

# THE UNDERWUNDER

P.O. Box 118370  
Carrollton, Texas 75011  
877 YOU BORE fax 972-436-4445  
972-436-3888



*These instructions are for the crew's safety and operational efficiency.*

1. Do not modify this machine in any way without Factory approval.
2. Be certain all **electrical lines, gas lines, and telephone lines**. Always look for signs of buried utilities **before** boring. Do not solely depend on other companies' information.  
**Toll Free No. for utility location: 1-800-258-0808**
3. **Always** operate machine with a minimum of **two** people.
4. **Never** straddle or stand on revolving drill rod nor attempt to guide or hold rod by hand.
5. Keep hands, arms, legs and clothing clear of all revolving parts.
6. **Do not** wear loose-fitting clothing, rings, etc., during operation.
7. **Do not** operate machine unless the entire crew has been properly instructed in safety requirements.
8. Contact with moving parts could result in personal injury.
9. **Do not** touch winch cable while engine is running.
10. **Do not** let the winch cable come in contact with any rotating parts.
11. **Always** use alignment stakes to hold drill tubing in bottom of lead-in trench.

## GENERAL INSTRUCTIONS

### A. PURPOSE

To describe safety precautions and hand signals to be used in horizontal earth boring.

### B. SAFETY REQUIREMENTS

Operator must be trained in the use of the boring machine and crew members made familiar with the following safety requirements before boring operations are performed.

1. At least two crew members to operate boring machine at all times, because the motor can produce torques higher than one man's ability to control.
2. Crew members and spectators must stay clear of rotating bore pipe, winch cable and rotating head of boring machine. Loose clothing, long hair or gloves can cause possible injury if caught in rotating bore pipe. The operator must kill engine if anyone is dangerously close to rotating bore pipe, winch cable or machinery.
3. Assign only one crew member to transmit signals to operator. An additional crew member may be used to relay signals if distance or visibility prevents communication between signaler and operator.
4. **Do not** interrupt or distract operators while boring machine is in operation.
5. The operators must be alert to all components of the boring operation and must be in constant communication with the assigned signaler. The operator must not leave controls of the boring machine while it is running, and must stop engine if any signal is unclear.
6. Crew members are not allowed in an excavation with a rotating bore pipe or in an excavation which a rotating bore pipe is about to enter.
7. **Do not** hold rotating bore pipe with hands or feet.
8. **Never** operate machine without using alignment stakes to hold drill tubing in bottom of lead-in trench.
9. To eliminate tubing whip and crawl between machine and rear alignment stake, drive wood stakes on both sides of drill tubing at necessary intervals.

**B. SAFETY REQUIREMENTS (Cont'd.)**

10. Never attempt to thread drill tubing onto machine while machine is running.

11. Do not uncouple bore pipe which is under a strain or bind unless it is adequately restrained. It carries a potential force which, when unleashed, can cause damage or injury.

12. Keep sidewalks, streets and working area free from tangled hoses and equipment which may cause tripping or injury to a crew member or the public.

**C. HAND SIGNALS**

1. Field crews use two types of signals during a boring operation: voice signals and hand signals. To be effective, voice signals must be heard and hand signals must be seen. Both must be understood by the entire crew.

2. To avoid confusion, only one person gives signals.

3. The following are four simple signals used by Boring crews:



Turn on Water

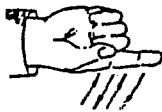
Make back and forth motion toward mouth with hand closed and thumb extended.



Start Engine

Fully extend hand overhead and rotate in circular motion.

**C. HAND SIGNALS (Cont'd.)**



Move Bore Pipe

Move hand to indicate direction desired.



Stop (stop engine - turn off water)

Fully extend hand overhead.

**MACHINE MAKE-READY**

**A. PURPOSE**

To prepare machine for use.



**WARNING**

**BEFORE USING** machine, start engine and verify proper operation of **ON/OFF SWITCH** (Kill Switch).

1. The engine and gear box are shipped dry. Fill each to proper level as directed in the engine manufacturer's Operating and Maintenance Instructions.

