EXPLORING EQUIPMENT:

Installing Pipe and Wire Without a Trench

By Daniel Ingham, Equipment Editor

Trenchless technology has come a long way. It used to be that only utility companies and large construction contractors could afford the technology and personnel necessary for successful underground boring. Today, boring machines can be found at rental stores and in municipal equipment inventories. A growing number of landscape contractors are adding them to their tool collection.

One reason for the increase in boring over trenching is that it reduces the disruption of carefully constructed surfaces like athletic fields and pavement. It's also more desirable in retrofitting situations because there is less danger of cutting through unidentified pipes or underground cables.

Today, the tools available for underground boring range from small units powered by an electric drill, to directional units that not only can bore under things, but around them as well. Sports turf managers need a basic understanding of borers and how they work.

Non-Directional Borers

Boring units fall into two main categories: non-directional and directional. Non-directional borers are the least expensive of the two and the most commonly used for smaller, uncomplicated tasks. These also fall into two categories, mechanical and pneumatic. Mechanical units are basically a metal rod with a drilling bit. A motor rotates the rod like a drill and additional sections of rod can be added as digging proceeds. Pneumatic borers are powered by compressed air and operate just like a torpedo-shaped jackhammer, traveling under the ground, trailing its air-hoses behind.

Both require excavation of both an entrance and exit hole. Because they cannot be steered, they will continue at whatever angle they enter the ground. Therefore, if you are going to bore under a driveway or sidewalk, the drill or pneumatic piercing tool must enter the ground horizontally.

When all you need is to go from point A to point B and there are no buried obstacles, non-directional (non-steerable) units will serve most of your needs.

Non-directional borer (below) works well for short bores with access on both ends. Directional units (right) can steer around obstacles.

Non-directional units are also best suited to shorter bores. If, for some reason, the drill or piercing tool is deflected or veers off course, you will not be able to correct it and a new bore will have to be attempted. The longer the bore, the greater the chance of this happening. If a drill pipe or pneumatic piercing tool disconnects below ground, it will be more difficult to locate and retrieve.

For short bores one of the easiest and least expensive devices to use would be something like Borit's hydro-mechanical earth auger. The power source is a standard 1/2-inch drive electric drill and the drill pipe is standard 3/4 or 1/2-inch water pipe. An attachment allows water from a standard garden hose to spray out through the drill head to facilitate boring.

"Once the entrance and exit holes are dug," says Jim Hill, president of Borit, "you can drill about one foot a minute. If it hits a rock that is not too large, the water will wet the soil around it, and by working the bit it can be jiggled out of the way."

Since multi-use equipment increases productivity and cost return, a good choice may be the L-2 by Line-Ward Corporation. The L-2 is a walk-behind vibratory plow designed for laying cable or irrigation pipe. Its maneuverable in close quarters and its size allows it to get through narrow gates and it has a boring attachment.

According to Robert Ward of Line-Ward, "The L-2 is the only unit we make. All attachments, including the boring attachment, go on and off in seconds without the use of tools." An entrance and exit trench still need to be dug when using the L-2's boring unit, the unit itself remains at ground level. A guidance tool is used to make sure that the drill enters at correct angle.

For longer, larger diameter bores, pneumatic piercing tools could be the way to go. One of the advantages of the pneumatic tool is that as it travels through the soil, it compacts the soil around the bore-hole which keeps it from collapsing during the bore or during pipe installation. They're efficient and can move fairly easily through compacted soils. Rocks, tree roots and other obstacles, however, can deflect a pneumatic boring unit into an undesired direction.

Because of the possibility of a pneumatic tool deflecting and perhaps getting "lost," many have stayed away from them.

For years manufacturers have tried to manufacture a locating beacon that can be installed in the piercing head and survive more than a few hours of normal

operation. The impact forces that occur during operation are so great that the necessary electronics could not withstand them. Ditch Witch, however, has recently developed what they say is a reliable beacon for the their Pierce Arrow pneumatic tool. This, in conjunction with a handheld locator, allows the piercing head to be located under the ground. The beacon and locator also allow the operator to know if the tool is proceeding on the desired course.

Directional Borers

Directional boring units eliminate the need for an entrance and exit trench. The drill rod of a directional unit enters the surface at an angle and levels out beneath the ground. It can be steered in any direction and surfaced at the desired point. Distances of 500 feet or more can be accurately bored .

Directional boring units are the Cadillacs of the industry. These machines can actually maneuver underground, follow terrain contours, avoid obstacles and surface in the desired spot.

With this ability, however comes cost. But, when one considers the cost of alternate methods the reasonability of their cost is quickly apparent. The time and labor that they save more than makes up for it.

Directional boring units use a special drill head to guide them as they maneuver beneath the surface. The cutting bit is basically a flat piece of hardened steel attached at an angle to the end of the drill pipe. When the operator wishes to change direction, he stops drilling and rotates the bit to the desired position. The drill-pipe is then pushed forward and the angled drill bit acts as a rudder, changing the direction of the bore in small increments. The position of the drill head is tracked by a beacon which sends a signal back to the operator, telling him the orientation of the drill.

Ditch Witch, in addition to making small version of their standard Jet-Trac system, has a new unit that should appeal to many that want the ability to do directional bores.

"The equipment is much easier to operate than most people think," says Shan Kirtley of Ditch Witch. "We have a new unit that is an attachment to any 30-plus horsepower trencher with a hydraulic manifold system. It bolts onto the backfill blade and is a good way for people to get into directional boring."

Bor-Mor has a directional unit that attaches to a standard skid-steer loader. This offers the versatility that many are looking for. "Its a fully capable directional unit that," says Steve Shultz, a Bor-Mor systems engineer. "If the operator is experienced and is properly prepared, the boring unit can be attached and ready to operate in about five minutes."

Directional boring units themselves are not difficult to operate, but the techniques necessary to make successful bores in difficult soils or terrain while maneuvering under and around obstacles is another matter. Boring is more than just drilling a hole in the ground, especially since directional boring units use water injected through the pipes to assist the process.

Because of these complexities, companies like Bor-Mor, Ditch Witch and Vermeer offer a variety of factory and in field training. ❑