

ERECTING POLES AND STUBS

CONTENTS	PAGE
1. GENERAL	1
SAFETY PRECAUTIONS	1
RAKE OF POLES	1
BACKFILLING AND TAMPING	2
RÉPAVING	2
GUARDS FOR POLES	2
2. USE OF POLE DERRICK	3
ATTACHING WINCH LINE TO POLES	3
SLAKING POLES	3
ERECTING POLES	4
3. GIN POLE METHOD	4
ERECTION AND USE OF GIN POLE	4
4. PIKE POLE METHOD	5
SMALL POLES	6
MEDIUM WEIGHT POLES	6
HEAVY POLES	8
5. WATER JET METHOD	9

application to stubs, when appropriate, is also intended.

1.02 This section is reissued to up-date information and to include information from Sections 621-205-015, 621-205-201, 621-205-202, and 621-205-203, which are cancelled. Since this issue is a general updating and consolidation of sections, the revision arrows commonly used have been omitted.

SAFETY PRECAUTIONS

1.03 The success of pole handling and the safety of employers and the public depend upon the intelligent cooperation of all concerned. Each employee should be assigned a definite part as the work operation is planned. He should understand his function and its relation to the complete operation.

1.04 The general precautions outlined in Sections 620-135-010 and 620-135-100 should be reviewed and observed as well as the specific precautions given with the work operations.

1.05 Ropes and blocks shall be used in accordance with the 081-510 and 081-511 Subdivisions.

1.06 Neither body belts nor climbers should be worn during work operations on the ground.

1.07 Plan work to avoid leaving pole holes open overnight. At all times the work area should be kept orderly and properly protected. Exercise an extra measure of caution when footing is not good.

RAKE OF POLES

1.08 Rake of guyed corner poles, dead-end poles, stubs, or push-braced poles should be approximately a distance equal to the diameter of the pole top. Pull the top out of line as the anchor guy is tensioned so the tensioning of the line wire or suspension strand and the settling of the structure will result in the pole stabilized in the vertical position. As conditions vary to permit more or

1. GENERAL

1.01 This section describes the various methods of erecting poles and stubs. The conditions existing and the equipment available should determine the particular method to be used. When practical, all material and hardware, such as crossarms, cable suspension clamps, bolts and pole steps, should be placed before the pole is erected. All work should be done so service interruption is avoided. Although this section refers to operations with poles, the

less yield under tensioning of the attachments, the rake should be modified accordingly. See Fig. 1.

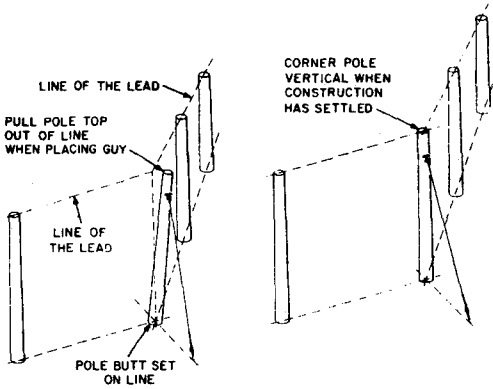


Fig. 1—Guyed Corner Pole Raked

1.09 Rake of unguyed or ground braced poles or stubs is one foot for all lengths of poles. The pole butt is set in one foot from the line of the lead. The top is set out a sufficient distance so when the line wire or suspension strand is tensioned, the top will come into line as the construction settles. See Fig. 2. In some cases the stabilization of unguyed poles will require heavier class poles and increased depth of setting. Such cases will be detailed by the plant engineer.

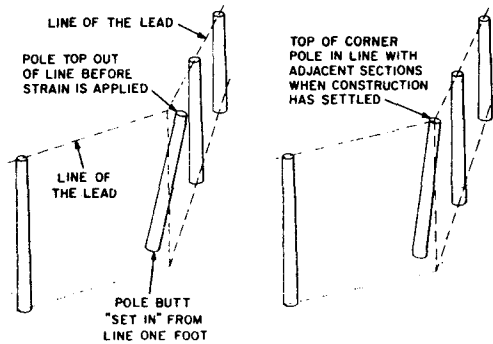


Fig. 2—Unguyed Corner Pole Raked

BACKFILLING AND TAMPING

1.10 After pole is placed, line it up and hold it erect so the pole is centered in the hole with pike poles or pole derrick. Backfill the hole with earth in six-inch layers, tamping each layer thoroughly. Avoid backfilling with frozen earth or with snow-mixed earth. When available use coarse earth or gravel at the top of the backfill and tamp well to create water-shed away from the pole. Do not bank excess earth around the base of the pole but after tamping enough to create water-shed away from the pole, dispose of excess earth.

