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Microtunneling Quality Assurance / Quality Control

Microtunneling is remotely controlled, guided, pipejacking that provides continuous support to the excavation face. Pipes of 12 inches to approximately 90 inches can be installed using microtunneling.

The process involves the jacking of a microtunneling machine (MTBM) and pipe from a jacking shaft to a reception shaft. The machine has a closed faced shield. Excavated soil is removed using slurry, which also counterbalances groundwater and earth pressures. The machine is guided by a laser or other survey device mounted in the jacking shaft, which projects a beam onto a target in the articulated steering section of the MTBM. The MTBM is steered by extending or retracting remotely controlled steering jacks.

Several types of pipe may be installed using microtunneling including reinforced concrete, concrete cylinder pipe, steel, centrifugally cast fiberglass-reinforced polymer mortar, polymer concrete, clay and ductile iron pipe. Jacking and reception shafts may be constructed using interlocking sheet piles, soldier piles and lagging, augered drilled shafts.

In addition to the MTBM, pipe and shafts, microtunneling operations require slurry additives, pumps, and hoses, control cables, generators, end loader, crane, soil separation plant, trucks, tanks, lubrication plant and materials, submersible pumps, and an area for pipe storage.

Quality Control

Quality control is an important element in the selection of microtunneling contractors, pipe, and equipment that should be addressed in the project specifications. Good quality control is also important in selection and inspection of the pipe, and is necessary during the installation process.

Difficult jobs should require contractors to demonstrate that they have sufficient work-related experience by meeting pre-qualification requirements. The MTBM must be compatible with expected ground conditions.

Contract specifications should address slurry disposal, lubrication, intermediate jacking stations, entry and exit seals. Other key items that should be addressed in

the contract specifications include shaft construction, pipe material, settlement monitoring, contact grouting, dewatering and ground restoration.

Pipe Selection

The pipe selected for installation must be compatible with the soil conditions and suitable for the service environment. Pipe should be manufactured in accordance with applicable ASTM and AWWA standards. Jacking pipe must have acceptable dimensional tolerances for roundness, lengths, end squareness, and straightness, and must have a consistent diameter from pipe to pipe. The jacking pipe must also have flush joints, evenly transmit jacking loads, and may need lubrication ports.

Installation/Construction

Prior to construction, utilities must be located and visually confirmed. A pre-construction survey should be made of the area to establish a damage and settlement baseline. A plan for addressing traffic control, handling and disposal of spoils, shaft construction and safety should be developed prior to beginning construction.

Proper shaft construction is a key quality control issue. Thrust block should be perpendicular to the drive and laser mounted, independent from shaft elements and the jacking frame. Ground water and soil entry into the shaft must be controlled and minimized, especially during breakout. The exit and entry seals must be monitored and maintained.

The MTBM should be thoroughly inspected prior to launch. Recording and monitoring of key measurements such as distance, machine torque, thrust, steering jack pressure and position, inclination and position, roll, slurry charge and discharge pressures and flow rates, bag samples of soils from separation plant and unusual problems encountered during excavation should be conducted multiple times per pipe. Settlement should be monitored and recorded at critical locations. Also, during excavation, the rate of excavation and penetration should be examined and matched taking into account soil conditions to guard against over or under excavation of the surrounding soil.

Job Completion and Post QA/QC Assessment

Soil and ground water must be controlled during retrieval of the MTBM. The annulus around the installed pipe may require grouting. The pipe's grade and alignment should be checked against plans and the pipe should be tested for joint integrity and design pressure. Manholes and junction structures must be constructed and abandoned shafts backfilled. Finally, the surface should be restored as specified by the contract.

For Further Information on Microtunneling Equipment & Operations Please Visit



Booth 428 & 430



Booth 226 & 228



Booth 208

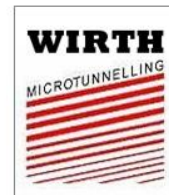
Schauenburg
MAB GMBH
Booth 212



Booth 623 & 722



Booth 615



Booth 327

For Further Information on Jacking Pipe Please Visit



Booth 626 & 628



Booth 400



Booth 418



Booth 311



Booth 202



Booth 309



Booth 303



Booth 527



Booth 721



Booth 517



Booth 630

For Further Information on Pumping Equipment & Operations Please Visit



Booth 410



Booth 500



Booth 316



Booth 101

For Further Information on Lubricants, Grouting & Sealing Please Visit



Booth 313



Booth 416



Booth 301