Pipe dream

In December *Metrobuild* visited a Trenchless Technologies pipe reparation site in Pretoria to see at first-hand their installation of a RibLoc Expanda Pipe system. Trenchless Technologies operate the RibLoc process under licence from RibLoc Australia. This installation was the final stage of a R2 million RibLoc section, completing an overall contractual value of R23 million of pipe reparation for the City of Tshwane. The entire project has been under way for three years, during which time the company has some 40 000 m of piping has been repaired.

Winding cage mechanism

The Rib Loc Expanda Pipe system is a revolutionary process developed in Australia in 1983. Designed to rejuvenate sewers, storm water drains and culverts in situ, it is reliable, cost-effective and eliminates the need for excavation.

The system consists of specially extruded plastic profile, a patented winding machine and ancillary equipment such as specially constructed spools for profile handling, and a hydraulic power pack.

The winding machine is placed at the base of the access chamber. Profile is then fed into the winding machine from the above-ground spool. The machine interlocks the edges of the strip as it spirally winds to form a continuous liner

Ribbon profile being fed into the winding unit

inside the host pipe. Whilst the profile edges are being locked together in the winding machine a lubricating sealant is being pumped into the primary female

Formed pipe being progressively fed to the right, into existing concrete pipe. Note previously completed section on the left

lock, and a wire is simultaneously inserted between the locks as the profile is interlocked. The liner then expands in diameter to fit tightly against the inside wall of the deteriorated pipe. A CCTV camera in the liner monitors progress of expansion for the above ground operator.

The system commonly used for drainage, sewer and road culvert applications from diameters of 150 mm to 750 mm. After the liner is wound from one manhole to the next, the end of the liner is held in position and the secondary lock progressively severed by pulling the high strength wire.

Expanda Pipe liners can be used to rehabilitate pipes in residential areas, industrial estates and is also suited for remote and steep terrains. Seriously damaged concrete sewer pipes can be fully renovated instead of being removed.

Some advantages of the system include:

- Speed of installation
- Adaptability
- Reduced overpumping costs
- Hydraulic efficiency within the pipe
- Sealing the pipeline
- Lightweight and ease of transport
- Simple and compact machinery
- Ease of installation
- Cost-effective

This system has been widely approved for use in Australia, New Zealand, USA, Hong Kong, China, Taiwan, United Arab Emirates, Saudi Arabia, France and Germany. ■

For further information on this system contact Trenchless Technologies on +27 83 212 4 888
www.trenchless.co.za

Topside ribbon profile spool

Trenchless Technologies cc scoops SASTT award

The Joop van Wamelen Award of Excellence was handed over to Sam Efrat and Marco Camarda of Trenchless Technologies cc by the outgoing President of the South African Society of Trenchless Technology (SASTT), Johann Wessels. The Award Ceremony took place at the SASTT Annual General Meeting held at the regional offices of Johannesburg Water in Midrand on 2 February 2010.

The award was in recognition of the ABSA Energy Centre sleeves reticulation project installed by horizontal directional drilling.

Project description

- Client/Employer: ABSA Bank Limited;
- Project managers: Mokala Collins Joint Venture;
- Consultants: Taemane/SDE and Asak/LC;
- Contractor: Trenchless Technologies cc;
- Contract value: R13 million

The works comprised connecting ten occupied ABSA Banks buildings in Johannesburg's CBD with 100 below ground sleeves for electricity, gas, fibre optic, low temperature hot water and chilled water. Works took place from building basement to basement beneath the CBD roadways, with the deepest installations installed at 16 metres and took ten months to complete. Sleeves ranged in outer diameter size from 160, 225, 450, 500, 560 and the largest being 710 mm PE 100 PN 8 HDPEpipe.

Challenges and solutions

Propping of the basement was required from the floor below to add support to all areas over which the drill was to travel. A floor to floor height restriction meant that all equipment be less than 2,1m in height. Modification of the Terra-Jet 7520 drilling machine was therefore required to reduce its height profile to 1,8 m. Most installations took place in clay whilst about 20 were in rock which necessitated the use of percussive hammer and rock reamers. Many lateral support ground anchors were encountered during drilling. Their unpredictable presence and position often resulted in drilling equipment becoming entangled. Drilling tools were pulled, pushed and rotated until they became free or broke the ground anchoring cables.

The benefits of trenchless technology

The installations were exceptionally deep, preventing conventional excavation methodology. There was no damage to roadways and existing buried infrastructure and cost savings were significant when compared to other possible methodologies.

Marco Aurelio Camarda, Samuel Julius Efrat, Johann Wilhelm Wessels

Why horizontal directional drilling (HDD)?

HDD allowed the pull-in of the required HDPE sleeves without requiring the installation of a temporary pipe or permanent rigid pipe, followed by the HDPE pipe installation. HDD also allowed for adequate steering accuracy. The equipment is self-propelled and capable of drilling in a wide range of soil conditions including clay and rock. It is also sufficiently compact and operable in the confined basement spaces. For the first six months of contract no drilling was allowed during the "freeze" period from the 26th of the preceding month to the 5th of the following month. This resulted in a very tight programme, necessitating crews to work two 12 hour shifts, seven days a week.

To enable location of drilling equipment Trenchless made use of the radio detection i-track and wireline system. Confined access into basements via vehicular ramps required the short 6 m lengths of HDPE pipe to be individually transported down into basements where they were butt-welded into long continuous lengths for installation. In two instances the HDPE pipe was hammered into the completed bore from the drill machine side, using pipe ramming equipment, as there was no access for the piping on the opposite side of the bore.

Some installations were within plant rooms and other inaccessible and confined spaces requiring the clay spoil to be contained in tanks for later removal. Containment of the large volumes of spoil was a necessity as the basements are in a pristine condition and in daily use. This was done utilising specially constructed tanks and brick burms. The removal of spoil material to the surface from within the basements was undertaken predominantly by means of pumping. ■