REPAVING

1.11 Repaving should be done after the backfill has completely settled. If satisfactory with the municipality or property owner involved, it is desirable to leave an unpaved collar (2 to 3 inches wide) around the pole. This space will facilitate future pole inspection, removal, or replacement.

GUARDS FOR POLES

1.12 Where poles must be located within six inches of the street edge of the curb, in business sections, or in narrow alleys, or driveways, where vehicles may scrape in passing, hub guards should be placed as shown in Fig. 3.

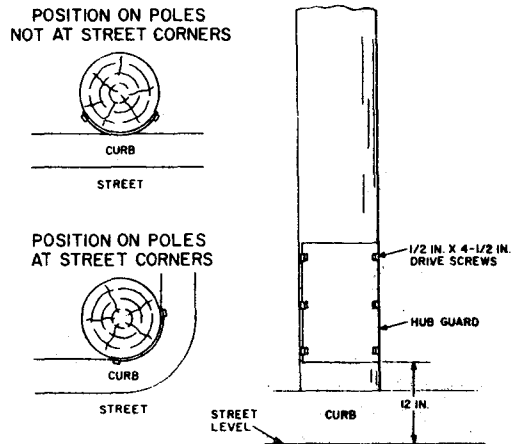


Fig. 3—Hub Guard

1.13 When bleeding of the preservative from a pole is objectionable, the public can be protected from contact by encircling the pole with a guard as shown in Fig. 4.

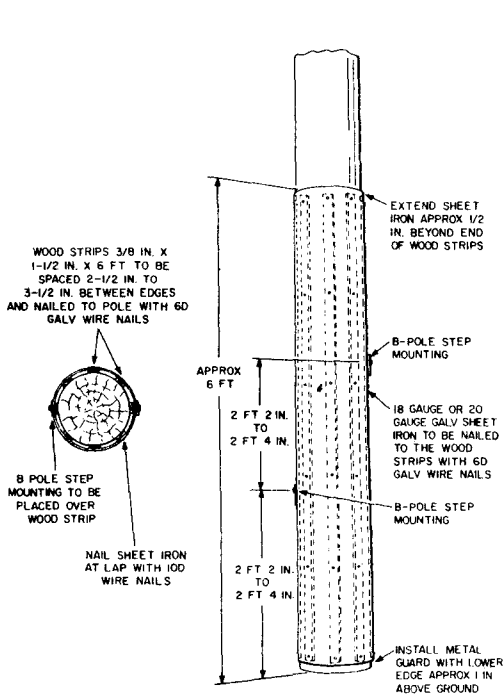


Fig. 4—Guard for Bleeding Poles

2. USE OF POLE DERRICK

ATTACHING WINCH LINE TO POLES

2.01 The use of the pole derrick will generally be the most convenient and safest method of erecting poles. Prior to use of pole derrick a review of the appropriate sections in the 649-300 series may prove helpful.

2.02 Attach the winch line to pole by placing the line, with hook in eye, around the pole and hooking down over the line. One wrap on larger poles, but smaller poles will require two wraps so the tail of the eye will not come into the hook. When the line is hooked from the top, the hook will not become disengaged by its own

weight should the line be slack. The wire rope sling, covered in 649-310-115, can be used to attach the winch line to the pole. See Fig. 5.

