Point of View

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Education — Not Equipment — Key to Safe Drilling

by Brian Sauer

The horizontal directional drilling industry has come a long way over the last 30 years. It went from novelty to niche tool, then went through a time of explosive growth fueled by the construction of cross-country fiber-optic networks.

Now that construction of these long-haul networks has slowed down, the growth of the HDD industry has likewise slowed. But there is no doubt that directional drilling is here to stay and slow, steady growth will return.

During the peak of rapid growth, many questions arose about directional drilling. What are the environmental effects? What are the effects on roads? Should drill rig operators be certified?

Another issue that was raised was the theory of reamer migration — a theory that was conceived to explain the rash of utility strikes that occurred during these long-haul fiber builds.

I was asked by a major telecommunications company to serve as an expert witness on a damage prevention panel. The idea was to explore why utility strikes occurred and how they could be avoided. I was surprised to hear that reamer migration — where the reamer purportedly drifts from the pilot bore — was being heralded as a reason for the strikes.

The theory was surprisingly popular in these circles in that it offered a legal defense for construction companies in the event of a strike. And when talk surfaced about requiring crews to track the back ream, manufacturers jumped on the bandwagon seeing an opportunity to market reamers and locators.

I was in the minority in my belief that the reamer simply does not migrate, so I set out to prove it. Last summer, I had crews perform three test bores to try to get the reamer to migrate.

Proving a Point

These outside plant experiments were designed with a greater than 10 percent bend radius on the rods and sometimes exceeding 90 percent in profile — bores that I wouldn't want my crews making in normal operations, especially superceding load conditions like we did in these experiments. The first bore was performed in undisturbed soils for the process of elimination to remove it from the theories that the reamer will migrate on its own. The second bore was performed in multiple crossing locations to prove that the reamer would not migrate into existing utilities while crossing them. The third test placed the reamer in the worst case scenario for reamer migration: parallel to an existing ditch line that we prefabricated to simulate an existing utility (i.e. gas, electric, fiber, etc).

This test — already superceding manufacturers load specifications — was targeted to the inside radius of the profile, which is exactly where the prefabricated ditch line was. The linchpin to this experiment was the fact that not only had we placed it in the aforementioned conditions, we also paralleled at 18 in. of separation which is violating the industry standards by 6 in. in some areas. What makes this third experiment so interesting is that proponents of the reamer migration theory argue that, in the case of paralleling a previously excavated trench line, the reamer takes the path of least resistance, i.e. the soft material or back fill.

Test pits were dug to observe and mark the pilot bore and pullback. A plumb bob was set over the centerline of the test bore, so the deviation — if any — could be seen during pullback.

On all test bores the operator was instructed to pull back harder than normal with poor fluid management to try to induce reamer migration. All test bores showed conclusively that the reamer did not migrate — that the path of least resistance was the pilot bore. In fact, the final test actually showed a slight drift away from the trench line. This would more than likely be explained by the spring effect the rods were trying to counteract due to the excruciating loads on the reverse side.

Education, Ethics Are Musts

While the drilling industry is waiting for the growth curve to take another upturn, we should channel our focus on the educational process. The ultimate question is not whether the reamer will migrate, but whether the safety sensitive area of the existing utility was violated during the pilot bore itself and not realized until after a strike had occurred.

Misinformation about causes of utility strikes simply to avoid blame or sell equipment would be detrimental to the long-term growth and health of our industry. It's bad enough when HDD gets bad publicity when a utility is struck, but people within our own industry spreading information about the dangers of reamers "migrating" only adds to the negative image that directional drilling is a dangerous practice.

The best way to avoid striking an existing utility is to adhere to preventative damage procedures. Key management must be educated on profiling bores around existing utilities while at the same time not superceding equipment manufacturers specifications. An example in our company is we have many different divisions. By channeling the education from all divisions during a final walk-out prior to excavation, managers help educate each other on the jobsite to site specific clues that may throw a red flag on a utility. This, as well as a stronger prequalification of subcontractors and others to see to it that corners not be cut and/or information be misled for the purpose of shedding liability, should be the framework of our focus.

Many of the negatives the industry has faced can be traced to a lack of education — a lack of education on the part of contractors in utility strikes and road damages, a lack of education on the part of inspectors with unrealistic expectations and a lack of education on the part of owners accepting artificially low bids from inexperienced contractors.

The more we know, the better we can educate and alleviate the fears of owners and the general public — and the result will be more work for drillers. Directional drilling is a great technology that will only get better — but only if we are educated.