2. Use unleaded gasoline only. **DO NOT ADD OIL TO GASOLINE.**

3. Grease water swivel before every use. 1/4 pump from a standard grease gun should be sufficient. **DO NOT OVERGREASE!**  
(Use of water swivel without proper lubrication will cause premature failure.)

# BORING INSTRUCTIONS

## A. PURPOSE

To provide instructions for horizontal boring operations.

## B. GENERAL

Review the work order and installation plan for any special conditions that might affect the boring operation. Determine that all closely parallel or crossing substructures have adequate clearance before mechanically boring or trenching. Expose electric power or communication conduits and cables, transmission lines and pipe lines transporting flammable and/or toxic substances to assure adequate clearance.

## C. SITE PREPARATION:

1. A lead-in trench must be made in line with the desired exit point. (See Illustration A.) This trench need only be wide enough to accommodate the drill tubing, bit, and alignment stakes. The depth of the trench should be a few inches deeper than the bore hole entrance depth.
2. Lead-in trench lengths:  
Entrance depth 1 ft. — length 15 ft.  
Entrance depth 2 ft. — length 18 ft.  
Entrance depth 3 ft. — length 21 ft.  
Entrance depth 4 ft. — length 24 ft.  
NOTE: 50% of lead-in trench to be at full noted depth. Remaining 50% can be tapered out to surface. (See Illustration A & B.)
3. A bell hole or continuing trench is needed on the exit side to expose the desired exit point.

## D. EQUIPMENT SET-UP:

1. Place **UnderWunder** astride lead-in trench.
2. Connect a water hose from the water source to the valve on the machine hose at upper left-hand handle position. City water pressure (usually 40 PSI or over) is sufficient. If water is not available, a pump and portable water supply must be used.
3. Attach required lengths of drill tubing with bit to machine and lay drill tubing in trench.

## D. EQUIPMENT SET-UP (Cont'd.)

4. Place target in bell hole or trench at desired exit point.
5. Align the drill tubing in the entrance trench by driving the hold-up alignment stake inside and to the right of the drill tubing approximately one foot from entrance point. Lock sleeve to hold bit up at the entrance point. (See Illustration A.)
6. Drive hold-down alignment stake three feet behind hold-up stake. Let sleeve rest on top of drill tubing. (See Illustration A.)
7. Place the sight on the drill tubing between the alignment stakes. Looking through the sighting device at the target, align the drill tubing by adjusting the hold-up and hold-down sleeves on the alignment stakes. (The alignment stakes provide horizontal alignment. The adjustable sleeves on the alignment stakes provide vertical alignment.) (See Illustration B.)
8. Drive a stake (3/4 re-bar x 2 ft. long) even with and 1-1/2 ft. to the right of rear alignment stake. Place winch in neutral position and pull out cable from beneath frame mounted pulley and place over stake.



# WARNING

Always use alignment stakes for all boring operations. Alignment stakes firmly hold the drill stem into the bottom of the lead-in trench preventing whip and the possibility of stem and bit coming out of trench.



# WARNING

Keep slack out of cable at all times. Keep cable taut throughout all boring operations and at all times when engine is running. **NEVER** touch cable while engine is running.

## E. BORING OPERATION (2" TO 3-1/2" BITS)

1. After checking for cable tension, start engine.
2. Turn on water by opening water valve on hose. OBSERVE SPRAY until supply hose, machine hose, and drill tubing are totally void of air. This prevents water holes in bit from becoming clogged at beginning of bore.
3. To begin bore, operators stand behind the **UnderWunder**. Grasp the handle and hold machine in alignment. Turn crank on winch until bit begins to cut. Increase throttle setting and make the bore keeping constant, steady pressure on the handle with left hand and turning crank with right hand.
4. Station an observer at target hole for signaling purposes.
5. When bore is completed, stop engine and turn off water. At this time wind cable back onto winch and make secure.
6. Re-start engine, turn on water and retract drill stem and bit from bore hole by pulling machine backwards.
7. Station observer near bore entrance point to signal when bit exits hole. **DO NOT** let bit come in contact with hold-up stake.
8. Long bores are accomplished by adding additional lengths of drill tubing. To add tubing, **stop the engine** by placing the **ON-OFF** switch (kill switch) in **OFF** position. **Remove spark plug wire.** Close water valve. Unscrew drill tubing from machine. Back machine up to provide sufficient room for additional drill tubing. Thread male end of additional tubing into female end of tubing that is in the bore hole. To fasten machine to additional tubing, **before starting**, turn engine with starter rope to thread machine into new drill tubing. Tighten all joints securely with a pipe wrench. Then start engine, turn water on, and continue boring as before.
9. **All bores should begin with a minimum of 20 ft. of drill tubing.** This provides the necessary flexibility to allow the drill bit and preceding 4 to 5 ft. of drill tubing to be held by the alignment stakes in a horizontal, inline position.