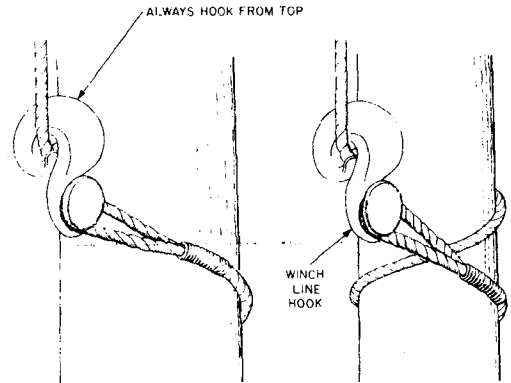


Fig. 5—Attach Winch Line to Pole

SNAKING POLES

2.03 Snaking poles along the ground is sometime necessary even though poles are delivered as close as practical to the erection site. Snaking methods vary with equipment used as follows:

- Earth boring machine derrick—run winch line from the derrick head through a snatch block on the eyebolt at rear center of the truck bed.
- Hydraulic derrick, A Frame type—run winch line directly from the derrick head for any angle of pull which will not overbalance the truck.
- Hydraulic Derrick, Rotating Type—align the derrick head directly with the pole to eliminate side load. Never place a side pull on this type derrick as this may damage the boom rotating mechanism.
- Other types of derricks—run winch line directly from the derrick head if pull is straight to the rear of the truck. If pull is at an angle, the winch line shall be run through a snatch block as shown in Fig. 6.

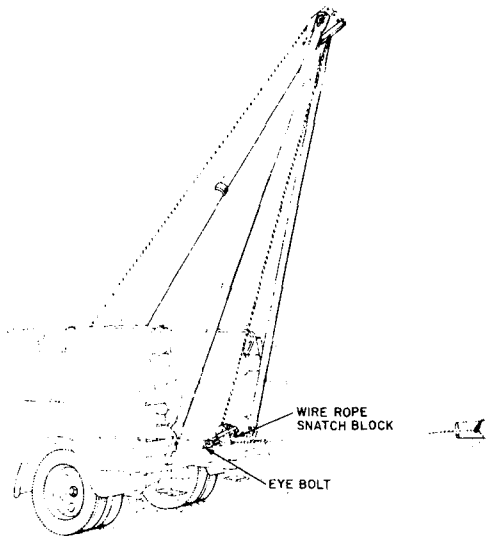


Fig. 6—Snaking a Pole

2.04 When a pole must be snaked only a short distance the winch line attachment near the balance point may permit both the snaking and erection without change of attachment. When snaking for a considerable distance, particularly over rough or irregular ground, the winch line attachment near the top of the pole will permit snaking with a minimum of resistance.

ERECTING POLES

2.05 The general methods used in placing poles with a derrick are essentially the same for all types of derricks. Proper positioning of the truck for erecting a pole will bring the derrick head pointed to the hole and approximately one foot short of the close edge as shown in Fig. 7.

2.06 The truck approach to position at the pole hole will depend upon the location of ditches and highway shoulders as well as the traffic. Truck position should be approximately level and at a point where interference to traffic will be a minimum.

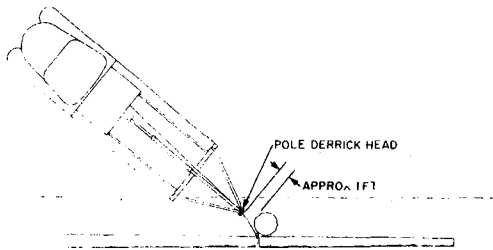


Fig. 7—Positioning Derrick

2.07 Do not lower the derrick beyond the maximum working angle specified for its type. When necessary telescope the derrick or use it in the ground position.

2.08 The winch line shall be attached to the pole at a point slightly above the balance point so that the suspended pole is slightly butt heavy. Generally this point is a few feet below the midpoint of the pole.

2.09 The pole shall be controlled from the butt end while being raised slowly and positioned for lowering into the pole hole. When the pole is being placed in an existing lead, the top should be guided carefully to avoid contact with wires or cables. ***If electric supply conductors are present the work operations shall meet requirements of Section 621-205-010.*** See Fig. 8 and Fig. 9. When control of the pole from the butt is difficult, the use of pike poles or rope guys to guide the top may be necessary.

3. GIN POLE METHOD

ERECTION AND USE OF GIN POLE

3.01 The gin pole method may be used to advantage:

- (a) When the location is not accessible to a construction truck.
- (b) When the pole is too long, or too heavy to permit the use of the pole derrick.

3.02 When practical, the use of a truck winch is recommended for setting a pole with a gin pole. Employees should keep clear of the angle

of strain presented when the winch line or pulling line passes through the snatch block at the base of the gin pole.

