C GUY ANCHOR

(AT-8891)

POWER INSTALLATION

CONTENTS PAGE

1. GENERAL

1.01 This practice covers the description, selection, and installation of the AT-8891 C guy anchor and also provides information for the use of the B torque indicator.

1.02 This practice is reissued to include information on the B soil test probe and to change torque requirements for C guy anchors. Revision arrows are used to emphasize the more significant changes.

1.03 The AT-8891 C guy anchor is for guying pole lines in varying soil classes ranging from soft through the very hard grade soils. This versatility is attained through a combination of helix selection and installation torque.

1.04 The C guy anchor is power-installed using the kelly bar attachment on rotating derricks equipped with hydraulic diggers. Attached to the kelly bar is the assembly of the kelly bar adaptor, C drive wrench, and C drive wrench extension when deeper anchor penetration is required. ▶When heavy duty diggers are used for installation, a B torque indicator is required. The digger torque capacity must be compatible with the recommended installation torque values required as indicated in Table A. The B soil test probe is used to estimate the type of soil at the specific anchor location.◀

TABLE A

SCREW ANCHORS (AT-8891)

SOIL GRADE	ANCHOR SIZE	ANCHOR TYPE	ROD SIZE MARKING (NOTE)	EYE NUT	GUYING LOAD	INSTALLATION TORQUE (FOOT-POUNDS)	NUMBER OF SHEAR PINS
2	5	Twin 4*	1″ Dia/32M	Triple	Up to 32M	5500	11
2	6A	Single 8†	1″ Dia/32M	Triple	Up to 32M	5000	10
2	3	Twin 8	1″ Dia/32M	Triple	Up to 32M	5000	10
2	6	Single 8	3/4″ Dia/18M	Double	Up to 18M	4000	8
3	1	Twin 10	1″ Dia/32M	Triple	Up to 32M	5000	10
3	4	Twin 8	3/4″ Dia/18M	Double	Up to 18M	3500	7
3	7	Single 8	5/8″ Dia/12M	Double	Up to 12M	3500	7
4	1	Twin 10	1″ Dia/32M	Triple	Up to 32M	4500	9
4	4	Twin 8	3/4″ Dia/18M	Double	Up to 18M	3000	6
4	7	Single 8	5/8″ Dia/12M	Double	Up to 12M	3000	6
5	4	Twin 8	3/4″ Dia/18M	Double	Up to 18M	3000	6
5	2	Twin 10	3/4″ Dia/18M	Double	Up to 18M	3000	6
5	7	Single 8	5/8″ Dia/12M	Double	Up to 12M	3000	6
6	2	Twin 10	3/4″ Dia/18M	Double	Up to 18M	3000	6
7	2	Twin 10	3/4″ Dia/18M	Double	Up to 18M	2500	5

Note: Rod markings are stamped below the threads on the eye nut end.

* Size 5—twin 4 anchor should be used only where size 6A—single 8 cannot be used.

† Always attempt to use size 6A—single 8 in difficult soils before choosing size 5—twin 4.

2. DESCRIPTION

C GUY ANCHOR

2.01 The C guy anchor is a screw-type anchor containing either single or twin helix blades welded to a 1-1/2 inch square hub, a rod with a hexagonal nut and either a double or triple grooved thimble eye nut (Fig. 1). The anchor design provides a maximum installation torque rating of 5500 foot-pounds, except the twin 4 which is rated at 7000 foot-pounds. The anchor type, such as twin 8, denotes the number of helices welded to the hub and the helix diameter.

2.02 The C guy anchor is available in eight different configurations for use in various soil conditions. Three of the anchors have a single helix design and five have a twin helix design. A tabular description of the anchors, their holding capabilities, intended soil usage, and recommended installation torque values are shown in Table A.

2.03 The standard rod used with the C guy anchor is 7 feet long. This length is adequate to allow for a soil penetration of approximately 5 feet, measured vertically (Fig. 2). A 3-1/2 foot extension rod and coupling is available when deeper soil penetration is required. The rod is equipped with either double or triple eye nuts. Either eye nut may be used for single guying applications.

