FASTRAK™
The Best Boring News from DCI
DIGITAL CONTROL INCORPORATED DCI
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Even When Everything Seems To Go Wrong ...

Snelson Companies Inc., based out of Sedro Woolley, Washington, proved that with determination and patience those tough projects can be a success even when it seems that nothing will go right.

Snelson had a difficult gravity sewer line nearly 1000 ft (305 m) long to install at a 40% grade at depths to 80 ft (24 m). Because of the depth, a conventional battery-powered transmitter was not an option. A traditional wireline system was also not an option due to the cost of the required downhole and above-ground equipment. The logical solution was to use DCI's Cable Transmitter system.

Geologic samples were available to a depth of 7 ft (2.1 m), which meant up to 73 ft (22.3 m) of unknown soil conditions. In Western Washington that can mean anything from clay to bedrock and everything in between, including glacial till with boulders. Another concern was managing the drilling equipment logistics to ensure that they didn't conflict with the traffic at the nearby Sahalee Country Club, where the 1998 PGA Championship was to be held.

Snelson commenced drilling on July 21, 1998, shooting downhill with their Vermeer 24x40, Geological Boring 4.5-in. (11 cm) Duro Spade tool, and DCI's Cable Transmitter. The minimal geologic samples indicated clay with sand and gravel. At approximately 30 ft (9.1 m) below ground surface, the soil conditions changed dramatically from sandy clay to hard soil with cobbles. Footage rates dropped to about 30 ft/day as the drill's rotation and advance pressures climbed. The drilling fluid program was reevaluated and a new drilling mud recipe was concocted, which resulted in an immediate drop in the drill's operating pressures.

Looking north, the drill site is in the center of the photo, with Sahalee just north of the site. The peak in the distance is Mt. Baker.

Looking south, with Mount Rainier in the distance, the borepath is from the undeveloped area in the lower left of the photo down to the shores of Lake Samamish.

Work then proceeded, but at 450 ft (137 m) into the shot, the ground conditions became so difficult that tripping out and retooling was the only option. The GeoBore Duro Spade was swapped for a GeoBore All Soils Bit, which is specifically designed for highly compacted formations

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with cobbles.

Due to the slowdowns largely caused by the difficult soil conditions, the job was falling behind schedule. Since the PGA Championship was about to begin and drilling operations would have conflicted with the tournament's traffic, the crew ceased operations and tee-ed off (haha) on another project for one week.

On August 11, upon the crew's return to the site, production increased to 60 ft/day (18.3 m/day). With three-fourths of the pilot hole completed, the job came to a disheartening halt due to drilling equipment repairs. A couple of days later, with repairs completed and a renewed sense of optimism, the drilling again came to a halt. This time, 800 ft (244 m) out with the tool 23 ft (7 m) below a ravine, drilling mud was noticed, which raised concerns from local residents that nearby water wells could be damaged. The rig was shut down for one day until Snelson's customer proved that the resident's drinking water was not jeopardized.

Shortly after the shutdown, the downhole wire was damaged, requiring yet another trip out of the tunnel. Since the depth of the bore would be decreasing from 50 ft (15.2 m), it was decided that a battery-powered long-range transmitter (DX) could be used. Finally, the soil conditions changed for the better, and the tool hit the exit area 993 ft (303 m) from the launch point.

Drill operator observing the remote display information while the locator in the background tracks the tool.

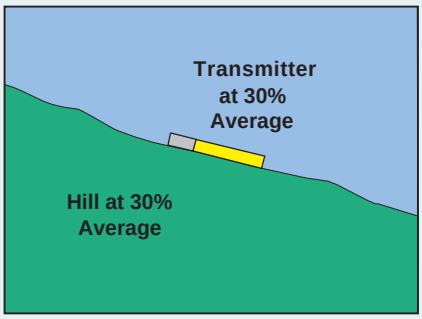
The tunnel was pre-reamed three times, each time with a successively larger reamer (8, 10, and then 12 in. [20, 25, and 30.5 cm]), which took nearly one week. The actual installation of the 8-in. (20 cm) pipe took 8 hours. However, the total installation, which required a fusion weld to join two sections of staged HDPE, brought the day to 13.5 hours.

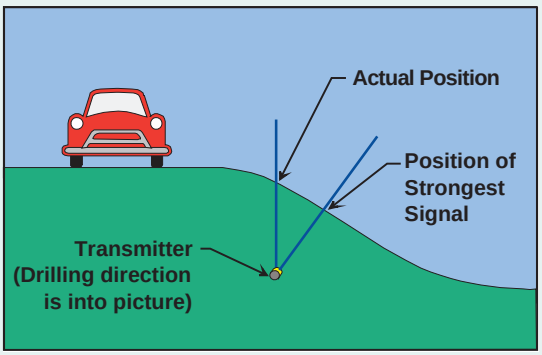
In the end, the project was a success. And the crew learned all too well the inherent complications of an HDD installation where patience and tenacity are necessary ingredients.

by Eileen Breum

Digi Know . . .

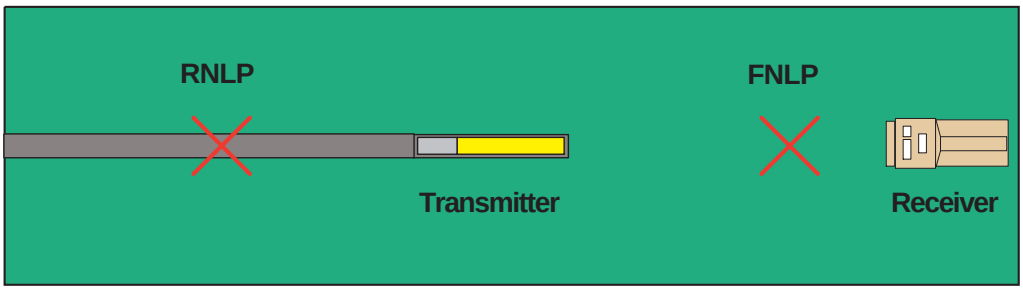
- You can use your Transmitter to determine the slope above your borepath so that you can easily follow the topography once you have reached your target depth. Prior to drilling, take pitch readings by laying the Transmitter on the ground in several locations above the intended borepath. This will provide you with the average angle of the ground. For example, if the average slope of the ground is 30% and you are required to follow the topography at your target depth, simply maintain a 30% pitch once you reach your target depth.





