

CHAPTER 12

INSTALLATION OF DIRECT-BURIAL COAXIAL CABLE

12.1 GENERAL

The route to be used for installation of direct-burial cable will be specified on site construction plans and will be surveyed and staked prior to cable installation. (Normally such installation is a Public Works responsibility.)

The following general procedures shall be followed when installing direct-burial cable:

- o Dig trench to depth specified in site plans. (This depth has been determined by consideration of such factors as soil conditions, use of land, and traffic conditions.)
- o Use ducts when cable run must cross under a primary-access road.
- o Allow an extra five feet of cable at each end of the cable run to function as an expansion loop.
- o Identification slabs (markers) shall be provided at each change of direction of cable, over the ends of ducts or conduits which are installed under paved areas and roadways, and over each splice. Slabs shall be of concrete about 20 inches square by 6 inches thick and shall be set flat in the ground so that the top surface projects not less than 3/4 inch, nor more than 1-1/4 inches above ground. The concrete shall be class D-1 conforming to specification 13Y. An identifying legend ("cable," "duct," "splice," or other applicable designation) shall be inscribed on the top surface before the concrete hardens. Circuit identification symbols shall also be inscribed on identification slabs as directed. The letters and/or figures shall be about 2 inches high and the grooves shall be about 1/4 inch in width and depth. The slabs shall be installed so that the nearest side is 12 inches, horizontally, from the cable, splice, conduit, or duct; the inscription on the top shall include an arrow indicating the nearest side.
- o Segregate cables by separating them by a distance equal to at least twice the diameter of the largest cable when a common trench for several cables is used to avoid possible interference and for ease of replacement.
- o Use a continuous length of cable, if possible.
- o Make connections between cable lengths in a manhole or handhole.
- o Protect cable connections by potting them in an epoxy resin material.

12.2 TRENCHING

The cable trench may be dug manually, by ditch-digging machine, or the cable may be plowed in with a cable plow. Ordinarily, the plow is used for long cable runs, machine trenching for shorter runs and manual trenching for very short runs or in areas of obstruction that will not permit the use of equipment.

The trench depth depends on the soil condition and the use of the land through which the trench must pass. The trench bottom must be reasonably smooth; fine soil or sand shall be used around cable if a smooth trench bottom cannot be attained. Trenches are usually dug 18 to 24 inches wide, depending on the number of cables to be run.

12.3 PLACING CABLE IN TRENCHES

A cable trailer may be rigged to lay cable in a trench. Accessories may be attached to the trailer to permit the cable to be laid directly from a reel installed on the trailer. If a trailer is not available, a suitable payout reel may be rigged on a truck or flatbed trailer (figure 12-1).

12.4 PROTECTION OF CABLES IN TRENCHES

Where the backfill alone does not provide adequate protection for cables in trenches, a redwood plank, or other suitably treated wood, may be installed over the cables (figure 12-2). After the cables have been placed in the trench, the trench should be back-filled and tamped for a depth of six inches. Sand must be used around the cable if the trench bottom is uneven or contains rock projections. A 1-1/2 inch thick plank is placed on the 6-inch backfill and the remainder of the trench is backfilled and tamped.

12.5 ADAPTERS AND END SEALS

It is sometimes necessary to change from one type of coaxial cable to another, or to install an end seal to terminate the cable run. Since many adapters and end seals for connecting and terminating coaxial cables are available, it is beyond the scope of this handbook to cover all types. Installation procedures for a typical adapter (RG-85/U to RG-12/U) and a typical end seal (RG-85/U) are included to illustrate the methods of installing these connectors. Figure 12-3 covers the end seal; figure 12-4 the adapter. For installation of other adapters and end seals, refer to the manufacturer's instructions for the specific item.

12.5.1 End Seals

Install end seals as follows:

STEP 1. Square off end of RG-85/U cable (A, figure 12-3).

STEP 2. Place armor gland nut and armor ring on cable (B, figure 12-3).

STEP 3. Place forming clamp on cable, six inches from the end, and tighten securely to cable (C, figure 12-3).

STEP 4. Refer to D, figure 12-3 and:

- o Fold the jute back from the armor and use a sharp knife to cut the jute below the bending level of the forming clamp.
- o Fan out and bend armor wires about 90 degrees over the forming clamp.
- o Cut armor wires to a length that will permit them to reach two-thirds of the way over the convex end of the forming clamp.
- o Bend all wires uniformly and tightly over the forming clamp. Use a lineman's hammer.