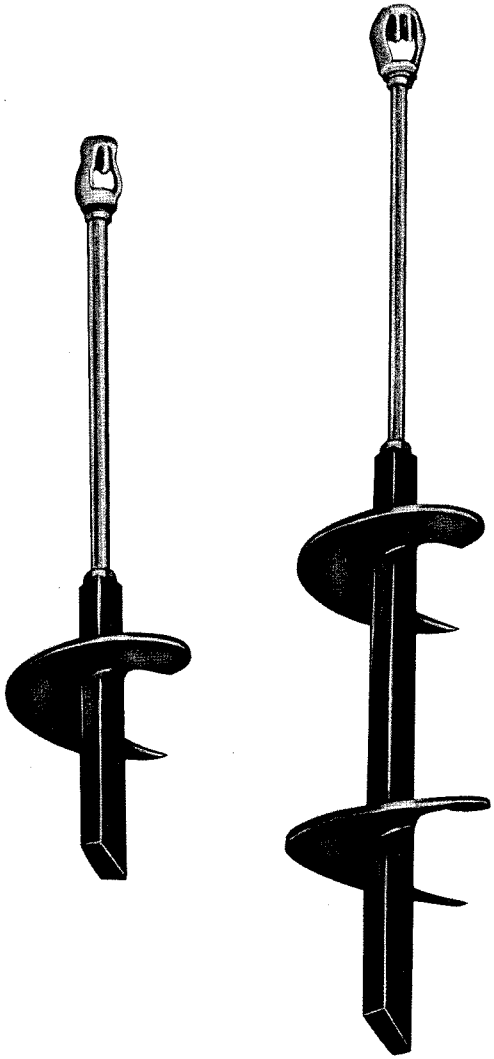


Fig. 1—Single and Twin Helix—C Guy Anchors

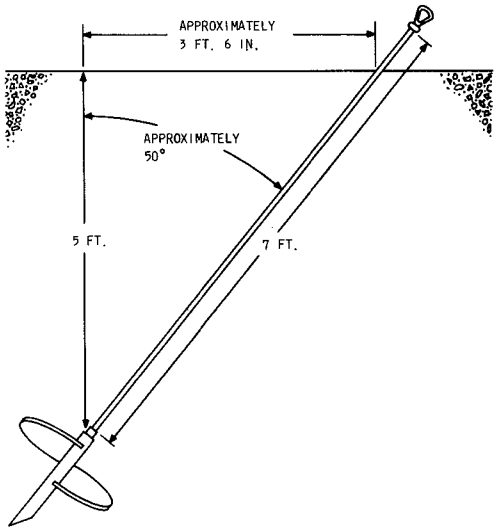


Fig. 2—Anchor and Rod Angled to Provide 5-Foot Vertical Penetration

B SOIL TEST PROBE

2.04 ▶The B soil test probe is used to determine the soil characteristics of the area where the C guy anchors are to be installed. The test probe (Fig. 3) consists of a helical head on a square shaft and a 5-foot extension. A ratchet wrench with a torque-measuring handle is used to install and remove the test probe or to take readings.

Note: The B soil test probe will not withstand torque loads over 750 on the scale; therefore, it will not penetrate packed gravel, shale, or rock.◀

B TORQUE INDICATOR

2.05 The B torque indicator, At-8894, (Fig. 4) is used to measure and limit the torque when installing C guy anchors. ▶The B torque indicator is not required with single speed diggers.◀ The torque indicator is mounted to the power digger truck kelly bar between the kelly bar adapter and the C drive wrench. Shear pins are inserted circumferentially around the torque indicator. The number of pins establishes the torque setting of the indicator. Each pin is rated at 500 foot-pounds torque capacity. When the torque setting of the indicator is exceeded, the pins shear and the indicator rotates transmitting zero torque. This prevents the anchor from being driven further which may cause overtorquing and anchor damage during installation.