- If you use signal strength alone to find the Transmitter's position when drilling on the side of a hill, such as in a roadside easement as pictured, you will find that where the signal is the strongest is not directly above the tool but rather off to the side. The steeper the grade, the greater the error will be. See Technical Tips for the most efficient and accurate technique for finding the Transmitter.

TECHNICAL TIPS - *Front & Rear Negative Locate Points*



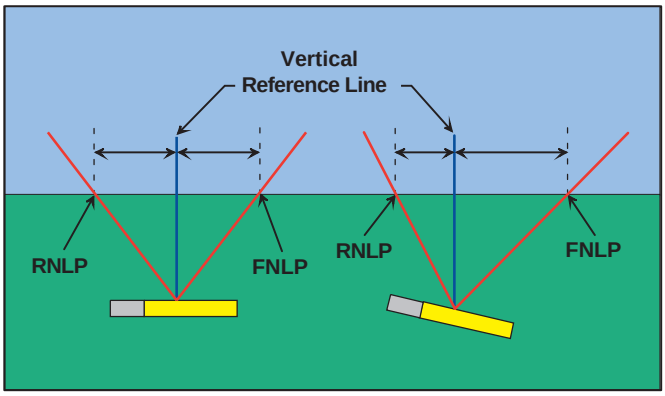
How many of you have been tracking the tool thinking everything is "spot on" only to hit the pit too far to the left or right? Are you one of those folks who finds the Transmitter (tool) by sweeping the DigiTrak Receiver from side to side looking for the highest signal or the shallowest depth? If yes, you are a perfect candidate for increasing your efficiency and accuracy at locating the tool's depth and direction by learning how to find and use the Front and Rear Negative Locate Points.

Although it may sound complicated, the concept is quite simple. Pictured above are the Front Negative Locate Point (FNLP) and the Rear Negative Locate Point (RNLP), which lie on a straight line. The Transmitter lies on this same line, and by finding these points you can determine the Transmitter's exact location and therefore its heading.

The heading is equally important, if not more so, than the Transmitter's actual location. Knowing the heading allows the locator to make more informed steering decisions, resulting in a straighter bore path and an easier pull-back. Having the ability to project the tool's right/left direction enables the locator to stay the course by rotating or change the course by steering.

If the Transmitter is level, the locate points will be at equal distances from the tool. That is, when the Transmitter is at 0% pitch under flat terrain, it is located in the center of the FNLP and the RNLP. The deeper the Transmitter, the further apart the locate points will be from one another. From a bird's-eye view, as shown above, the locate points will always lie on a straight line, but the distance between them will increase with Transmitter depth. If the pitch is not level (and/or the topography is not flat), the locate points will not be at equal distances from the Transmitter (see sketch below).

The locate points are a property of the electromagnetic field sent out by the Transmitter. The orientation of the Transmitter will affect the orientation of the field. In other words, if the Transmitter is angled up or down, the magnetic field will be tilted at the same angle. This means the locate points will be shifted correspondingly.



Now that we know what locate points are, how do we find them? With the Receiver's trigger held in, a plus or minus sign will be shown in the pitch window along with the signal strength. A "+" indicates you need to move forward; a "–" indicates you need to move backward. If you see a plus, walk forward until the plus changes to a minus. At this point, turn the Receiver 90°. The display will show a plus or a minus. If a plus is displayed, walk in the direction of the front panel; if a minus is displayed, turn the locator 180°, a plus will now be displayed. Move forward until the plus changes to a minus and, again, turn the Receiver 90°. Do not walk too fast or you may pass the change point. Once you see that the sign changes back and forth with very little movement (back and forth), you have found the FNLP or the RNLP. A second indication of having found a locate point is that your signal strength will remain almost constant when you rotate your Receiver over the locate point. Imagine a stake through the center of the display face and pivot the Receiver around it. Directly below is your locate point.

by Siggi Finnsson

Customer Field Service Managers

Johnnie Bristow, shown below, is DCI's northeastern U.S. field service manager based out of Virginia Beach, Virginia. He has more than 13 years of HDD field and management experience, which lends well to his current position of training, customer service, and troubleshooting for customers and dealers in his area. DCI is pleased to have Johnnie on board as one of our newer field managers. He can be reached on his mobile at 704-904-7568 or his pager at 888-285-4021.

Randy Peterson, shown at right with his truck, is the original DCI road warrior. Based out of Witchita Kansas, he has been cruising the highways helping many a DigiTrak operator hone their locating skills. Randy has been involved in the industry longer than he cares to remember and has been involved in all aspects, including working for an HDD machine manufacturer in the early days. Randy can be reached on his mobile at 206-409-5708 or pager at 800-317-0548.

Terry Crosier (right) has recently joined DCI as the southeast U.S. field service manager. He will be based in Clearwater, Florida. Terry has worked as a contractor and most recently as a product specialist for an HDD machine manufacturer, giving him over 10 years of experience in the HDD industry. Terry can be reached on his mobile at 813-220-1515 or pager at 888-794-6242.

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