

UNDERGROUND CABLE PLACING HIGH-PRODUCTION METHODS

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1. GENERAL

1.01 This practice covers high-production underground cable placing methods. High-production underground cable placing methods involve placing more than one cable section from each pull manhole while utilizing reel handling techniques and reel delivery that are coordinated to meet a carefully planned placing schedule. Conventional placing equipment or various types of special placing equipment may be used.

1.02 This practice is reissued to delete information in paragraph 3.05, subparagraph (a), about restrictions on placing cables larger than 3 inches in diameter. Since this is the only change, no revision arrows are used.

1.03 To be effective regardless of the type of equipment used, high-production methods of placing underground cable require a detailed job plan. The plan must be based on a thorough field study. It must designate pull and feed manholes and must include a strict cable placing schedule with cable delivery to the job site arranged to meet the schedule. The cable should be delivered on multireel carriers that are loaded in a way that permits the reels to remain on the carrier during cable placing. If multireel carriers are not available, having cable reels spotted on the job or having cable reels delivered as the job progresses are suitable methods as long as cable placing can continue uninterrupted. On-time cable delivery and the minimization of reel handling are

essential parts of any high-production cable placing operation.

1.04 Placing procedures will vary depending on the type and condition of the duct, the type of placing equipment available, and other factors; however, the following are the basic methods for high-production placing.

(1) **RPV (Rod and Place Vehicle) Method:**

Using a RPV (see Practice 649-321-100 for detailed operating procedures), install a test ball, corresponding in size to the cable being placed, on the end of the rod. Push the ball through the duct. Remove the ball and install the pulling eye. Pull in the cable as the rod is retrieved. If the ball cannot be pushed through, rod the duct with a bullet nose installed on the rod. When the rod reaches the feed manhole, install a swab, attach a winch line to the trailing end of the swab, and retract the rod pulling the swab and winch line to the RPV. Retract the winch line, pulling the swab and rod back to the feeding end. Install the pulling eye on the rod and pull in the cable as the rod is retrieved.

(2) **Pneumatic Rodder Method:** Using a pneumatic rodder, such as the Burnup and Sims rodder placer, in clean, single bore, reasonably airtight conduit, the missile with the winch line attached is blown through the duct. The cable is pulled in with the winch line.

(3) **Fishline Kit Method:** Using a B fishline kit in clean, single bore conduit, the missile with polypropylene rope attached is blown through the duct. Pull in the winch line with the polypropylene rope and pull in the cable with the winch line. Conventional placing equipment is used.

(4) **Conventional Method:** Using conventional placing equipment where the duct has been rodded, cleaned, and a pulling line or wire is placed in advance of the cable placing date, pull in the

winch line with the pulling line or wire. The pulling vehicle should be set up as far as possible (up to the total length of the winch line) from the first feed manhole. As each reel of cable is pulled in, the cable reel trailer is moved to the next feed manhole. The pulling vehicle remains stationary.

1.05 Practice 628-200-208 covers manhole setups for feed and pull manholes using conventional equipment. Pull manhole setups for high-production methods will be different if special equipment is used, depending on the types of equipment available. Feed manhole setups are essentially the same for both methods.

2. PRECAUTIONS

2.01 Safety headgear and eye protection shall be worn during all cable placing work operations.

2.02 Before starting any underground cable placing operations, all personnel must be thoroughly familiar with the 620 Division of the AT&T Practices. The practices covering the following operations should be given special emphasis.

- (a) Guarding and protecting work areas
- (b) Testing and ventilating manholes
- (c) Occupational exposure to lead dust
- (d) Precautions pertaining to smoking or use of open flames around manholes
- (e) Removing and replacing manhole covers
- (f) Signals used in outside plant construction work.