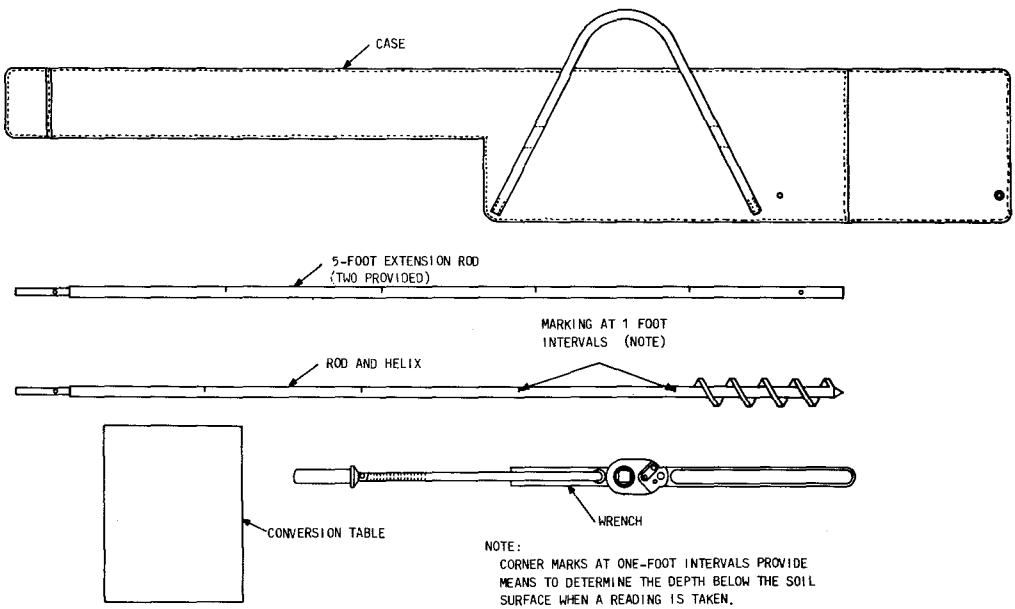


Fig. 3—▶B Soil Test Probe◀

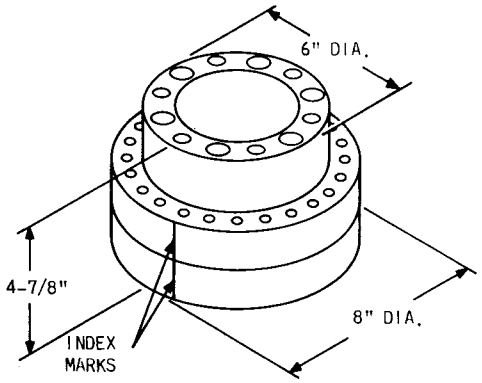


Fig. 4—B Torque Indicator

3. SELECTION

3.01 In selecting the anchor to be used for installation, the following steps must be considered.

(1) Determine the soil class in the area of installation. Refer to Table B for definitions of soil class. ▶The B soil test probe may be used to determine the soil classification as shown in Fig. 5.◀

(2) Determine the maximum guying load required.

(3) Select the proper rod and anchor from Table A which will accommodate the soil class and maximum guying load required.

4. INSTALLATION

4.01 ▶Anchors should always be installed to accommodate the maximum guying load for the rod design, ie, 1″—32M, 3/4″—18M, 5/8″—12M. To hold those loads, the installation torques shown in Table A must be adhered to. Proper anchor selection for the soil class and matching installation torques are necessary to achieve maximum holding power.◀

Before attempting the installation of a C guy anchor using a rotating derrick equipped with hydraulic digger, all personnel must know and understand the precautions required for using this equipment as outlined in Section 649-300-021.

