
A Short Course in *Pilot Tube Microtunneling*

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INTRODUCTION:

The Pilot Tube Microtunneling (PTMT) method of pipeline installation can be used with pipe outside diameters ranging from 4 to 48 inches. PTMT is a trenchless installation method for pipelines with grade and alignment precision to within 1/4 inch per 500 LF throughout the entire drive length. Due to this line and grade accuracy, this system can install product pipe by direct jacking without the use of casing. This method involves a three-step process starting with launch and reception pits strategically located to minimize surface disruption.

PTMT is generally used for new installation of small diameter gravity flow pipelines. These machines can operate out of a minimal diameter

shaft and provide pinpoint accuracy through the use of a LED target viewed down the center of the pilot tubes with a theodolite and LCD monitor. PTMT performs well in most displaceable soil conditions up to SPT = 50 and 4m below the water table.

“PTMT IS GENERALLY USED FOR NEW INSTALLATION OF SMALL DIAMETER GRAVITY FLOW PIPELINES. THESE MACHINES CAN OPERATE OUT OF A MINIMAL DIAMETER SHAFT AND PROVIDE PINPOINT ACCURACY THROUGH THE USE OF A LED TARGET VIEWED DOWN THE CENTER OF THE PILOT TUBES WITH A THEODOLITE AND LCD MONITOR.”

METHOD:

Guidance System: In the steering head is a battery powered LED illuminated target that is visible to the

operator by means of a theodolite, camera, and monitor screen.

The theodolite is set on line and grade and is positioned to view the target through the bore of the pilot tube with the cross hairs of the theodolite visible on the monitor

along with the illuminated target. The operator rotates the steering head as needed to maintain the desired line and grade. This step is complete when the steering head reaches the reception pit.

Step 1: The first step in the Pilot Tube Method is the installation of the pilot tubes on line and grade. The pilot tubes are insert-

ed through the ground from the launch pit to the reception pit. On the leading end of the pilot tube is the steering head with an angled tip.

Step 2: The second step is to follow the pilot tube with a reaming head to match the diameter of the product pipe. The reaming head and auger casings are attached to the pilot tubes and the jacking frame advances the reaming head and casings into the ground. Different types of tooling are available to work in various ground conditions.

With the addition of each section of auger and casings in the launch pit, a section of pilot tube is removed from the reception pit. The process continues until the auger and casings reach the reception pit at which point all the pilot tube sections have been removed.

Step 3: The third step is installation of the product pipe. A pipe adapter

is installed on the last section of auger casing to match the product pipe. As the pipe is thrust into place, the auger casings are removed from the reception pit. This process continues until the product pipe reaches the reception pit.

With the installation of the product pipe, the job is complete with minimal impact and disruption to activities in the immediate area.

Should the product pipe size be larger than the reaming head / auger casing OD used in the second step, a powered reaming head (PRH) or cutter head (PCH) can be used in the third step to increase the size of the bore.

Both the PCH and PRH hydraulically driven units operate within the typical PTMT three-pass process.

First, pilot tubes are installed on line and grade with the jacking frame and theodolite guidance system. Second, the bore diameter is increased by installing temporary augers and casings. The third step is to install the powered cutter or reaming head behind the augers and casings. The PRH or PCH are sized to match the outside diameter of the final product pipe. The augers (installed in the second step) are then reversed by the unit's hydraulic drive and push spoils to the reception shaft while cutting the tunnel to the final pipe diameter. The PCH or PRH is advanced by final product pipe. As each section of augers and casings is removed from the reception shaft, a section of product pipe is installed in the launch shaft until the total drive length is complete. ●

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