2.03 When placing lead sheath cable, precautions must be taken to **limit the amount of exposure to lead from handling and from airborne lead dust**. Lead dust is released into the atmosphere any time the sheath of **older** lead sheath cable is disturbed. The inhalation of lead dust, the transfer of lead dust from the hands to the nose or mouth, and the ingestion of lead from food, drink, and tobacco products that have been exposed to lead dust can have adverse effects on the health. The handling of **new** lead sheath releases only negligible amounts of lead dust; however, to effectively remove the potential hazards presented when working with

lead, the lead handling procedures covered in Practice 620-100-010 must be strictly observed.

2.04 All personnel involved in placing underground cable must be trained in the operation of the equipment and construction apparatus used.

2.05 ***Adequate two-way communication must be established*** between the cable feeding location and the pulling equipment prior to starting any pulling operation and ***must be maintained during the entire operation***.

2.06 Practice good housekeeping. Arrange material in the vicinity of the manhole so it will not fall into the manhole or unnecessarily interfere with pedestrian or vehicular traffic.

2.07 Inspect manhole ladders each time before using and replace when found in a deteriorated condition. When the bottom of the ladder is in water or otherwise not visible, remove the ladder for inspection.

2.08 Each time before using pulling irons, inspect for significant corrosion and to make sure they are securely anchored.

2.09 If work is done with a truck not equipped with an overhead exhaust and the truck is stationed near a manhole, locate the truck so the exhaust gas will not blow into the manhole or be picked up by the manhole blower.

2.10 Locate gasoline and propane driven generators, blowers, pumps, etc., downwind so the exhaust fumes will not blow into the manhole or be picked up by the manhole blower.

2.11 Exercise caution when entering and leaving manholes, particularly those located on traveled thoroughfares. Always use a ladder when entering or leaving manholes. Keep hands free of materials or tools when ascending or descending ladders. When ascending from manholes, always face oncoming traffic. Never use a cable, coil case, or apparatus case as a step.

2.12 When working in manholes, exercise care to prevent damage to cables while setting up the pulling apparatus or while using tools of any kind.

2.13 Do not place hands on a moving winch line. Be sure that sheave guards are properly installed as outlined in Practice 649-305-101.

2.14 Employees should not remain in manholes during cable placing or removal operations (see note). Should it be necessary to check for proper alignment of equipment prior to starting the pulling operation, the employee can enter the manhole if:

- (a) The employee remains clear of the equipment and outside the angle formed by the pulling line
- (b) The winch line has only enough tension to provide normal alignment of the equipment
- (c) The pulling crew is notified that a technician is going into the manhole.

Note: Employees may be permitted in a manhole under certain conditions during the placing of connectorized exchange cable and lightguide cable. Refer to Practices 628-200-205 and 628-200-216.

3. TOOLS AND EQUIPMENT

3.01 At the feed manhole, the tools used for high production placing are the same as for conventional placing. A cable feeder, feeder nozzle, and lubricator are normally required. These items are described in Practice 081-410-116. Other tools that may be required, including tools used in the pull manhole when conventional equipment is used, are described in Practice 628-200-208, Underground Cable Placing.

3.02 The truck (whether conventional equipment or special equipment) used at the pull manhole should be equipped with a manhole dewatering pump, a manhole blower/ventilator, and a radio communication system with a loudspeaker. If conventional equipment is used, the pulling vehicle should be equipped with a continuous duty winch (AT-8003 or equivalent). Cable sheaves, pulling frame, etc., are necessary also unless a special placing truck of the type illustrated in Fig. 1 is available or the rod and place method is used. The truck illustrated is not intended to be representative of a specific unit currently available, but only to illustrate types of special equipment that can be utilized for high-production cable placing.