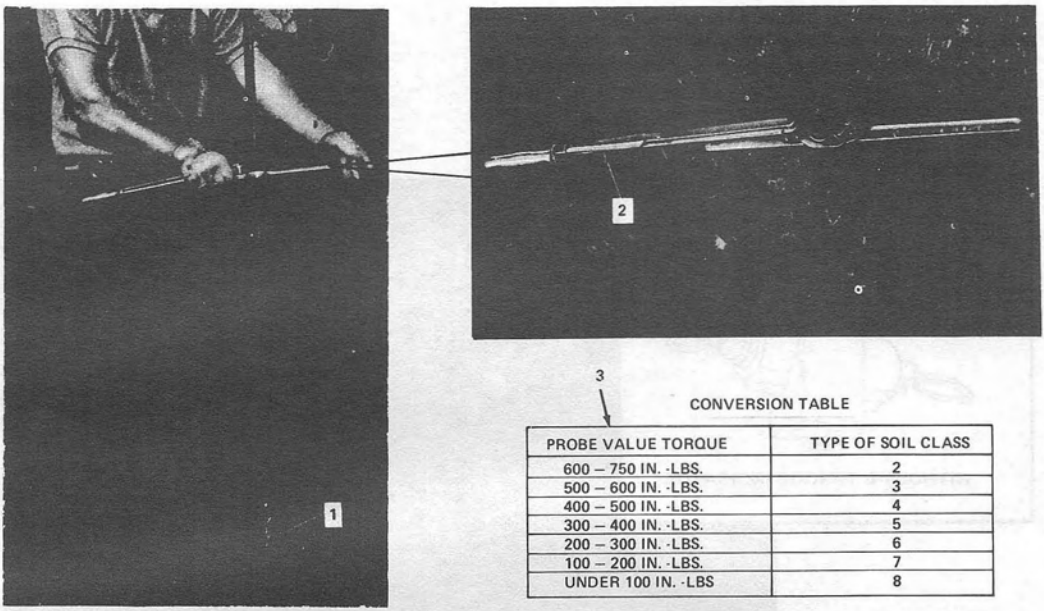
▶TABLE B◀

SOIL CLASS DEFINITIONS

SOIL CLASS	DESCRIPTION OF SOIL
1	Extremely hard; bedrock
2	Very hard; dense clay, compact gravel, dense fine sand, laminated rock, slate, schist, sandstone
3	Hard; shale, broken bedrock, hardpan, compact clay-gravel mixtures
4	Gravel, compact gravel and sand, claypan
5	Medium firm clay, loose sand and gravel, compact coarse sand
6*	Soft plastic clay, loose coarse sand, clayey silt, compact fine sand
7	Fill, loose fine sand, wet clays, silt
8†	Swamp, marsh, saturated silt, humus

* Includes areas only seasonally wet with slow drain as in fairly flat terrain.

† Install anchors deep enough, by the use of extensions, to penetrate a class 5, 6, or 7 soil underlying the class 8 soil.



CONVERSION TABLE

PROBE VALUE TORQUE	TYPE OF SOIL CLASS
600 – 750 IN. -LBS.	2
500 – 600 IN. -LBS.	3
400 – 500 IN. -LBS.	4
300 – 400 IN. -LBS.	5
200 – 300 IN. -LBS.	6
100 – 200 IN. -LBS.	7
UNDER 100 IN. -LBS	8

Fig. 5—Determine Soil Class Using the Soil Test Probe

STEP	PROCEDURE
1	Assemble test probe and rotate Helix into soil with wrench. The extension shaft may be added where required. When starting the probe, maintain the shaft perpendicular with respect to ground.
2	Torque readings should be taken at the depth to which the anchor is to be installed and approximately 2 to 3 feet above this depth to determine the average soil consistency. Use the corner notches on the shaft to determine the probe depth. One notch equals 1 foot in depth. When taking the torque reading, use one hand for the torque indicator and the free hand at the junction of the wrench and the probe. Maintain a slight force with the free hand as the torque reading is taken. This will prevent the probe from bowing which may influence the reading.
3	Use the conversion table (located on the inside flap of the carrying case) to determine the soil class.
4	The main requirement during soil testing is to ensure the probe advances one full pitch before readings are taken. This is accomplished by application of a heavier downward pressure on one handle of the wrench while the probe is being screwed into the ground.

4.02 To assure proper installation of the C guy anchor, the kelly bar of the hydraulic digger must be equipped as shown in Fig. 6.