3.03 To erect a line pole by the gin pole method proceed as follows:

(1) The gin pole should be of adequate class and in good condition. Its length should be sufficient to permit attaching the snatch block or upper pulley block at a distance above the ground about 2 feet greater than the distance between the butt of the pole to be set and the point at which the winch line or sling will be attached.

(2) Erect the gin pole as close as practical to the hole which has been dug for the line pole. Where conditions permit, the butt of the gin pole should be set in a shallow hole to prevent its slipping. See Fig. 10. The butt may be set on the ground (or in the case of soft soil, on a plank) provided the butt is properly guyed in the opposite direction from the pull. This can be done by rope lashings to bars driven into the ground or to any other suitably substantial object.

(3) Guy the top of the gin pole with 3/4-inch rope or larger.

(4) Attach a wire rope snatch block or 3-sheave block at the proper height on the gin pole to permit the line pole to be raised clear of the ground.

(5) Run the winch line through the snatch block and attach it to the line pole to be raised at a point just above the balance point of the pole. If rope tackle is to be used, attach the lower sheave block just above the balance point. It is usually preferable to run the winch line or pulling line through a snatch block placed close to the ground on the gin pole. See Fig. 10 and Fig. 11.

4. PIKE POLE METHOD

4.01 The use of pike poles in the erection of poles and stubs and the setting of small poles by hand are described. Where poles are to be set by pikes, do not place pole steps before the pole is erected due to possible interference with the pike poles. Body belts or climbers shall not

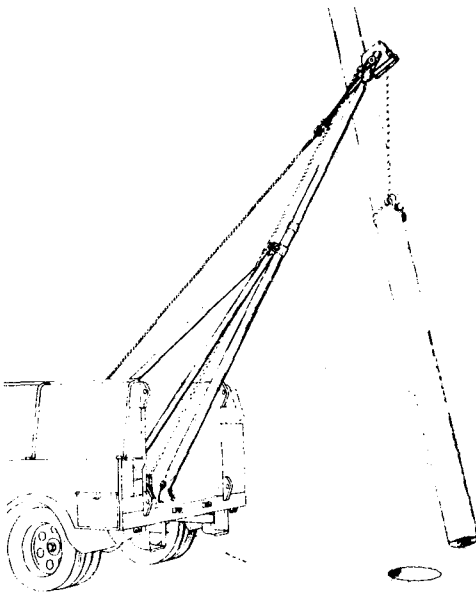


Fig. 8—Raising Pole

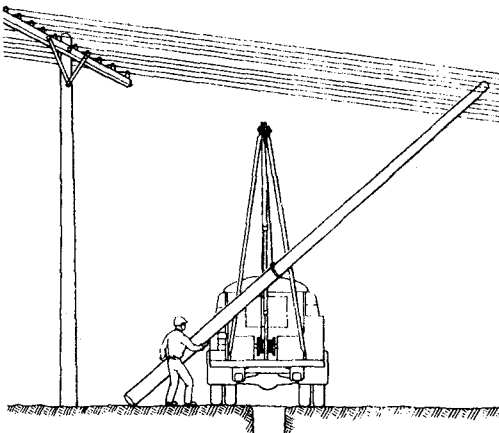


Fig. 9—Guiding Pole While Raising

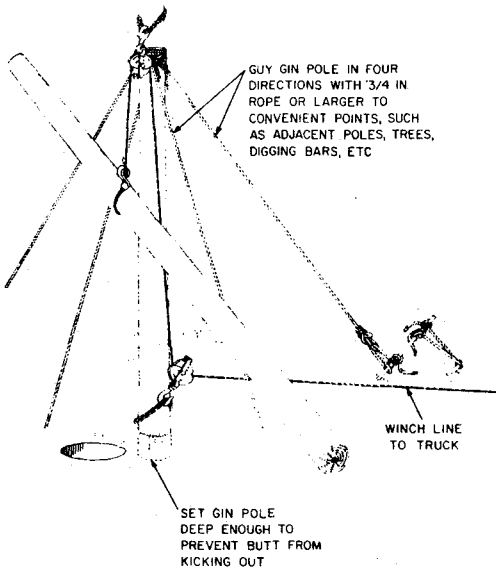


Fig. 10—Gin Pole with Winch Line to Truck

be worn by employees engaged in any pole setting operation. Nothing should be left under foot where it might cause tripping when setting the poles. Secure footing shall be obtained before attempting to raise the pole manually or by pikes. Lifting the pole should be done by the leg muscles, keeping the back straight. If it is necessary to turn a pole with a cant hook or peavy while it is being held erect, by pike poles caution should be used and the pikes held in place to avoid the possibility of the pike point being dislodged from the pole. Fig. 12.