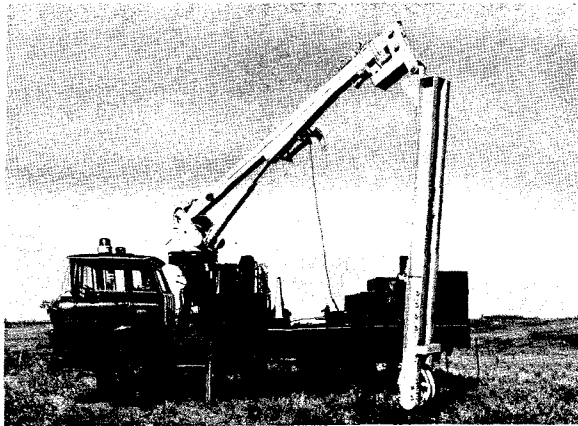


Fig. 1—High-Production Placing Truck—Front Mounted Turret

3.03 The equipment for the rod and place method may be one of the types illustrated in Fig. 2 and 3. Figure 2 illustrates an RPV. Figure 3 illustrates a pneumatic rodder placer.

3.04 The equipment used at the feed manhole should be equipped with a manhole dewatering pump, a manhole blower/ventilator, and a radio communication system with a loudspeaker. Where ducts are prewired, the equipment must include a collapsible power reel. Where ducts require swabbing, a winch truck must be available.

3.05 Multireel cable trailers can be a side-feed setup, a rear-feed setup, or equipped with a crane for suspended reel payout. Feeding the cable directly

from a side-feed or rear-feed setup is suitable in most cases but not always possible. The trailer-mounted crane provides an alternative method. Refer to Practice 649-210-134 for special reel handling methods and equipment.

(a) *Side-feed setup* on a flatbed trailer is shown in Fig. 4. Side feed permits feeding the cable into the manhole at confined locations by eliminating the critical parking requirement that might otherwise exist. The trailer does not have to be positioned directly over or alongside the manhole opening. However, the cable path should be as direct as possible and the distance as short as practicable.

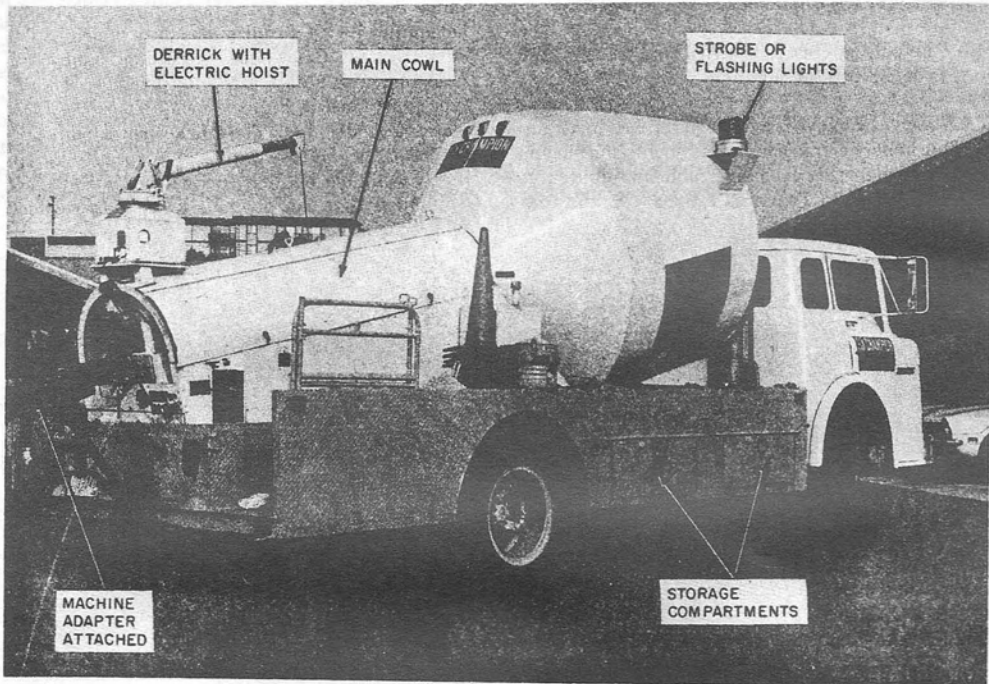


Fig. 2—Rodding Truck (RPV)