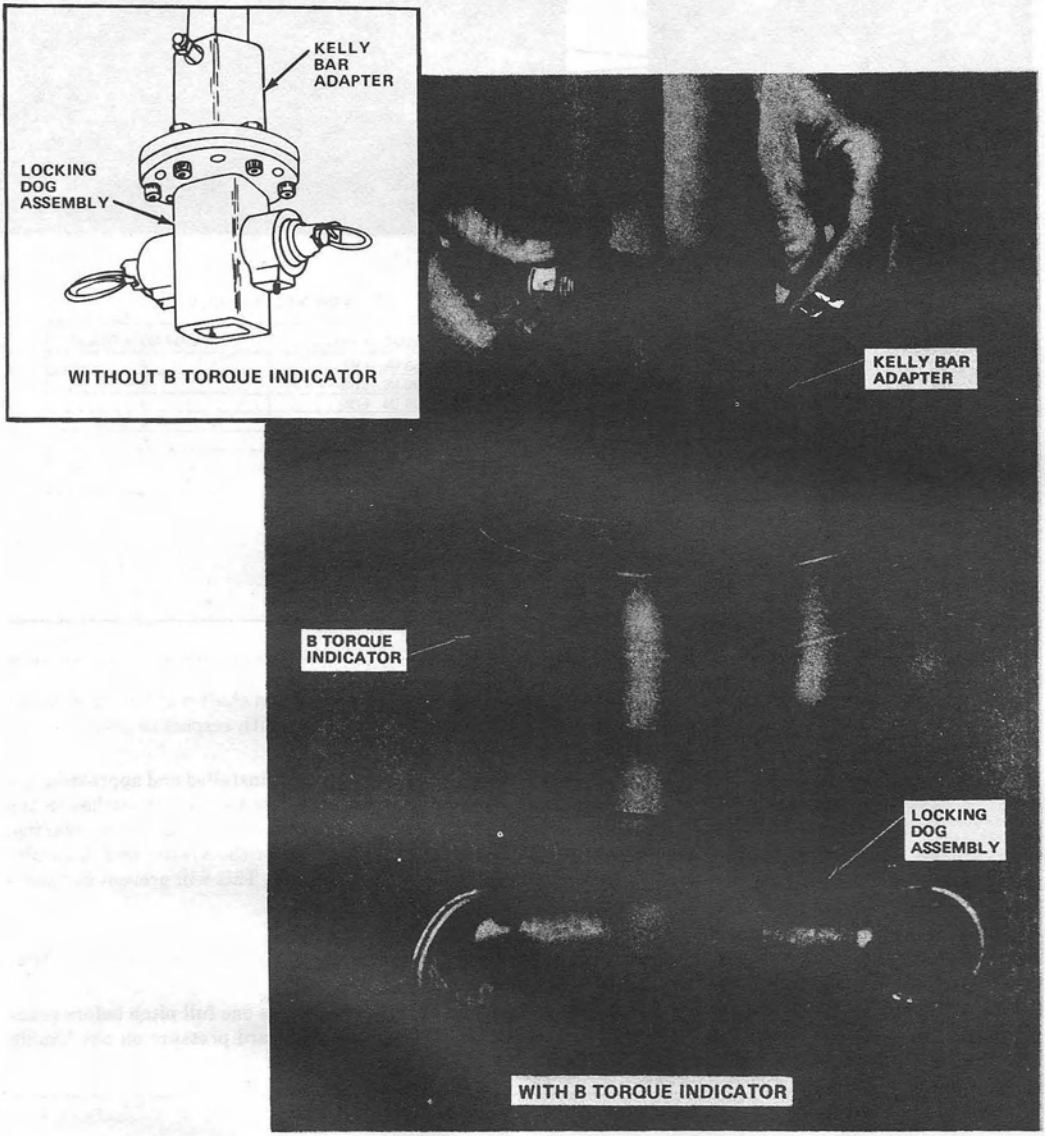


Fig. 6—Assembly of the Kelly Bar Adapter and B Torque Indicator

STEP	PROCEDURE
1	Allow kelly bar adapter and B torque indicator or locking dog assembly to rest on ground in upright position.
2	Lower the kelly bar and guide into adapter.
3	Secure adapter assembly to kelly bar with 5/8-inch by 4-inch bolt and nut.

4.03 When using a heavy duty digger, determine the torque value needed for the anchor installation and load the B torque indicator as required. See Table A and Fig. 7. Each pin is rated at 500 foot-pounds torque capacity.

4.04 Install the drive wrench attachment as indicated in Fig. 8.

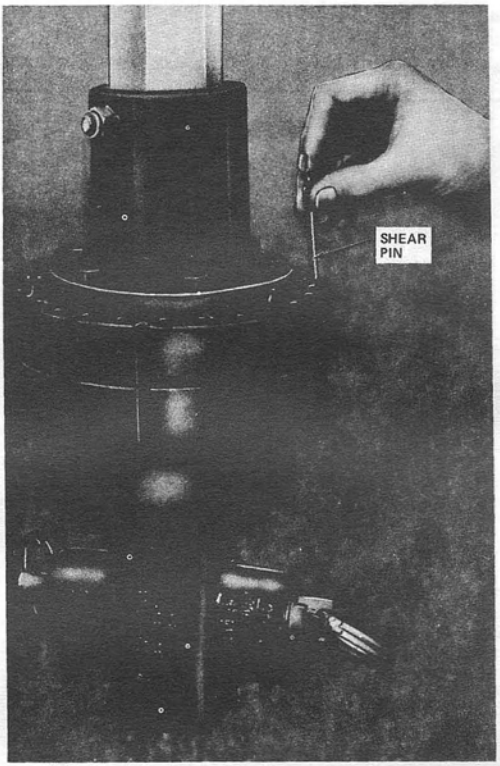


Fig. 7—Loading B Torque Indicator

STEP	PROCEDURE
1	Raise assembly to waist height.
2	Check freedom of unit by rotating bottom plate with respect to top plate.
3	The outer diameter of each plate has an indented mark accented with paint. Rotate plates to bring these index marks into alignment before loading.
4	Insert shear pins, spacing them evenly around B torque indicator (Table A).

