



Thailand Challenge Overcome Using Off-Track Guidance

A tough challenge for HDD contractors when installing steel pipe is to drill a straight and level borehole—a borehole that makes gradual changes in depth and left/right direction. This can be particularly difficult when you cannot walk over the tool to confirm the heading and avoid oversteering.

Such was the case for Strega Co. Ltd., a Bangkok-based underground infrastructure company. Strega was awarded a project in Bangkok to install 3.5 km (2.2 miles) of 25.4-cm (10-in.) steel gas pipe. The PTT Natural Gas Distribution Company and its main contractor, BKK (1985) Public Company Ltd., required a minimum distance between tie-in points of 500 m (1640 ft), which translated into a difficult pull for Strega's Vermeer D80x100 Navigator.

With only a few months of experience in horizontal directional drilling, Strega was presented with several interesting challenges. Approximately 400 m (1312 ft) of a 576-m (1890-ft) shot was beneath a concrete box culvert. The high level of interference from the culvert's steel reinforcement prevented them from locating the drill head in the conventional manner, i.e., above the tool. Besides this potentially difficult locating situation, safety was also a



Transmitter being inserted into housing with extra-wide steering blade.



Locating on access road below on-ramp to Rangsit Pathumthani Highway.

concern—the borepath paralleled the six-lane Rangsit Pathumthani Highway in Bangkok. Last but not least, BKK handed Strega a tight set of tolerances for depth and lateral deviation.

The soil conditions consisted of very soft, saturated marine-type clays that required drilling fluid additives and tooling modifications. The mud mixture included a liquid polymer and a detergent to help maintain a stable borehole with plenty of lubricity to prevent the buildup of sticky clays. Because the soft, saturated soil made steering difficult, the 12.7-cm (5-in.) steering shoe was increased to 22.9 cm (9 in.), as shown in the photo.

An interference test was conducted, and the background noise came in around 200 points. Although the target depth for this shot was 4 m (13.1 ft), John Barton, Strega's managing director, decided to use a DigiTrak Extended-Range Transmitter (red DX) and DCI's SuperCell Lithium Battery. The SuperCell will provide 120 hours of drilling time (in the red transmitter), which alleviated concerns of having to change batteries on this long shot.

Locating under the box culvert was still a major concern for Strega. Barton knew that there would likely be problems in finding the locate points and, thus, the heading of the tool. The left/right heading was of particular importance, due to the tight

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tolerance requirements. Barton and the crew began the pilot bore and soon found out that locating was indeed difficult.

Considerations were made to upgrade to a transmitter with stronger signal strength, such as the DigiTrak cable transmitter. A stronger signal would normally solve the problem, but not in this case. When drilling under rebar, the transmitter induces a secondary signal on the rebar that rebroadcasts the signal at the exact same frequency but at a lower signal strength. The solution had to be "separation"—that is, the receiver had to be moved away from the culvert, effectively taking it out of range of the interfering signal (the rebar around the culvert).

When Barton called DCI's customer service troubleshooters, the suggestion was to try off-track guidance. This method allows tracking of



Drill rig crew confirming steering commands during off-track locating.

the tool and its heading without being on top of it. Barton felt comfortable attempting this method of locating and found that the tool's heading and

depth could be confirmed by locating 2 m (6.6 ft) off to the side of the intended path. Paul Hutchinson, the drilling manager for Strega, stated that off-track locating takes a little getting used to, but when they came to the end of the 400-m (1312-ft) culvert, they were just a little off-line to the left but still well within the drilling specs.

Strega's project was a success due to their ability to quickly learn and use the off-track locating technique, besides their planning and their strategy for handling, welding, and laying out the 576-m (1890-ft) length of steel pipe in a heavily commercialized area.

If you are interested in DigiTrak equipment in Thailand, contact Asia Technical Consulting, 662-575-0747 (phone) or 662-575-0749 (fax). For more information about the off-track locating technique, please call DCI at 800-288-3610 or 425-251-0559 or browse our web site (www.digital-control.com) for *FasTrak*, July 1999 (Vol. 3, No. 3).