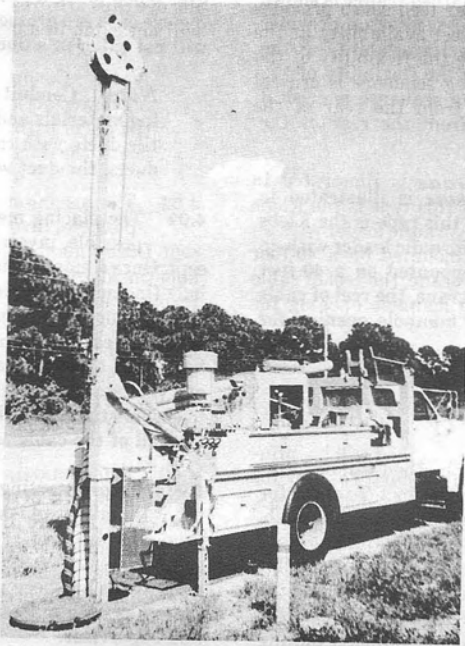


Fig. 3—Pneumatic Rodder Placer

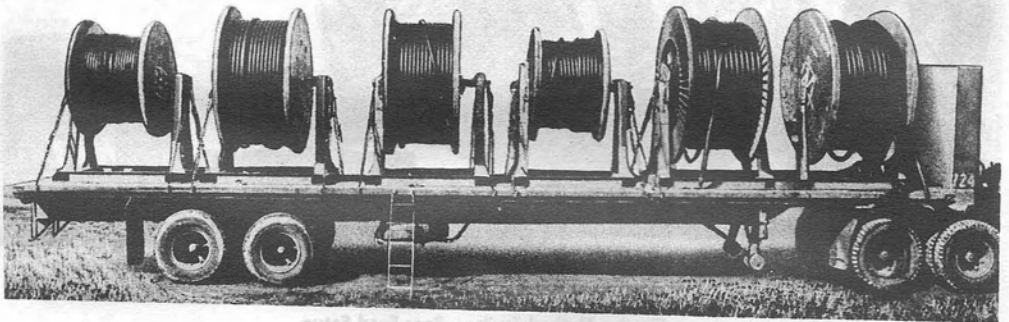


Fig. 4—Flatbed Trailer—Side-Feed Setup

(b) **Rear-feed setup** on a flatbed trailer is shown in Fig. 5. While the rear-feed setup provides the efficiency of multiple reel availability at the job site, it does not provide the flexibility of the side-feed setup. Reel loading sequence is critical and feeding can be done from the rear of the trailer only.

(c) **A trailer-mounted crane** is illustrated in Fig. 6. A typical unit of this type is the Klebs unit which incorporates a hydraulic loader with an articulated knuckle boom mounted on a 40-foot drop-deck trailer. With the crane, the reel of cable can be suspended over the manhole opening for cable payout.

4. PLACING METHODS

4.01 The choice of the placing method will be influenced by the condition of the duct. To check for obstructions, pull a conduit mandrel, conduit swab, or cable slug through the duct. Use a D conduit mandrel to check 4-inch round bore and an E conduit mandrel to check 4-inch square bore conduit. Use the F conduit mandrel to check 3-1/4 inch conduit for passage of cables with a 3-3/16 inch diameter pulling

eye. When using a cable slug, make certain the pulling eye caps are dressed into the cable sheath so they will not catch in a duct joint.

Note: Conduit mandrels are made of unyielding materials and should be drawn through clay tile ducts with care. If forced through clay tile ducts, the duct walls or webs may be broken.

4.02 The placing method chosen should, wherever possible, involve a one visit per manhole concept. Once a manhole is opened, all work at that manhole (including securing cable ends, racking in pull-through manholes, and installing conduit plugs) should be completed before moving to the next manhole. Pull-through manholes do require more than one visit since a technician should be stationed there to observe the end of the winch line as it is placed and the end of the cable as it is pulled through.

4.03 Before starting to place cable, check the serial numbers of the cable reels to be sure the proper reels have been delivered. Verify that the cable is under pressure and record the pressure. After cable has been placed, recheck the pressure. If there has been a pressure drop, notify the construction supervisor.

