More Horsepower or Proper Fluids?

I have been over a decade since I entered the world of horizontal directional drilling. At that time, the market was in a period of renewal. Contractors had a new generation of rigs available that were smaller, faster and more automated.

One thing that did not change with the more sophisticated equipment was that many contractors still believed that more horsepower was the only thing needed to complete a successful bore. Visiting job-sites, I was amazed at the size of the rigs being used. Over time, it became apparent to me that the diameter of the product and lengths of the bore were small in comparison to the size of the rigs.

The rigs available today deliver a big bang for your buck in terms of capacity and capabilities. If I would have told you 15 years ago that you could use a 10,000-pound rig to pull 6-inch pipe distances of over 250 feet, you would have laughed me off the site. But today’s new rigs are more powerful and there have been many innovations in drilling fluids and downhole tooling.

Drilling fluids keep the hole open, provide lubrication, and allow the driller to complete a hole efficiently and with minimum horsepower. I will never forget a presentation I saw when I was at the University of Texas. It compared similar bores: one drilled with water and the other with a proper mud mix. The results were conclusive. The pullback forces with water were almost 20,000 pounds, but with a proper mud mix, the pullback forces were 4,400 pounds. This showed that the proper drilling fluids can reduce the required horsepower dramatically, and reduce the stress on the equipment and the product being installed.

The availability of smaller-footprint rigs with large horsepower means that drillers can mobilize quicker and reduce the size of the product being installed. Over time, it became apparent to me that the diameter of the product and lengths of the bore were small in comparison to the size of the rigs.

The driller on this project was performing a 14-inch backream installing 9-inch HDPE pipe. The bore was 360 feet through fine, dry, compacted sand. The driller attempted the bore once with water and got stuck.

We recommended a drilling fluid mix (for a 750-gallon tank) that included:
- Soda ash
- HDD bentonite gel
- PAC polymer
- And suspension enhancer.

This mix yielded a 65-viscosity fluid, so the pump performance is reduced by 30 percent. As a reminder, mud pumps are rated using fresh water at 26 viscosity. This increased viscosity, of course, affected the outcome.

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The level of fluids in the pit were maintained above the borehole to ensure positive hydrostatic pressure.

Summary

I was on the job for the duration of this bore. The contractor completed the bore in a timely manner and maintained very low pullback pressures. The maximum pressure during the last 10 rods peaked at about 10,000 pounds but, on average, the overall pullback pressures were around 6,000 pounds.

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You can have the biggest and most powerful rig on two tracks, but if you don’t consider drilling fluids one of the most important components of the bore, your chances of success are reduced. Do not hesitate to get recommendations from the drilling fluid manufacturers or your local distributor. There are also very useful HDD mud calculators available online. Keep on turning to the right and make sure you “got mud.”