HDD 2000 Rodeo

From February 28 to March 2, some of the best directional drilling contractors around the world gathered at the Georgia National Fairgrounds in Perry for a friendly drilling competition. This

event, the second annual International Directional Drilling Rodeo, was well attended. Over 30 crews competed, some from as far away as Denmark. DCI, DitchWitch, and Vermeer, to name a few industry manufacturers, deserve recognition for hosting meals

and evening events, which were greatly appreciated by all attendees.

The drilling competition took place under perfect weather conditions, with clear skies and comfortable temperatures. The ground conditions were

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Aerial photo of entire competition field showing starting line at top.

TECHNICAL TIPS - Troubleshooting Basics

There are generally three possible causes of locating problems in the field: (1) the transmitter is faulty; (2) the receiver is malfunctioning; or (3) the signal is being affected by interference. The easiest way to determine the cause of your problem is using the process of elimination. This can perhaps best be explained with an example.

Let's suppose that half way through a 183-m (600-ft) bore you lose your pitch and roll readings (your two top display windows go blank). Being a well-prepared contractor, you should pull out your backup transmitter and walk some distance (30 m [100 ft], for example) away from where your drill head is located. Then insert fresh batteries in the backup transmitter. If pitch and roll readings immediately appear on the receiver, then you can rule out any receiver problems.



This leaves you with a faulty transmitter in the ground or local interference. Let's assume that the depth of the transmitter is 3 m (10 ft) and the signal strength is 540 points. Wait 15 minutes until the transmitter in the ground falls asleep. Bring the receiver and the backup transmitter back to the spot on the drill path where you lost the signal. Leave the receiver here and take the backup transmitter away from the receiver until the signal strength registers 540 points—the receiver is now seeing the same amount of signal from this transmitter as it had from the one in the ground. If you still have no pitch and roll readings, then the problem is that local interference is blocking out the signal. However, if the pitch and roll information is displayed,

then the problem is with the transmitter in the ground.

This procedure is much faster than pulling back the 91 m (300 ft) and replacing the transmitter batteries only to find, once you get back out to the same area, that you still lose the pitch and roll data. In this case you can waste a considerable amount of time only to find that the problem is due to local interference, which will likely disappear some distance further out.



NOTE: Your locating problems may be compounded if you are using a remote display unit. For troubleshooting tips when using a remote display and for more general troubleshooting information, please refer to the *DigiTrak Directional Drilling Locating System Operator's Manual* and our web site: www.digital-control.com.

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also ideal. The soil consisted of uniform clay overlaid with sand.

DCI brought the ever-popular locating platform, which lends itself very well to training and to answering questions contractors might have with their locating equipment.



The starting line.



Danish operator checking final locate point at finish line.

DCI awarded prizes for the first three drilling crews using DigiTrak equipment as follows:

1. B & W Backhoe, Sanger, TX, using a Vermeer 24-40 – received a complete DigiTrak Mark IV System.
2. G & R Directional Drilling, Onaga, KS, using a Straightline 2462 – re-

ceived a DigiTrak 70-ft (21.3-m) Transmitter.

3. Henkels & McCoy, Patascula, OH, using a Vermeer 24-40 – received a DigiTrak 40-ft (12.2-m) Transmitter.

Congratulations to these crews, and good luck next year!



DCI Opens Office in Australia

On March 14, DCI formally opened an office in Australia to better serve what DCI sees as a burgeoning market.

The office is located on the east coast about 60 km (37 miles) south of Brisbane. Denis Clark, who handles repairs and all customer service issues, will manage the office. His wife Barbara is the office manager, and she is assisted by their daughter Kirsty.

DCI's Australian crew can be reached at the following address:

Digital Control Australia
Unit 5, 19 Tonga Place
Parkwood, QLD 4214
Phone: 61-7-5574-5963
Fax: 61-7-5574-5974
Denis's mobile: 61-412-108-862



DCI crew celebrates opening of new office in Australia.

To celebrate the opening, DCI invited local customers to an open house. Peter Hambling and Chris Weise flew in from the head office in Renton to attend. The initial response from our Australian customers has been great, and we will now be able to further improve our customer service in this part of the world. 

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