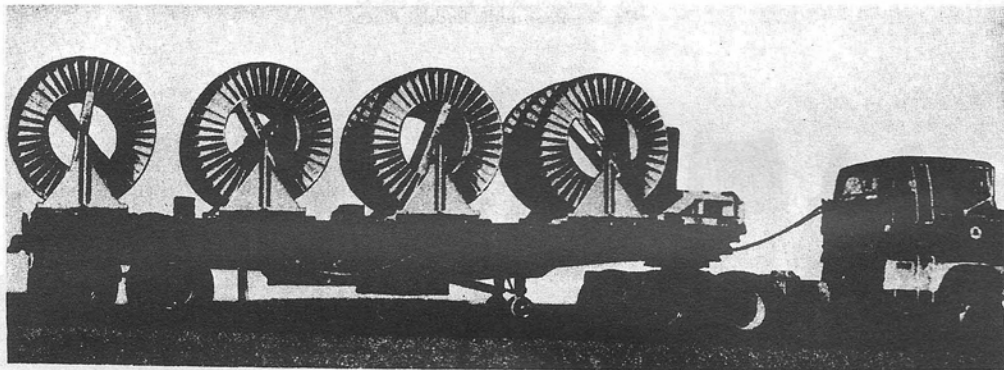


Fig. 5—Flatbed Trailer—Rear-Feed Setup

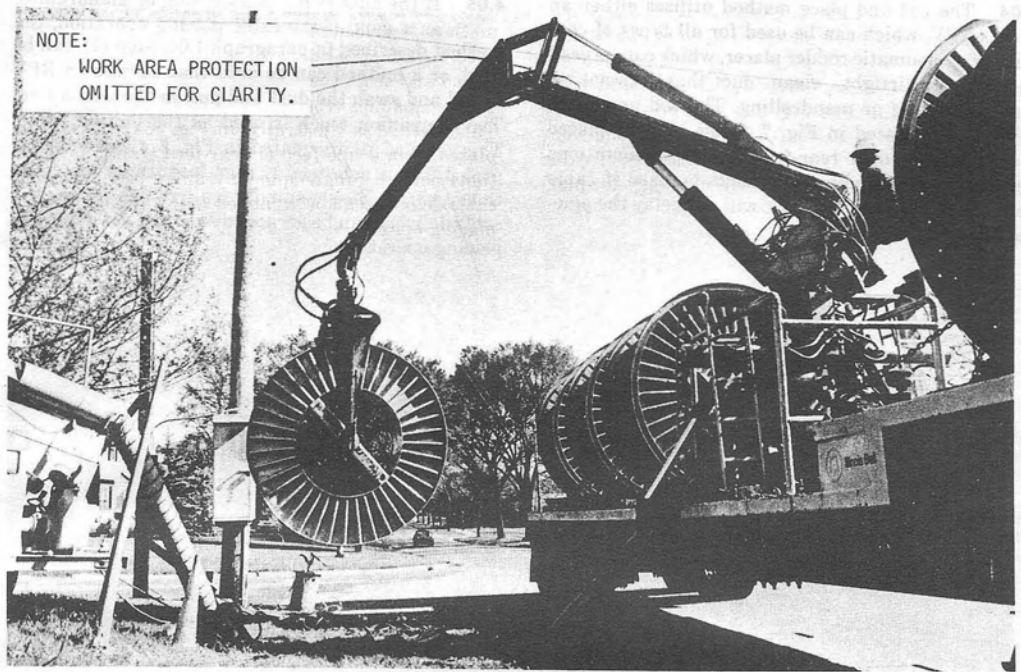


Fig. 6—Trailer-Mounted Crane

4.04 The rod and place method utilizes either an RPV, which can be used for all types of conduit, or a pneumatic rodder placer, which can be used in relatively airtight, clean duct that does not require swabbing or mandrelling. The rod and place setup is illustrated in Fig. 7. Cable may be placed from a side-feed or rear-feed trailer as conditions permit. Single-spindle trailers can be used if cable delivery can be arranged so it will not delay the placing operation.