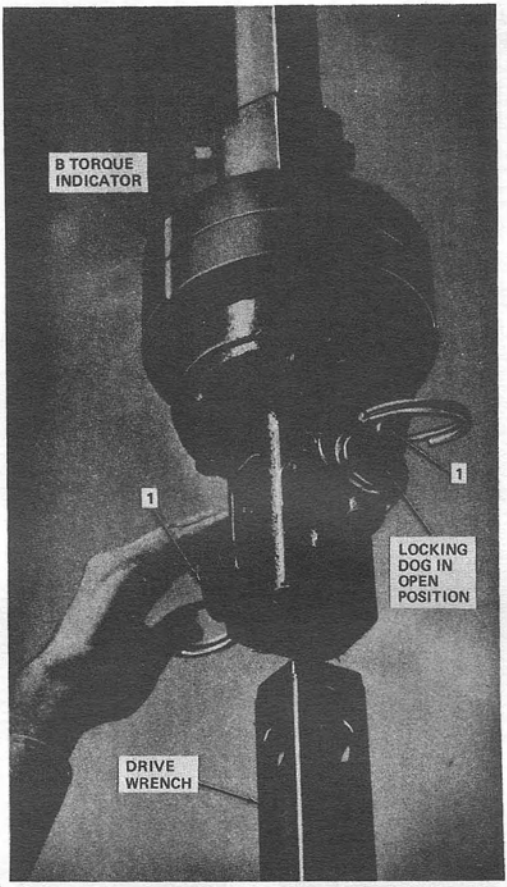


Fig. 8—Drive Wrench Attachment

STEP	PROCEDURE
1	Pull out on rings and twist to open locking dogs of the drive wrench adapter.
2	Raise, then lower assembly to fit drive wrench into adapter.
3	Twist rings to close locking dogs to the inner position.
4	Make certain locking dogs snap into the inner position to hold the anchor rod.

4.05 Place the anchor rod into the tubular drive wrench as shown in Fig. 9.

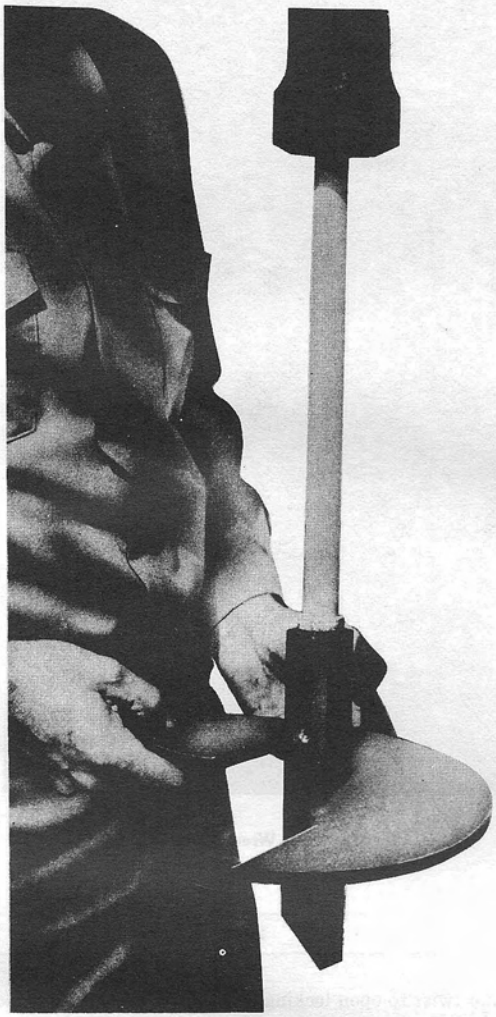


Fig. 9—Attaching Anchor to Drive Assembly

STEP	PROCEDURE
1	Raise the drive assembly high enough so the anchor and rod will slide into the hollow drive wrench.
2	Lower the drive assembly to elbow height and with upward push of anchor, lock the anchor into the drive wrench. The locking dogs, properly closed to the inner position, will hold the anchor in the wrench.

4.06 ***Caution: To prevent damage to underground plant, it must be determined that the area to be penetrated is clear before installing the anchor.*** Insert the anchor assembly as shown in Fig. 10.

