FASTRAK™
The Best Boring News from DCI Digital Control Incorporated
Vol. 2, No. 2 - July 1998

HDD -- Different Technologies Coming Together

Tracking the drill head under a French motorway.

After reviewing the available options for installing a fiber-optic cable across a busy motorway in Central France, Batiment Industrie Reseaux (BIR) decided to use horizontal directional drilling (HDD). Although this solution was the most cost-effective, it became apparent that it would have its own inherent difficulties.

The pilot bore design called for a length of about 110 m (361 ft) with a maximum depth of 9 m (29.5 ft). The machine had to be set up 3 m (10 ft) off the intended drill path, resulting in a compound curve. The geology was considered to be of greatest concern, however, since the compressive strength of the soft chalk would in some cases be as high as 415 bar (6000 psi). Due to the geological conditions as well as the drill profile, BIR decided to use an 8-cm (3-inch) Sharewell mud motor with a 4¾ mil tooth bit .

BIR also used a Vermeer D 24x40 with a Marindco mud system, a transmitter housing from Geological Boring, and a DCI Mark III DigiTrak receiver with a D4X (4-cell long-range) 21-m (70-ft) transmitter. The drill profile was easily within the DigiTrak system's operating capabilities. To document the pilot bore accurately, DCI's DataLog system was used. Both Bill Ettel and Steve Edwards, DCI's European customer service reps, as well as representatives from Cogeprec, the French Vermeer dealer, were present to assist with the project.

Before launching into the pilot bore, very careful consideration was given to the mud motor alignment—that is, the 12 o'clock position of the transmitter and the 12 o'clock position of the mud motor and drilling tool had to coincide. As a result,

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The drill string heading into the ground at the starting pit.

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all torque requirements had to be met prior to the final adjustment so that the orientation did not change.

Detailed discussions ensued on drill planning, which covered penetration rates, mud pressures and steering, so that no bend radii would be exceeded. It was determined that a 3% to 4% pitch change per rod was the most allowable. By making sure that all these parameters were predetermined, the actual execution of the drill was that much more straightforward.

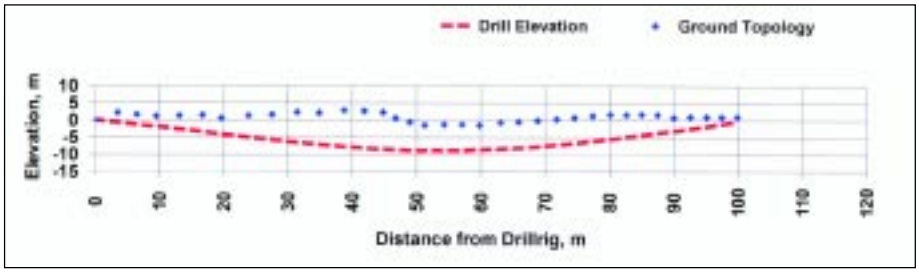
Late Tuesday evening, April 14, at 6:39 p.m. according to the DataLog records, all the planning and preparation work was complete and the first rod was drilled in. At this point it was decided to wait for daylight to continue.

The drill head exiting from the ground at the end of the bore right on target.

The following morning the work started in earnest and the second rod was drilled in. Steady progress was made, where the average time for each 3-m (10-ft) drilled joint was about 11.5 minutes. The final rod was drilled out of the ground about 7.5 hours later right on line and on target.

In hindsight, we can clearly see why the pilot bore was a success. Careful planning along with the correct equipment selection and knowledgeable operators were the key factors. In addition, the combination of a downhole mudmotor with a walkover system has now proven to be a solution that will open new frontiers in directional drilling.

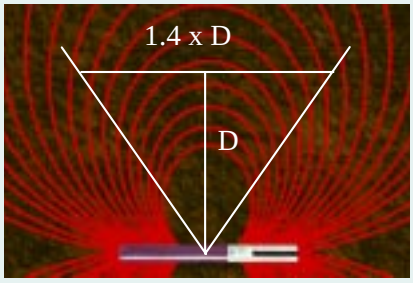
by Siggi Finnsson and Bill Ettel



DataLog graph showing the depth of the bore below the ground surface.

DigiKnow . . .