4.05 If the duct requires swabbing or mandrelling as a part of the cable placing operation, the method described in paragraph 1.04, Step (1), can be used, or a method can be used that utilizes an RPV to rod and swab the duct and pull in the winch line. The companion truck is used as the pulling truck. This method is illustrated in Fig. 8. Cable may be placed from a side-feed or rear-feed trailer as conditions permit. Single-spindle trailers can be used if cable delivery can be arranged so it will not delay the placing operation.

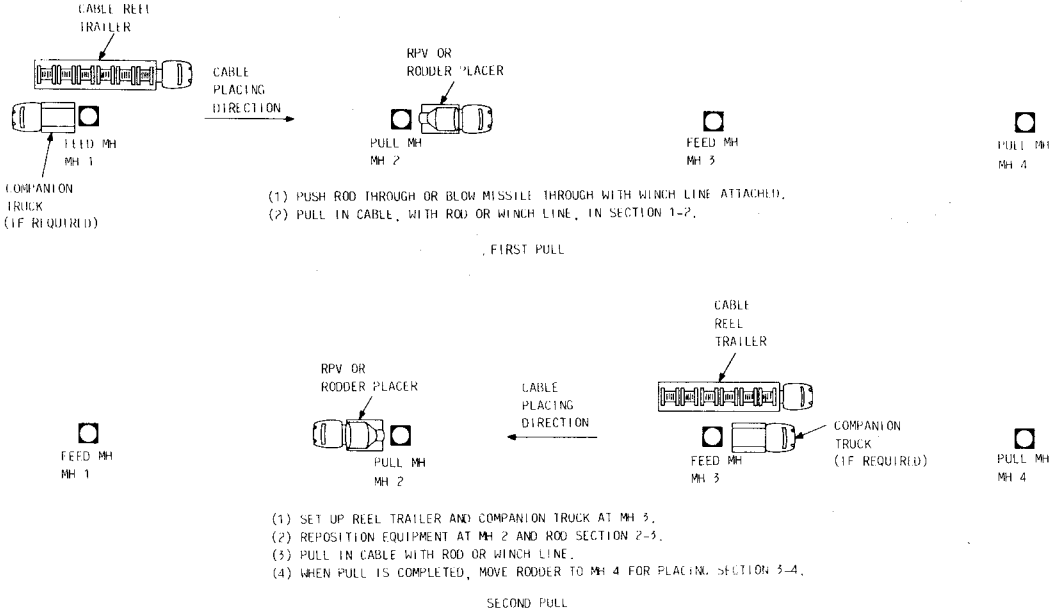


Fig. 7—Rod and Place Method

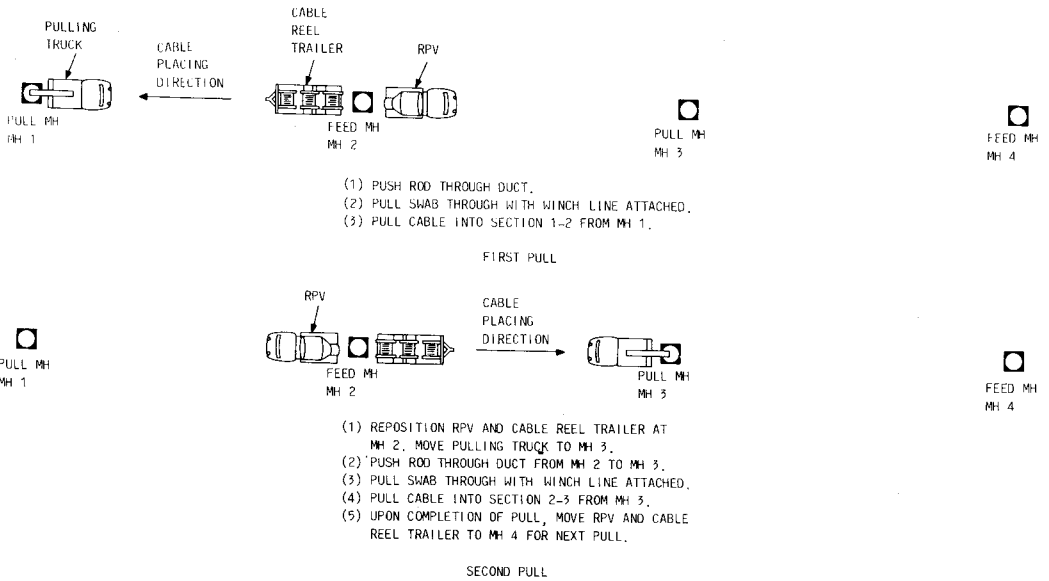


Fig. 8—Method for Placing Cable When Duct Requires Swabbing

4.06 If cable is to be placed in clean, relatively airtight, single bore conduit and an RPV or pneumatic rodder placer is not available, a placing method utilizing the B fishline kit (Practice 649-325-101) can be used. With the B fishline kit, a 3/16- or 1/4-inch polypropylene rope is attached to a cone assembly that is blown through the duct. The polypro-