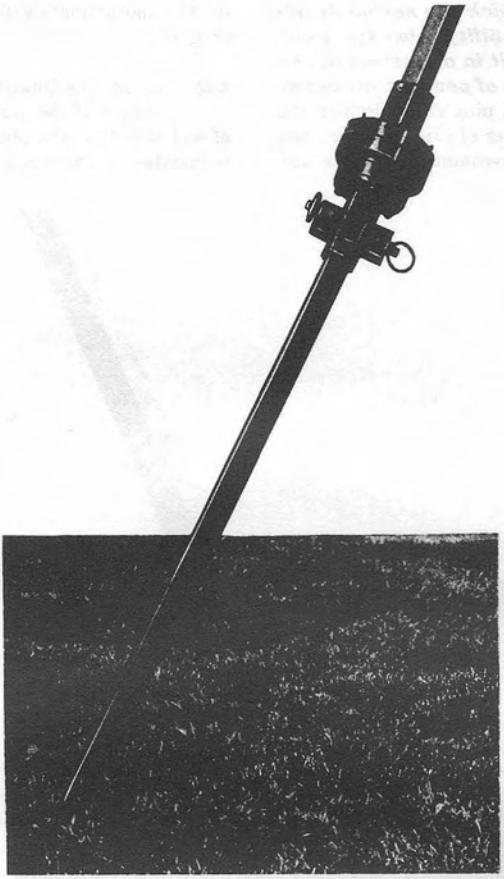


Fig. 10—Angled Assembly Ready for Installation

STEP	PROCEDURE
1	Raise anchor and place perpendicular to point of insertion.
2	Rotate anchor clockwise with down pressure to break ground surface.
3	When the anchor has a good bite in the soil, angle assembly (approximately 50°) in direction of pull and continue to rotate, clockwise, with down pressure.
4	When the locking dogs reach ground level, stop the installation.

4.07 ***Caution: If the operator fails to keep enough down pressure on the anchor to allow for a steady, smooth anchor insertion, the result is spinning which can seriously affect anchor-holding capability. Also, too much down pressure can result in distortion of the helix and a resultant loss of penetration capability.*** Install anchor until pins shear. Reload the unit with the original number of pins plus two, not to exceed maximum torque recommendation for anchor (paragraph 2.01) or equipment and drive anchor at least 2 additional feet into soil. When the locking dogs are at grade, the end of the rod is at proper depth, approximately 6 inches out of the ground (Fig. 11).

4.08 Reload the indicator with the original number of pins. If the anchor is still in the same type of soil or better, the pins will shear and the anchor is installed to the recommended torque value.

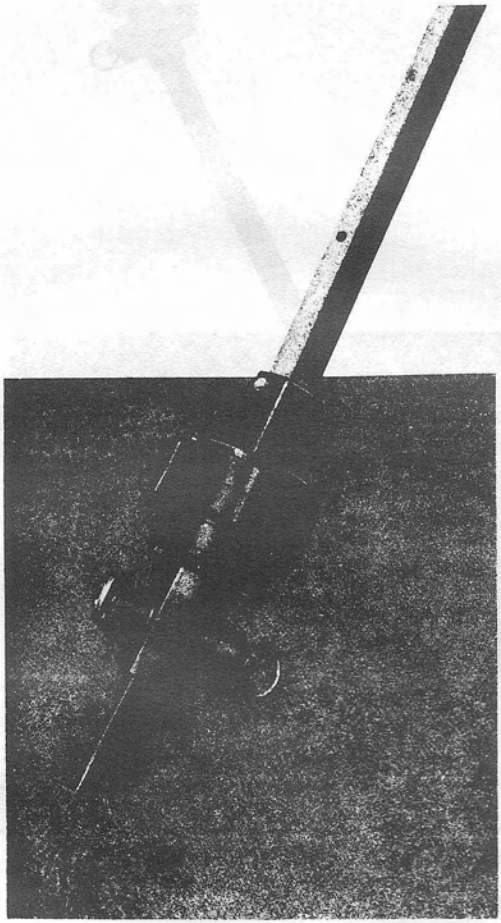


Fig. 11—Completed Anchor Insertion

4.09 If the pins do not shear, add an extension to the anchor. A 3-1/2 foot extension rod and wrench may be added as indicated in Fig. 12, 13, and 14.

