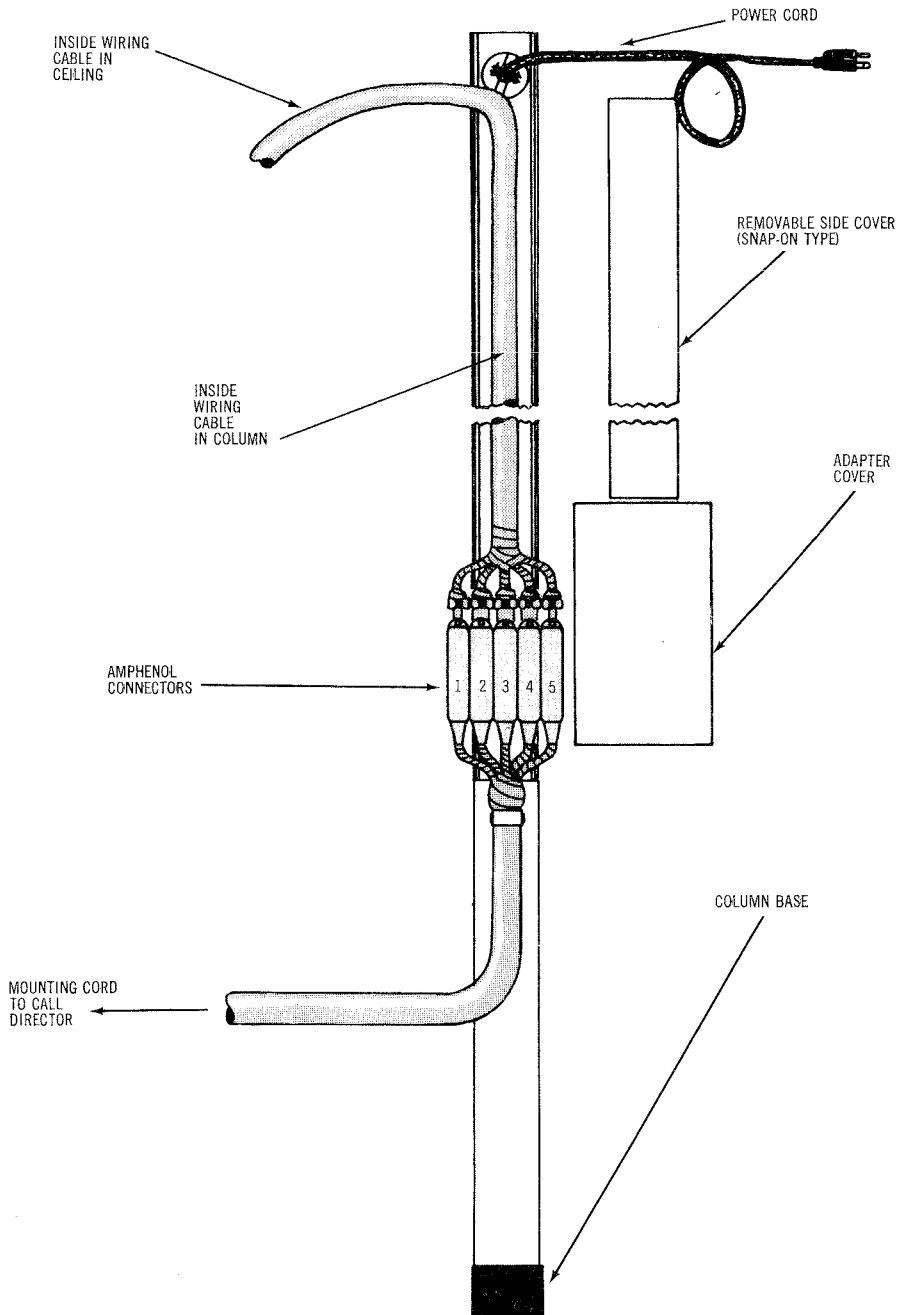


Fig. 15 — Typical Utility Column
(With Covers Removed)

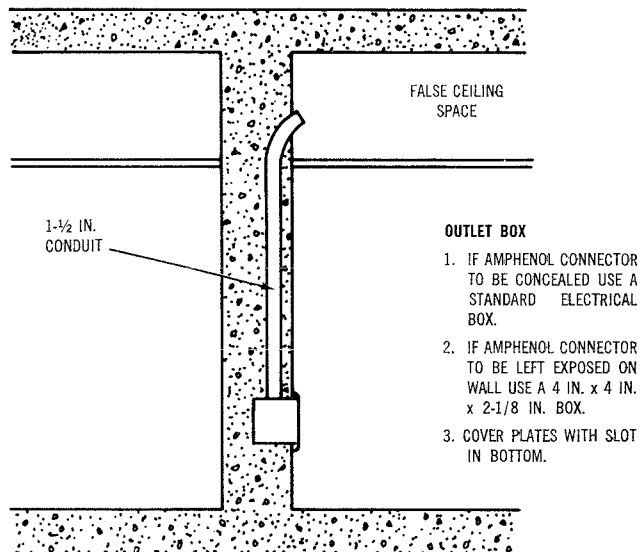


Fig. 16 — Conduit in Wall

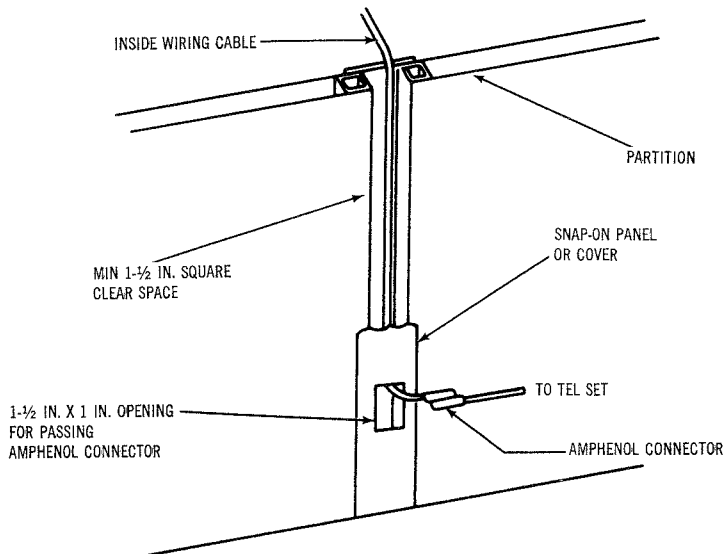


Fig. 17 — Partition Design