pylene rope is used to pull the winch line through the duct. The winch line is used to pull in the cable. This method is illustrated in Fig. 9. Cable may be placed from a side-feed or rear-feed trailer as conditions permit. Single-spindle trailers can be used if cable delivery can be arranged so it will not delay the placing operation.

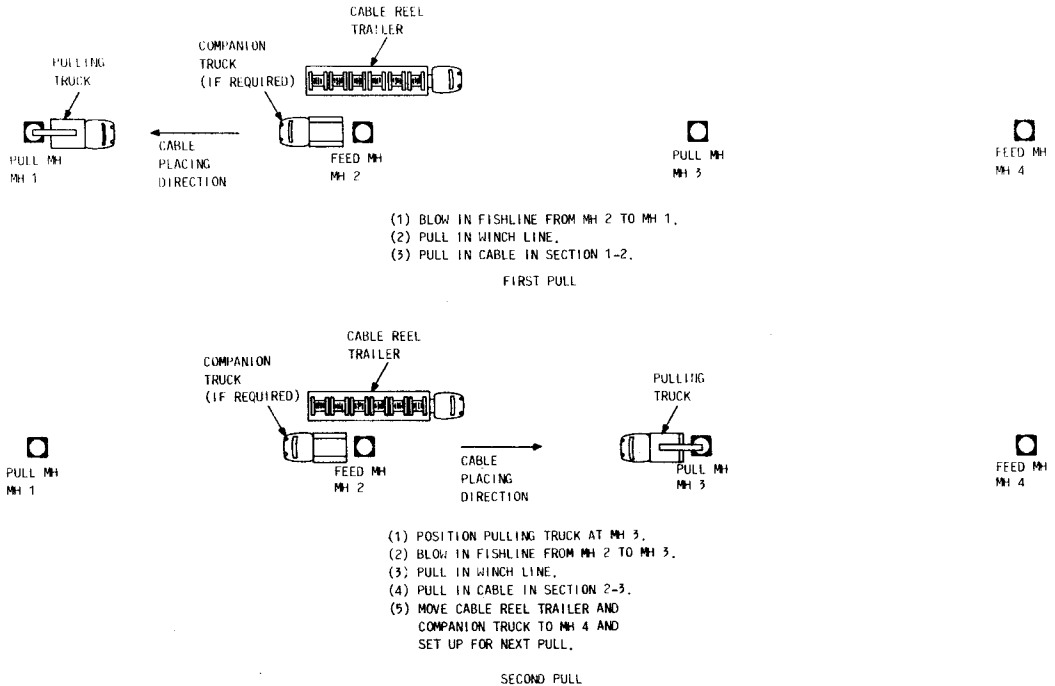


Fig. 9—Method for Placing Cable Utilizing the B Fishline Kit

4.07 Rodding and cleaning the duct and placing a pulling line or wire in advance of the actual cable placing date can be advantageous under certain conditions. With this method, the pulling truck is set up as far as practicable (up to the length of the winch line) from the first feed manhole. The winch line is pulled through all manholes between the pull manhole and the first feed manhole. As each reel of cable is placed, the cable reel trailer is moved to the next