STEP 5. Refer to E, figure 12-3 and:

- o Cut lead sheath 1-15/16 inches from forming clamp and remove loose section.
- o Remove neoprene from cable to a point 2 to 8 inches from forming clamp.
- o Cut copper braid 2-15/16 inches from the forming clamp and remove loose sections.
- o Remove forming clamp.

STEP 6. Refer to F, figure 12-3 and:

- o Assemble armor coupling gland, armor ring, and armor gland nut.
- o Cut lead sheath to extend 1/16 inch beyond the assembly.
- o Solder lead sheath to armor coupling gland.

STEP 7. Refer to G, figure 12-3 and:

- o Divide copper braid into six sections and twist each section into a pigtail: solder pigtails to grooves in the armor coupling gland.
- o Cut off polyethylene insulation 1-7/8 inches from end of cable.
- o Tin center conductor.
- o Place lead seal washer over threads of coupling gland.

STEP 8. Refer to H, figure 12-3 and:

- o Place connector nut over connector.

- o Slide connector and nut over end of cable and screw connector to coupling gland.
- o Slide Teflon gasket over inner conductor and push into end of conductor.
- o Measure amount that Teflon gasket protrudes from connector.
- o Remove connector and trim off amount of polyethylene required to allow Teflon gasket to protrude 1/16 inch from connector.
- o Reinstall connector, nut, and Teflon washer.

STEP 9. Refer to I, figure 12-3 and:

- o Place neoprene gasket over inner conductor.
- o Screw Teflon cap with lug and cap nut attached to connector.
- o Solder inner conductor to cap nut.

STEP 10. Cut off excess inner conductor (see J, figure 12-3).

NOTE

If the end seal is to be attached to coupling transformers, the inner conductor may be left long enough to make the required connection in the transformer box.

12.5.2 Adapters

Install adapters as follows:

STEP 1. Perform Steps 1 through 8 of the end-seal installation procedure A, (see figure 12-4).

STEP 2. Refer to B, figure 12-4 and:

- o Slip sleeve through Teflon washer and over center conductor; butt washer firmly against connector.
- o Solder sleeve to center conductor.
- o Cut off center conductor flush with tip of sleeve.
- o Install adapter by tightening connector nut.
- o Insert SO-239 connector.

STEP 3. Install and tighten assembly screws (see C, figure 12-4).

12.6 DUCTS

Ducts used for routing coaxial cables are usually terminated in a manhole or cable vault adjacent to the building. Additional ducts are then used to accomplish cable entry into the building (figure 12-5). The cable is routed along the manhole wall and secured by Unistrut fittings or similar means of attachment.

