

World-first pipe reaming for Tshwane

A new pipe reaming method never before used in a single pass on a bulk pipeline has proved optimal in replacing ageing pipeline infrastructure, causing no disruption to overhead powerlines.

BY FRANCES RINGWOOD

THE USE OF one-of-a-kind pipe reaming technology was recently demonstrated at the Temba Water Purification Plant upgrade and extension project. The demonstration saw older asbestos pipelines reamed out and replaced on a 130 m portion of the pipeline situated in Hammanskraal, some 50 km north of Pretoria.

The trenchless component of the project is being carried by Trenchless Technologies on behalf of the contractor, Group Five, for the City of Tshwane.

Site specifics

Sam Efrat, managing member, Trenchless Technologies, explains, "The pipe reaming phase of the project entails replacing the existing 800 mm asbestos cement (AC) pipeline with a new 800 mm OD high-density

polyethylene (HDPE) pipeline over a distance of 1.3 km.

"Pipe back reaming is a modified boring process where the existing pipe is reamed out and the new pipe is pulled through the existing pipe and newly created bore using a horizontal directional drilling (HDD) machine," explains Efrat.

"The process of pipe reaming starts by placing the HDD rig at a designated location (behind an excavated receiving pit). This should preferably be downstream and at a lower point, which allows a gradient for the injected bentonite mud mix, and the outflow of the AC cuttings and particles," he adds.

World first

The process described above has been used worldwide for several years, predominantly on small-sized host pipelines up to about

300 mm D. "The method we're using is, to our knowledge, a world first because a host pipe of 800 mm OD has not been done before. The process would also normally involve fragmenting a smaller host pipe and increasing the diameter of the bore over several runs. What differentiates this project is that we're doing it in one pass – in other words we are fragmenting the old pipe and



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Horizontal directional drill (HDD) rig specifics

The HDD rig is a DD10 from American Augers and it's a midi-machine. Categories of HDD machines are from mini (up to about 12 t), midi (from 12 t to about 70 t) and maxi (70 t up to about 1000 t). Although the DD10 is considered a large machine in South Africa, worldwide it's technically considered a "midi". It has a rod basket with nine rods that can be automatically loaded. The rods themselves are 89 mm in diameter; this increases to 106 mm at the joints.

threaded together by the HDD rig to form a long continuous drill stream. This is pushed from the HDD rig through the existing pipe to the upstream launch pit. The HDD rig is capable of pullback forces of up to 50 tonnes and a rotation force of 18 982 Nm.

Catchment pits

At intervals, catchments are constructed between the launch and receiving pits, as required, to assist with the pipe reaming operation, either to carry out repairs to equipment, remove any obstacles, relieve pressure on the bentonite or to act as a catchment pit to contain the bentonite.

Excavated (virgin) material from the launch, receiving and catchment pits will be stockpiled for later backfilling of all pits. The launch and receiving pits, as well as any additional

catchment pits, are all lined using 250 micron plastic sheeting.

Once all phases have been completed, the plastic sheeting is then removed from the pits and water is pumped out, double bagged and disposed of. The remainder of the launch and receiving pits, as well as any additional catchment pits are then backfilled and compacted using the excavated and stockpiled virgin material.

Conclusion

"Trenchless Technologies pioneered this system in South Africa and is now refining it," adds Efrat. "As on other projects, at the Temba site, we have again shown that this technique is an innovative and affordable practice well-suited for the refurbishment of ageing or damaged infrastructure." **35**

pulling through the new pipe in a single, seamless installation," explains Efrat.

In order for a project of this size to be carried out, a DD10 American Auger drill rig was purchased. The rig's 6.1 m long drill rods are

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