## F. BACK-REAMING OPERATION

**NOTE:** All pilot holes, regardless of reamer size, should be bored with a 2 inch bit (2003BC).

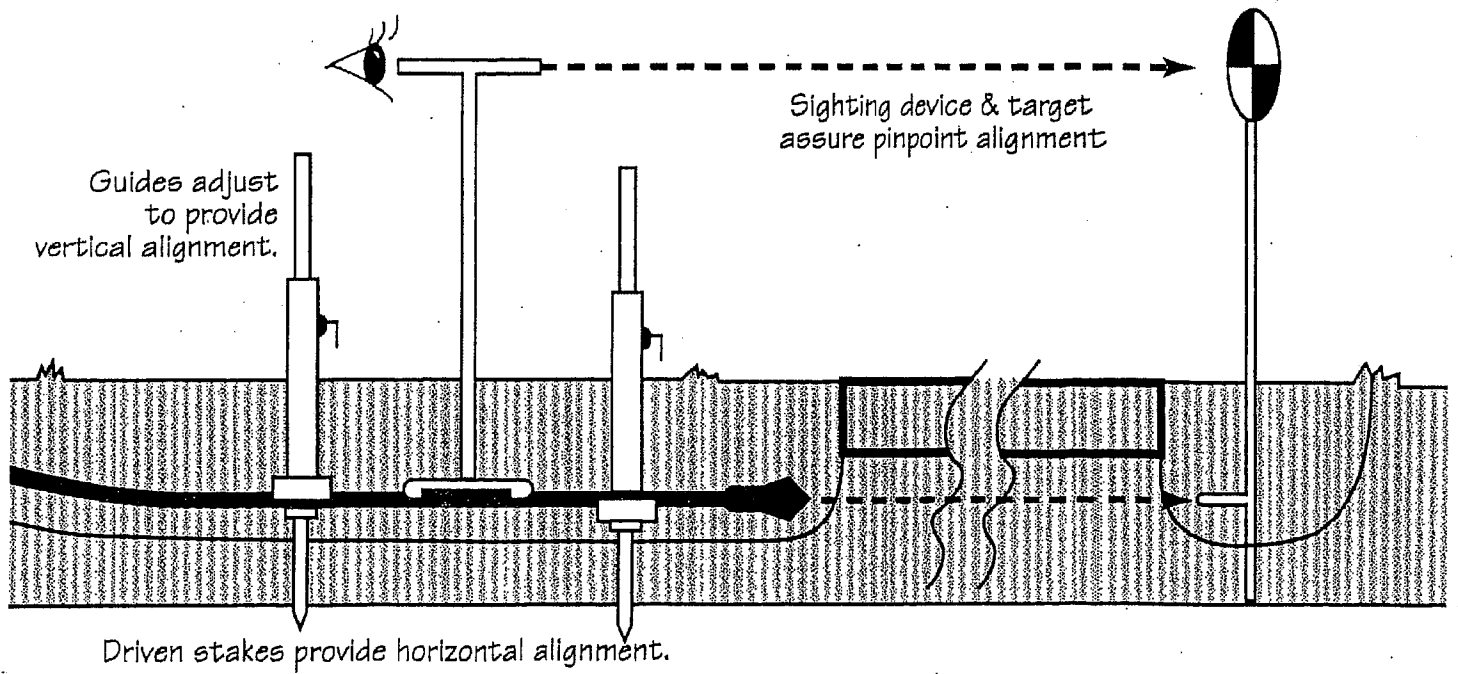
1. After completing 2 inch pilot hole and before retracting drill tubing, **remove spark plug wire.** Remove pilot bit and install reamer.
2. Remove cable from beneath pulley on frame, run cable over top of pulley and pull out from beneath toward rear. Pull cable away from machine (away from bore hole) and stake cable behind machine.
3. Clear water system of air and crank reamer back through pilot hole.
4. Station observer near bore entrance point to signal when reamer exits hole. **DO NOT** let reamer come in contact with hold-up stake.
5. In some soil conditions (clay, black gumbo, etc.) before initial ream can be completed, reamer must be pushed back through bore to starting position to clear cutting teeth of spoils. In doing so, unwind winch handle while pushing machine forward.

