



DIRECT PIPE: TAILOR-MADE PIPE LAYING WITH THE DUAL POWER OF MICROTUNNELLING AND THE HERRENKNECHT PIPE THRUSTER.

Pipe Thruster installed at the launch pit.



DIRECT PIPE: FOR DIRECT LAYING OF PRODUCT AND OTHER PIPELINES.



In the past numerous methods and machines were developed for the trenchless installation of pipelines to enable the undercrossing of sensitive surface areas. The Direct Pipe method combines the advantages of the well-established construction methods Microtunnelling and Horizontal Directional Drilling (HDD) and thus opens up new application potentials. Geological ground conditions, specified time and costs targets are the decisive criteria for the selection of the most suitable technology.

The Direct Pipe Method allows the excavation of the borehole and the simultaneous trenchless installation of a prefab and tested pipeline in one single continuous step. Similar to pipe jacking, the soil is excavated with a HERRENKNECHT microtunnelling machine. The position along the specified tunnel route is monitored by state of the art techniques of controlled pipe jacking. The excavated material is removed through the slurry circuit placed in the prefab pipeline.

The forces which are necessary for pushing the pipeline are exerted by a novel push mechanism known as the Pipe Thruster, an innovation of HERRENKNECHT AG. The pressure necessary for tunnelling is transmitted to the cutter head via the pipeline.

ADVANTAGES OF DIRECT PIPE.

Technical advantages

- Single-phase mode of operation.
- Permanent borehole support.
- Borehole collapse breaking the surface is thus not possible.
- The cutting wheel can be equipped for any geological condition.
- Excavated material is transported safely out of the borehole by conveyor lines, sedimentation in the borehole is not possible.
- Curved routes can be tracked, precise to the centimeter, thereby avoiding excessive bending stress on the pipeline and excessive laying forces.
- Operations at the target pit only to dismantle the cutting head.

Economic advantages

- Limited work areas required at the launch pit and target pit.
- A minimum volume of slurry is required.
- Due to a very small overcut a minimum borehole diameter can be realized, thus minimizing the amount of excavated material.
- Boring time can be reduced, no coupling times are necessary and the pipeline can be laid continuously in one single step.
- No permanent protective piping/casings are necessary.



Pipeline embraced by the clamping device of the Pipe Thruster.

THE DIRECT PIPE METHOD.

The Pipe Thruster

The Herrenknecht Pipe Thruster can be used for all pipe diameters ranging between 20" and 48" by just changing the clamping inserts. The clamping device is suitable for all types of pipelines and coatings. The modular design does not require special cargo transports.

- Max. push and pull force 500 to (5,000kN)
- Max. speed: 5m/min
- Stroke: 5m
- Dimensions: 9 x 4,1 x 4,4m
- Weight: 45t

Launch Situation

A remote-controlled microtunnelling machine is prepared in the launch pit. At the same time the Pipe Thruster is positioned and anchored to a sheet piling. The pipeline is lead through the Pipe Thruster and coupled to the microtunnelling machine with specially designed adaptor parts able to withstand the compressive and tensile forces.



Tunnelling Process

The tunnelling machine loosens the soil and hydraulically removes it from the borehole through the slurry lines inside the pipeline. The Pipe Thruster pushes the pipeline from the start to the target point while providing the necessary pressure on the cutter head for the drilling process.

Herrenknecht Universal Navigations System (U.N.S.) allows curved tunnelling by using a Gyro-System and hydraulic water leveling.



Ready to connect

The tunnelling process along the planned tunnel route is continued until the tunnelling equipment reaches the target point. Consequently the complete pipeline is installed and the machine can now be recovered. In a final step the conveying system has to be removed out of the pipeline. The crossing is ready!





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Herrenknecht AG is a technology and market leader in mechanized tunnelling. As the only provider offering a complete range throughout the world, Herrenknecht delivers high-tech tunnel boring machines for all ground conditions and with all diameters – ranging from 0.1 to more than 16.0 meters.

Herrenknecht's tailor-made machines create pipeline systems for water and sewage, for gas and oil as well as cable tunnels (Utility Tunnelling) and tunnelling systems for road, metro and railway traffic (Traffic Tunnelling).

Herrenknecht sees itself as a partner in teamwork tunnelling in all phases of a project. Comprehensive services for all aspects of tunnel boring activities complement our range.

Today, the Herrenknecht Group employs more than 1,600 people in numerous national and international subsidiaries and associated companies.

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