feed manhole until the last reel is placed. For additional sections in the same run, the pull manhole remains the same and the procedure is repeated in the opposite direction. This method is illustrated in Fig. 10. Cable may be placed from a side-feed or rear-feed trailer as conditions permit. Single-spindle trailers can be used if cable delivery can be arranged so it will not delay the placing operation.

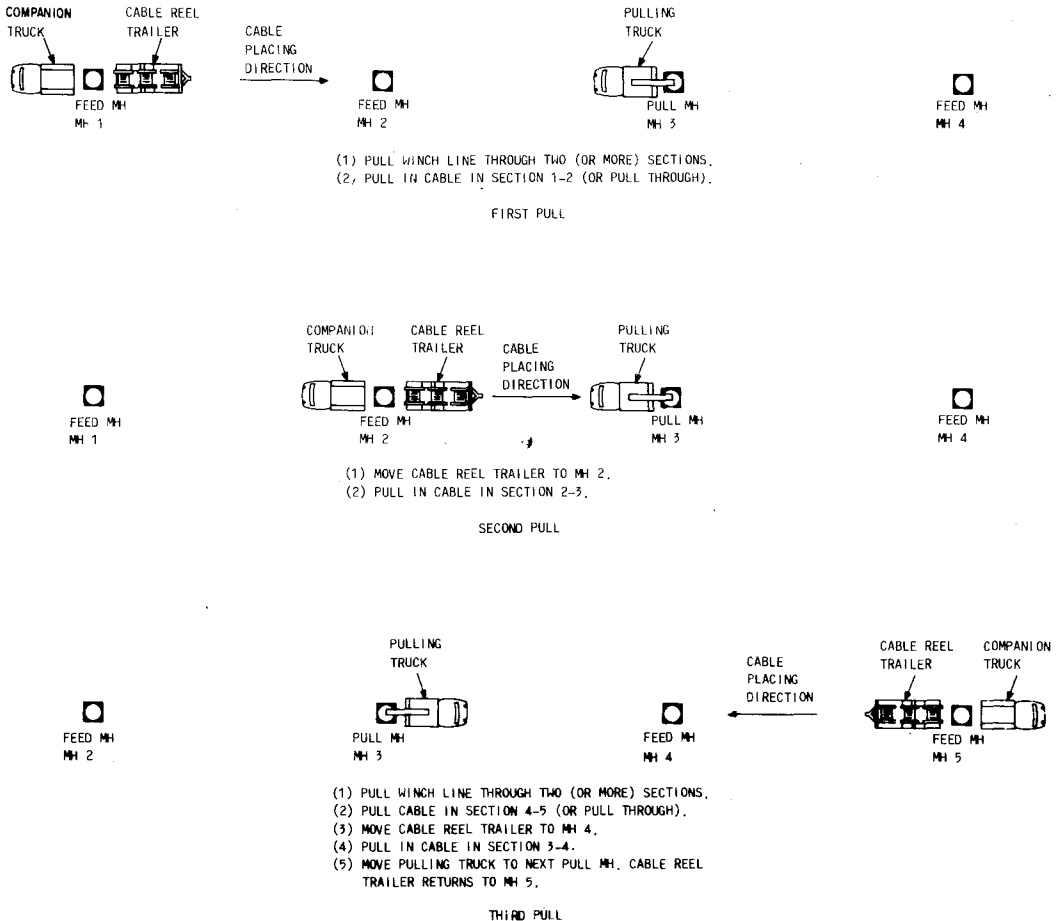


Fig. 10—Method for Placing Cable With Conventional Equipment—Prewired Ducts