- English Contractor Stockton Pipeline recently completed a 530-m (1740-ft) drill using the DigiTrak system with a 100-ton machine they built in-house. The product was a 25-cm (10-inch) steel pipe for transporting lime slurry to a cement factory. The steel pipe required very tight control of the pilot bore gradient, which was completed in about 2 days on line and grade. This was the first time Stockton has elected not to use a wireline guidance system for this large rig, and they were very satisfied with the performance of the DigiTrak system.
- DCI is in the process of developing a 2-day advanced training class that focuses on all aspects of the DigiTrak system. It covers everyday as well as advanced locating techniques and theory. The intent is to enable locators to tackle those currently troublesome drills with confidence. We guarantee that you will learn more in 2 days than you have since you started using DigiTrak. If you are interested in finding out more about this class, call DCI at 425-251-0701.
- You can estimate the depth of the transmitter by measuring the distance between the Front and Rear Negative Locate Points and dividing by 1.4. This is correct if the transmitter is running close to level. At greater pitch angles, this number gets bigger.



TECHNICAL TIPS - *Transmitter Care*

Sondes, probes, beacons, and transmitters . . . Transmitters is the preferred DCI term because it best describes their function. Transmitters transmit the signal and data from within the drill housing to the surface, which allows the locator to determine position, pitch, tool face orientation, and heading. Transmitters are therefore one of the most critical parts of any drilling operation. They are at the same time subject to more abuse than most other components of the drilling system.

One can think of the DigiTrak transmitter as a computer rolled up into tubular form. It is a computer and it should be treated as such. You would not use your computer as a hammer or pry bar or casually throw it onto the ground.

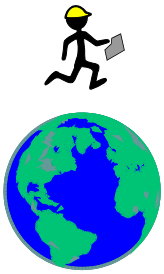
After the pilot drill, the transmitter should be removed from the housing, the batteries should be taken out, and the outside of the transmitter should be cleaned with water. If the inside of the battery compartment needs cleaning, use a small amount of water and a cotton swab. Never use solvents, such as gasoline or diesel fuel, as they will damage the components. Make sure that the threads on the battery end cap are clean for a good grounding contact and verify that the O-ring is lubricated and is intact. Do not use conductive grease on the battery contacts; you run the risk of shorting out the contact.

It is critical that the transmitter fit snugly into the drill head. If not, excessive resonance and vibration will dramatically increase the g-loads and shorten the life of the transmitter. The transmitter should not be able to move inside the head. If required, wrap the transmitter with electrical tape until you achieve a snug fit. Make sure that the key pin fits snugly into the 12 o'clock index slot and that there is no play. We no longer recommend the use of O-rings to tighten up the fit because they are elastic and can exacerbate the transmitter movement within the drill head.

The good, the bad, and the ugly—Transmitters can be severely damaged by overheating.

When drilling, pay close attention to the temperature of the transmitter. Determine what is a normal temperature for your conditions, and keep an eye on any variations. As a general rule if transmitter temperature hits 40°C you have a problem. Once the temperature has risen 8°C to 12°C above normal, stop drilling, back the tool off the face, and continue to pump drilling fluid. Determine what has caused this temperature increase. It could be due to ground conditions, excessive friction from drilling too aggressively, blocked jets, etc. After you stop drilling, always continue to pump fluids for some time to cool down the head and continue to monitor the temperature. If not, you may overheat the transmitter from the friction heat resident in the head after drilling has stopped.

by Frank Maida



Customer Service Field Reps

Denis & Barbara Clark (above) are DCI's own "Kiwi's" abroad. Denis is our customer service rep taking care of New Zealand, Australia, and Asia. He also runs DCI's repair facility based in Auckland. Barbara keeps the administrative side of things ship shape for all our mates down under. Denis can be reached by phone at 64-9-473-2221 and by mobile at 64-(0)-25-934-726.

Bill Ettel (right) is our field rep located in England. He brings a wealth of drilling experience to DCI, having worked for both Flowmole and Sharewell. Bill handles mainly the UK, Benelux, and Western Europe, although he has been known to travel as far as Siberia when needed. He can be reached in his office at 44-1832-293-427 or on his mobile at 44-410-865-189.

Steve Edwards (below) is stationed in Germany, which he handles for DCI along with the Eastern European countries. He is also a veteran of the drilling business. Steve and Bill work as a team and share the workload as needed. Steve has also been sighted in Russia. You can contact him in his office at 49-9394-8598 or on his mobile at 49-171-357-7557.

The **FasTrak** newsletter is published quarterly by Digital Control Incorporated, 425 S.W. 41st St., Renton, WA 98055, USA. Phone 800-288-3610, Fax 425-251-0702, E-mail dci@digital-control.com. We welcome comments and letters to the editor via mail, fax, or e-mail. Please contact us if you are interested in more information or would like to be added to our mailing list. FasTrak, DigiTrak, DataLog, and the DCI logo are trademarks of Digital Control Incorporated.

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