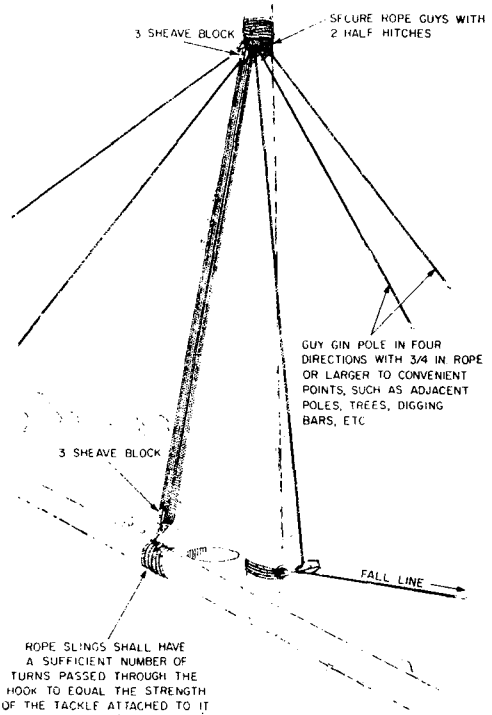


Fig. 11—Gin Pole with Rope Tackle

MEDIUM WEIGHT POLES

4.03 For medium weight poles (35-foot and smaller) proceed as follows:

- (1) Place butting board (used in soft soil) or digging bars (used in firm soil) in the hole on the side away from where the pole lies. The hole should be trenched. The depth of the trench at the edge of the hole should be at least the diameter of the pole butt and it should taper out to ground level.
- (2) Move pole into position with the butt against butting board or bars.
- (3) Place deadman on the ground near the top of the pole and approximately at right angles to the pole. The fork of the deadman should be against the pole and the footing should be

SMALL POLES

4.02 Small poles (25-foot class 7 and smaller) can be set by hand without the use of a deadman. In such cases, the hole should be trenched and pike poles and either a butting board (used in soft soil) or digging bars (used in firm soil) should be used. The depth of the trench at the edge of the hole should be at least the diameter of the pole butt and it should taper out to the ground level.

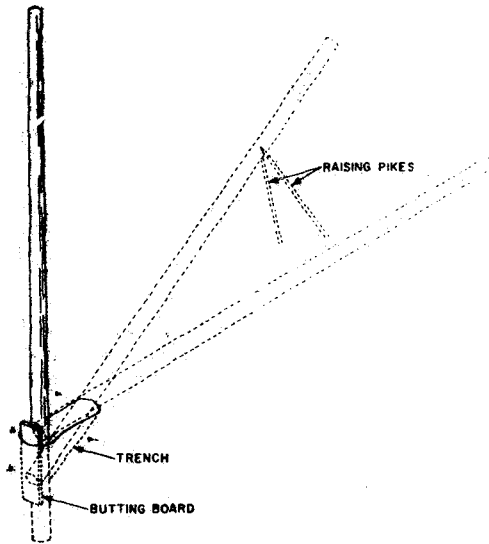


Fig. 12—Pike Raising Lightweight Pole

at a point where it will not slip when the pole is lifted and the weight is supported by the deadman as shown in Position A of Fig. 13. Station a workman to guide the deadman as the pole is lifted and prevent it from slipping along the pole or at the foot. The workman handling the deadman should, at all times, avoid standing directly under the pole.

