ELB v. HDD or Jack and Bore or Microtunnel

Executive Summary. There are many trenchless methods, and variations of these methods, when it comes to pipe installation. Here is a basic introduction to three very common methods in the industry today.

The traditional pipelaying method: ELB. The traditional method of installing a pipe is to do it via ELB (Excavate-Lay-Backfill):

1. *Excavate* a trench.
2. *Lay* the pipe in the trench.
3. *Backfill* the trench.

This method requires an excavator and some sort of shoring (i.e. trench shields or speed shores, or even just sloping the earth away from the pipelaying).

What is trenchless technology? Notice the word *trench* used three times above in the traditional ELB method. Trenchless technologies remove the word "trench" from the equation, and install the pipe via some method of boring, or tunneling.

Name three trenchless methods. There are many ways to pipes without a trench, here are three of the most common methods:

1. HDD – Horizontal Directional Drilling
2. Jack and Bore
3. Microtunnel

Give me the basics on the three methods please. Here's a quick description of the three methods and some helpful links.

All three methods required excavation for a launching pit and a receiving pit. The former is where the drilling will start, and the latter is where the drilling tool or the pipe will exit. However, not all three methods start the pipe installation from the launching pit – HDD drills from the launching pit and then pulls the pipe back through the hole it just drilled.

HDD narrative.

Horizontal directional drilling ("HDD") is a method where a drill head drills the hole under the "obstacle". The "obstacle" may be a body of water, other utilities, or even a structure. Once the drill head pokes out on the other side of the obstacle, it then attaches to the carrier pipe and pulls it back through the drilled hole (the pipe which carries ultimately carries the utility, sewage or other, is called the "carrier

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pipe"). ***Note that before the hole is drilled, the carrier pipe was to have been completely built on the receiving pit side of the operation. The pipe in its entirety, and full length, is pulled back through the hole in one continuous operation.

A jack and bore automation.

Jack and bore, also known as auger boring, is a process where a casing (a steel cylinder) is advanced through the earth. The casing is not the carrier pipe; the carrier pipe actually gets placed into the casing after the casing has been installed. The carrier pipe has carrier spacers installed on it to facilitate it sitting in the casing pipe. There is a great automation on the QR code at the right.

Installation of the casing spacer.

Microtunneling is the third and final method presented. This method is more of a tunneling approach. The tunneling machine advances through the earth by having its leading face pushed by jacks while its excavating face simultaneously eats away at the soil. Once the jacks pushing the tunneling machine have reached their limit in pushing (because the jack length is limited), they are pulled back to make room for a piece of pipe to be placed from above. This piece of pipe, which is rated for the jacking forces put upon it, is then thrust into the bore. This pipe serves not only as the carrier pipe, but also as a means of providing force to the drill head to allow it to continue to excavate the tunnel face. This process of jacking carrier pipe into the earth, to allow the tunnel head to advance, is the iterative process of microtunneling. There's a great video on the adjacent QR code.

Microtunneling video.

My story. I've been on projects with all three of these methods. I enjoy all of them. The HDD was in several locations under swampy creeks in Aberdeen, Washington. The jack and bore was under the Seatac Airport entry highway. And finally, the microtunnel was in Honolulu to expand the sewage transport infrastructure. Each of these methods is a learning experience and a lot of fun.

Work safe!

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