**NOTE:** Make certain 2 inch pilot hole is deep enough to keep reamer from coming in contact with bottom surface of concrete. Failure to do so will severely damage reamer blades and teeth.

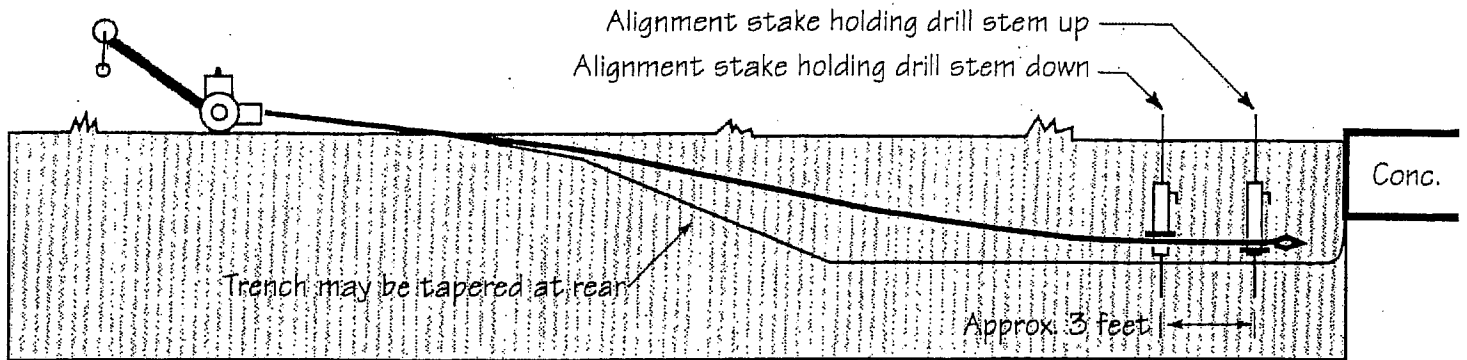
### HELPFUL SUGGESTIONS:

- Run water during all boring and reaming operations.
- Do not force the machine when in hard soil or rock. Maintain a firm forward pressure. **NEVER** bump cutting tool (bit or reamer). Doing so can cause damage to carbide teeth.
- Upon completing the bore, if cuttings remain in the bore hole, make one or two complete passes through with engine and water running.
- Two critical factors affect the life of bits and reamers:
  1. Maintain constant, firm, and steady pressure. **NEVER** jerk or bump cutting tool into work. To do so will cause tool damage.
  2. Make all bores far enough below walk, drive or road to insure that the bit (or reamer) does **NOT** come into contact with underside of concrete. If the bit or reamer does contact bottom of walk, drive or road, damage to carbide and/or blades is highly probable.

# Illustration B



# Illustration A



(Illustration exaggerated for clarity)

## WARNING

Always use enough drill stem to complete bore before machine comes within 6 to 8 feet of road or drive. Failure to do so makes drill stem ride up against underside edge of concrete, causing excessive stress on machine and will groove the drill stem. This can cause premature drill stem failure.

**CAREFULLY OBSERVE ALL WARNINGS,  
CAUTIONS AND INSTRUCTIONS IN THIS MANUAL  
AND KEEP FOR FUTURE REFERENCE.**