- (4) Lift pole and deadman to Position B (Fig. 13). If pole is brought into place on a pole dolly, lift top of pole and place deadman underneath. The butt of the pole should be in the trench prepared for it.
- (5) Use 2 cant hooks or peavies, one to pull against the other as a means of preventing the pole from turning as it is being raised. Place the cant hooks or peavies about 2 feet above probable ground line. Station a workman to hold the hooks as the pole is being raised.
- (6) Place pike poles near the top of pole, one considerably to each side to assist in the lifting and to steady the pole as it rises and the others slightly to one side to do the greater part of the lifting. At this stage, the steadying

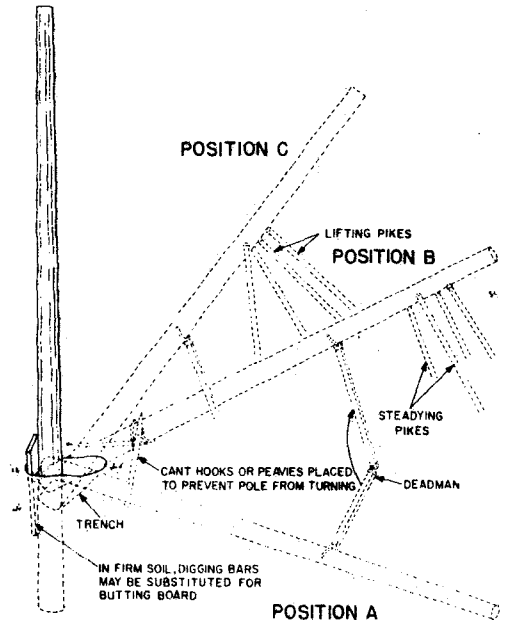


Fig. 13—Raising Medium Weight Pole with Deadman and Pike

piques should be held with the two hands separated and the lift pikes should be held in the hollow formed by clasped hands.

- (7) Raise the pole, then move the deadman down until it supports the pole again. (Fig. 13 Position C.) In changing the location of the deadman, keep it in instant readiness to support the entire weight of the pole. (Pole may be lifted from Position B to Position C by hand, if more convenient.)
- (8) Apply pikes further down the pole. (Position C.) Shift the pikes one at a time. Raise the pole again. When the pole passes the 45° angle, the men on lift pikes may work to better advantage if they use one hand to support the butt of the pike at the level of the shoulder and the other hand to guide the pike.
- (9) Repeat this operation until the pole can be piked directly into the hole. When the pole

commences to slide into the hole, remove the deadman so that it will not interfere with the movement of the pole.

- (10) Line up pole with cant hooks and steady it with pikes while backfilling and tamping.

HEAVY POLES

4.04 Where heavy poles are to be set, proceed as follows:

- (1) Move pole into position with butt against butting board, preferably using pole dolly. See Fig. 14. A short trench should be dug to keep the pole butt going into the hole. It should be wide enough to permit pole to be rocked sideways and still stay in trench.

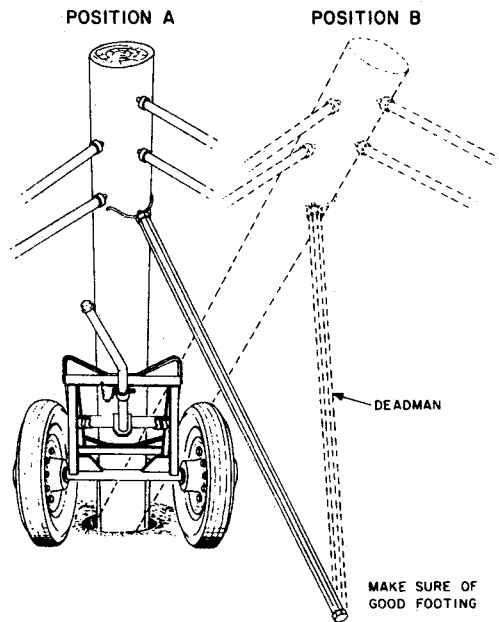


Fig. 14—Positioning Heavy Pole with Pole Dolly

- (2) Place a deadman under the end of the pole at right angles to the pole and at an angle from the vertical. (Position A.)

- (3) Distribute workman with pike poles evenly along both sides of the pole.

- (4) Place two cant hooks or peavies near butt about 2 feet above probable ground line to prevent pole from turning and station a workman to tend them.

- (5) Pike the pole toward the leaning deadman until pole is in Position B.

- (6) Remove dolly.

- (7) Place a second deadman nearer the butt at an angle from the vertical and pike the pole toward this deadman till the pole is in Position C. See Fig. 15.