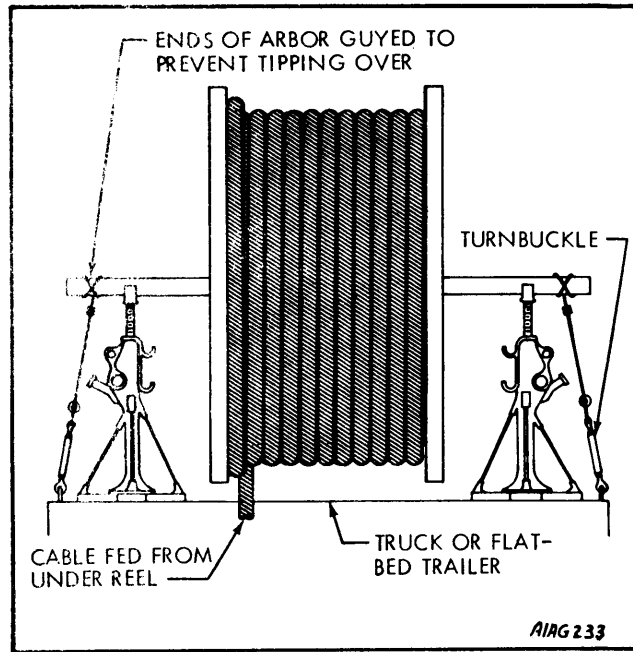


Figure 12-1. Mounting Payout Reel on Truck of Trailer

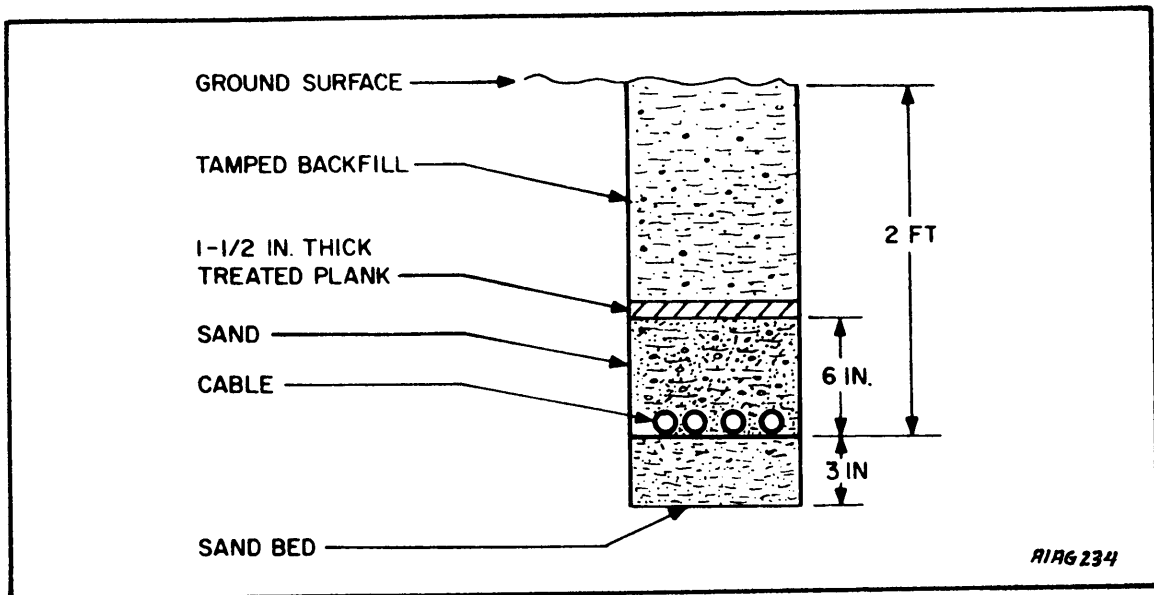


Figure 12-2. Protection of Cables in a Trench

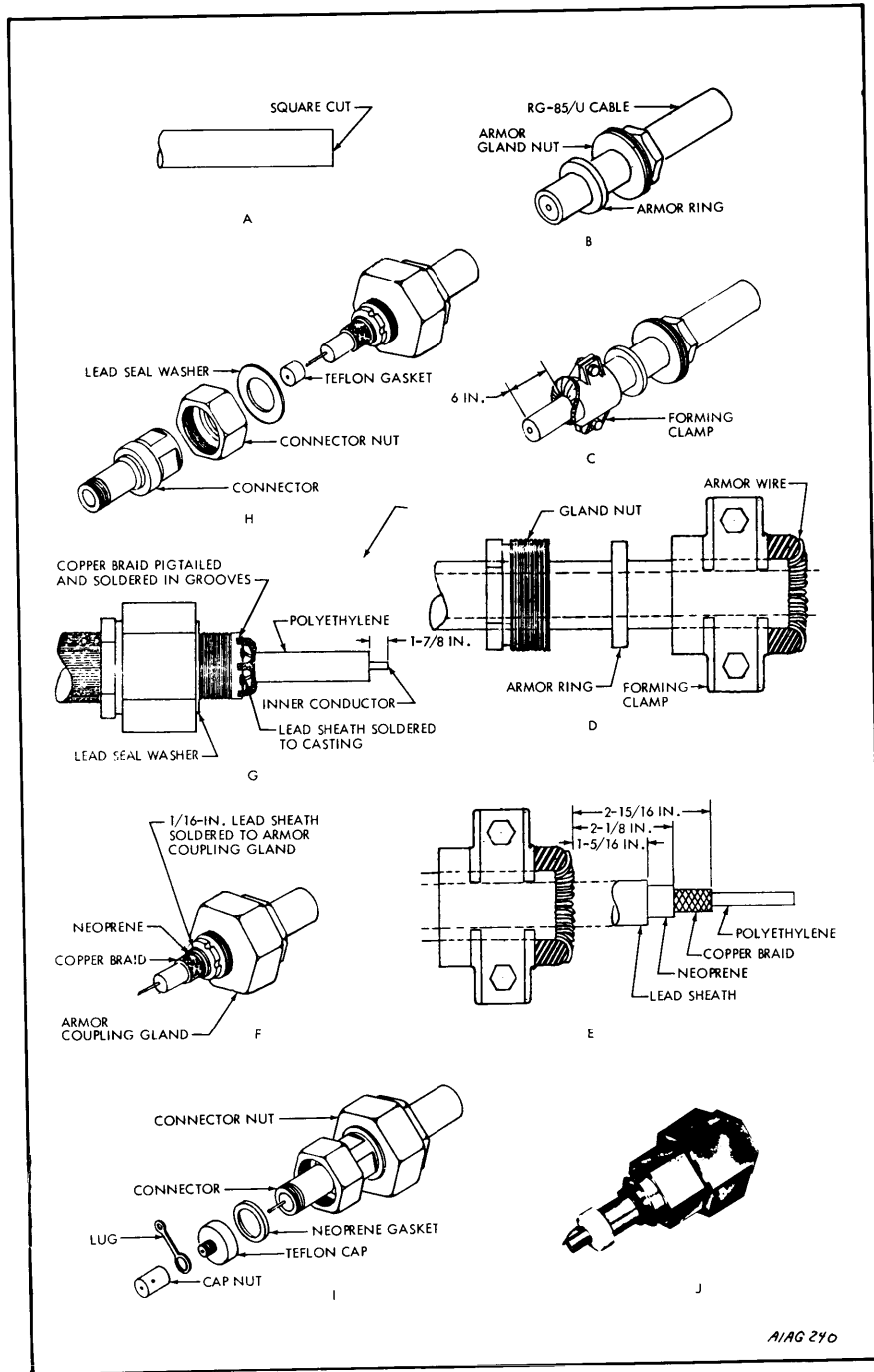