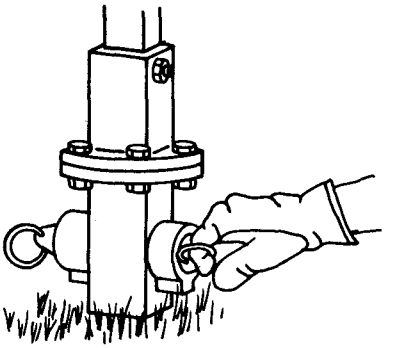


Fig. 12—Removing Kelly Bar and Locking Dog Assembly

STEP	PROCEDURE
1	Position locking dogs in outside position.
2	Withdraw kelly bar and locking dog assembly. (Wrench assembly and anchor will remain in the ground.)

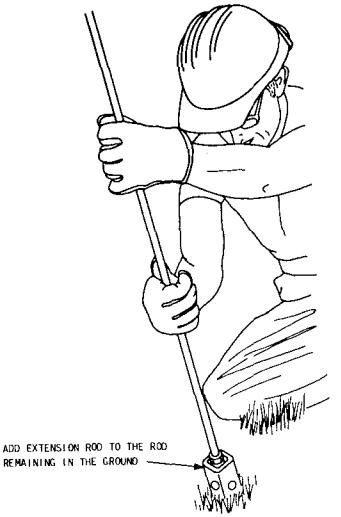


Fig. 13—Adding Extension Rod

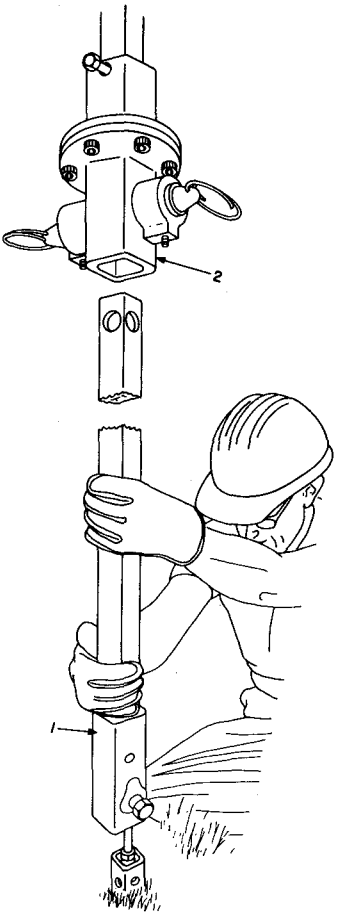


Fig. 14—Adding Wrench Extension Assembly

STEP	PROCEDURE
1	Place extension wrench over anchor rod extension and bolt to wrench extension.
2	Attach top of extension rod and wrench in locking dog assembly and continue installation.

4.10 After the anchor has been installed, the assembly can be removed from the rod and anchor by opening the locking dogs to the middle position and simultaneously rotating and pulling the kelly bar assembly. Upon removal of the drive assembly, the thimble eye nut is added to the anchor rod and the installation is complete as shown in Fig. 15.

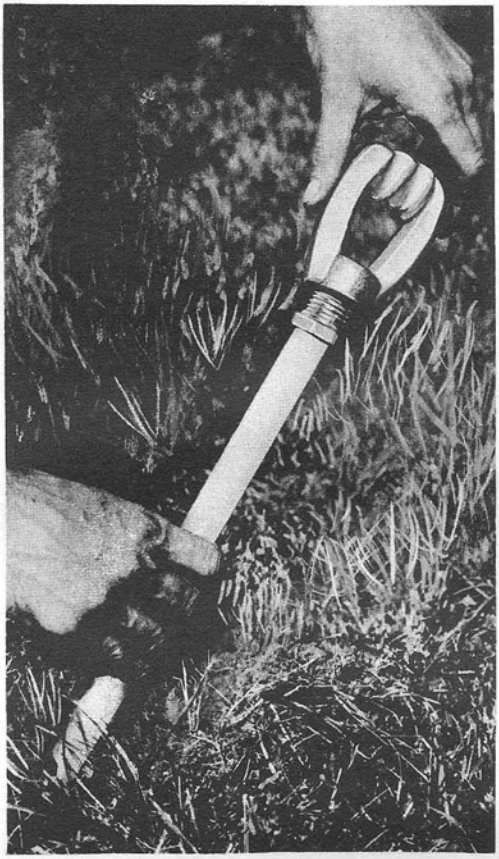


Fig. 15—Completed Anchor Installation