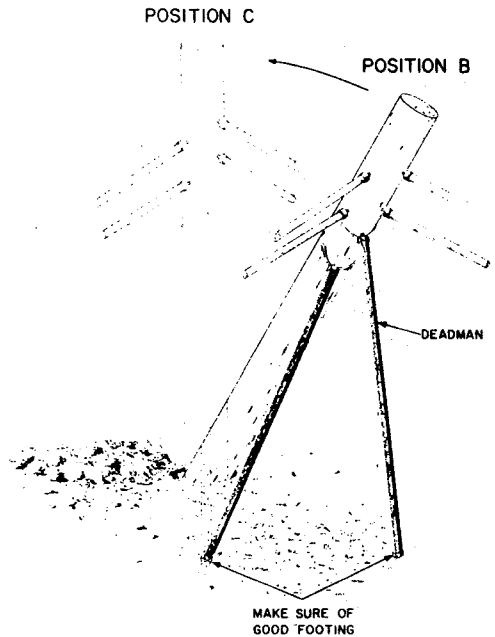


Fig. 15—Complete the Raising of Heavy Pole

- (8) Remove the first deadman and place it below the second deadman at about the same angle as before.

(9) Repeat the process. The pole is thus swayed back and forth, rising each time until it can be piked directly into the hole.

(10) Line up pole with cant hooks or peavies and steady it with pikes while backfilling and tamping.

5. WATER JET METHOD

5.01 The water jet method can be used to an advantage, when digging holes to full depth is impractical because of caving soil or subsurface water. This method requires a water supply either at the job location or hauled to it. A centrifugal pump driven by a gasoline engine can be used. A nozzle (obtained locally) is necessary at the end of the pump's discharge hose. The nozzle should reduce the outlet to about one inch when working in mud or muck. A 1/4-inch nozzle opening is effective in wet subsurface sand. A 6-foot length of 1-1/2 inch or 2-inch pipe fitted with a nozzle and coupled to the pump's discharge hose can be used to guide the jet of water or if the nozzle is fitted directly to the end of the hose it will be found helpful if it is lashed to a short pike pole handle.

5.02 Effective nozzles that can be used are:

- (1) Standard fire hose nozzle
- (2) A nozzle made up of the appropriate reducer fittings, couplings, and pipe to produce the size jet opening desired
- (3) A length of pipe to fit the discharge hose beaten down at one end to an opening of about 1-1/4 inch in diameter.

5.03 To set a pole with the water jet method proceed as follows:

- (1) Dig hole of sufficient diameter to give approximately an 8-inch clearance around the pole until the soil begins to cave or until water is encountered.
- (2) Set pole in this hole and hold it upright with pike poles or derrick.

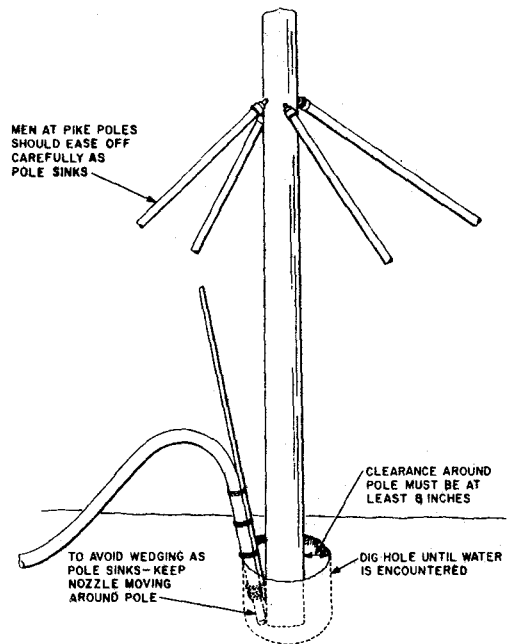


Fig. 16—Erect Pole with Water Jet

- (3) Direct a stream of water from a nozzle lashed to a short pike pole handle into the soil at the butt of the pole. The pole is gradually undermined and is sunk. During this operation move the nozzle around the butt to avoid wedging and ease off carefully on the pole support. A pressure of 25 pounds per square inch has been found to work well with this method, although the volume of water is more essential than high pressure.
- (4) When the pole has sunk to the desired depth, reduce the flow of water, remove the nozzle and shut off the water supply.
- (5) Shovel back the overflow of sediment around the pole. Usually no tamping is required.