Figure 12-3. Installation of a Typical End Seal

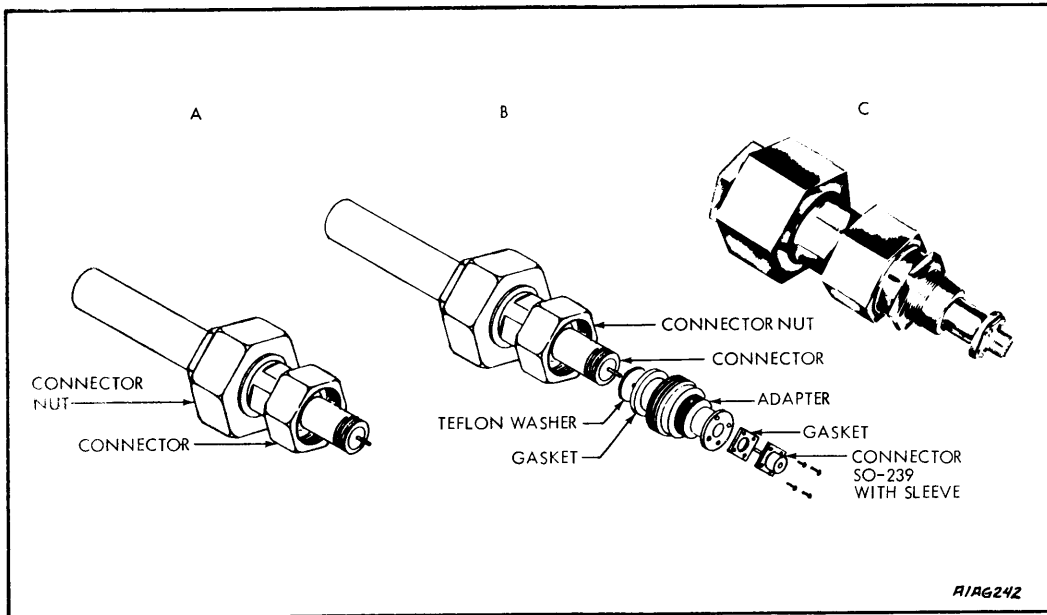


Figure 12-4. Installation of a Typical Adapter

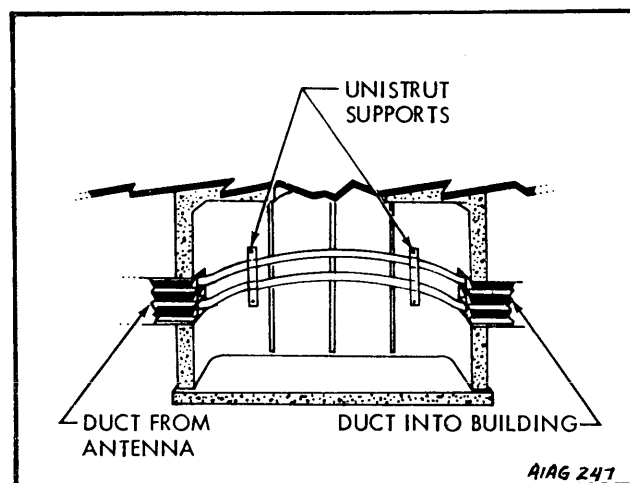


Figure 12-5. Entry of Duct Cable Run Into Building

