

Securing a century of sewerage service

The City of Cape Town (CCT) recently completed the second, and final, phase of the Northern Areas Sewer upgrade, which featured a R30 million component of trenchless work. **IMIESA** sat down with Anic Smit, head: Planning, Design and Projects, CCT, to find out more.

WORK ON THIS phase of the project began in 2009 when the CCT appointed AECOM SA for the professional services related to the design of the new sewer and the subsequent tender compilation and contract administration.

The scope of works entailed the replacement of the remaining portion of the original sewer built in the 1950s. The project, which was successfully completed in the latter part of 2015, had a limited impact on the public and featured uninterrupted road, rail and electricity services, thanks to three main methods of trenchless technology.

“The trenchless technologies consisted of nine pipe jacks, two horizontal directional drilling (HDD) operations, and a 1 040 m length of cured-in-place pipe (CIPP),” says Smit.

Pipe jacking

The Northern Areas Sewer Phase 2 (NAS 2) route traverses a number of busy roads and railway lines, which could not be taken out of operation. Therefore, eight pipe jacks were undertaken at

road and rail crossings – five 1 460 mm diameter pipe jacks and three 1 680 mm diameter pipe jacks. A total jacked length of 330 m was completed successfully by the appointed subcontractor, Wepex.

In the two cases where pipe jacking was undertaken beneath the railway lines, the tracks were structurally supported and strapped in order to mitigate the risk of train derailment, should there be any ground subsidence.

“In addition to the above-mentioned jacks, Franki was appointed to undertake a 1 117 mm diameter pipe jack beneath a group of important 132 kV and 66 kV cables, near the Epping Substation, in order to connect the two bulk sewers from Epping 1 and 2 to the new NAS 2,” explains Smit.

“Although this pipe jack was not included in the original scope of works, the decision to install the sewer using pipe jacking followed various communications and on-site investigations with the CCT’s

RIGHT View from within HDPE-lined pipeline during pipe jacking installation (Photo: Henk Aartsma)





Electricity Department, which ultimately indicated that conventional, open-cut excavation pipe laying would be too risky in the

ABOVE Final pull-in of 630 mm diameter HDPE product pipe following horizontal directional drilling reaming process (Photo: Terry February)

ABOVE RIGHT Typical pipe jacking launch pit (Photo: Henk Aartsma)

vicinity of the live cables that could not be taken out of operation," he notes.

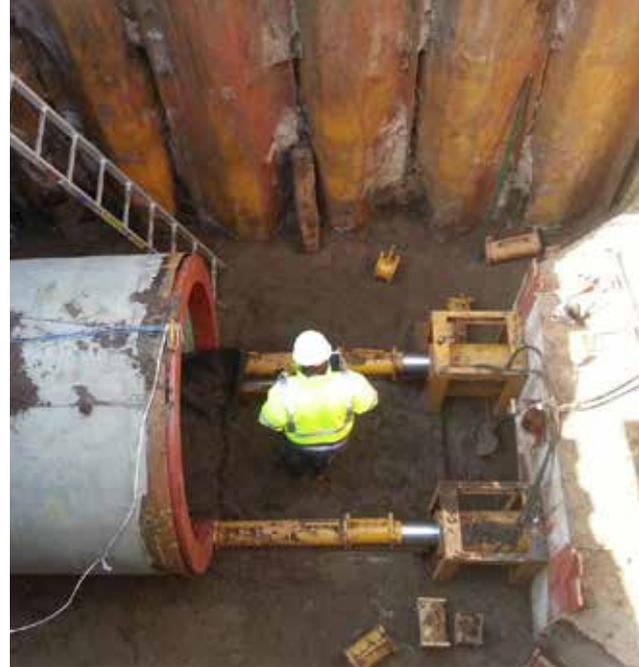
Pipe jacking was, therefore, effectively used for the construction of the NAS 2 in order to limit any interruptions to road, rail and electricity services.

Horizontal directional drilling

TT Innovations was appointed as a subcontractor to install a 65 m length of 630 mm

diameter HDPE pipe, traversing Jan Smuts Drive, by means of HDD.

"Upon encountering unusual lignite thinners in the groundwater, which affected the bentonite mud mix, TT Innovations needed to use a specially formulated, high-yield bentonite additive, as well as a highly dispersible, low-viscosity, polyanionic cellulose (PAC) polymer in order to successfully install the pipe," says Smit.



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ABOVE Insertion of CIPP liner into the old 762 mm internal diameter Northern Areas Sewer (Photo: Timothy Hotchkiss)

ABOVE RIGHT Insertion of CIPP liner into the old 762 mm internal diameter Northern Areas Sewer passing underneath the Jan Smuts Drive/Viking Way interchange (Photo: Timothy Hotchkiss)



The company also installed a 35 m length of 160 mm diameter HDPE pipe by means of HDD in very close proximity to a residential boundary wall. Unforeseen rock material in the ground again provided a challenge. However, with the assistance of CSV Construction, this HDD was successfully completed without impacting on the nearby residents.

Cured-in-place pipe

Since the new NAS 2 does not follow the same route as the old NAS, a portion of the sewer catchment area will still be serviced by a 1 040

m section of the old 762 mm internal diameter NAS. This sewer is still in relatively good condition, despite its age; however, in order to provide for another 50-year service life, Tuboseal was appointed as a subcontractor to rehabilitate the sewer using the CIPP trenchless technology method.

This rehabilitation work comprised cleaning the sewer, isolating the sewer and over-pumping the existing effluent, CCTV inspections, installing the CIPP liner, and repairing and rehabilitating the manholes.

"The sewer runs through the backyards of more than 30 residential properties, the parking areas and access roads of various businesses, crosses a triple-track railway line, and traverses the busy Jan Smuts Drive/Viking Way interchange. Nevertheless,

CIPP technology was used to rehabilitate 1 040 m of sewer over a period of less than one month, with minimal impact on the nearby

residents and business owners," enthuses Smit.

Ultimately, the sewer was installed to a high quality, based on strictly enforced specifications. The aim was to provide the CCT with at least 50 years of low-maintenance service.

"However, considering

the high-durability materials used for the project and the quality of the construction work, it is anticipated that this sewer will continue offering uninterrupted service to the city for the next 80 to 100 years," concludes Smit. **35**

**Look out for more on this project in upcoming editions of IMIESA.*

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World-class trenchless solutions

Determined to stay on the cutting edge of technology, Tuboseal is driven to offer its clients the best and most cost-effective methods of pipe renovation. Founder Jean-Louis Frey and operations manager Daniel Bruwer outline the company's ability to deliver turnkey trenchless solutions from start to finish.

Can you please provide readers with a little background about your company?

JF & DB Tuboseal was established in 1987 by Jean-Louis Frey, when it became apparent that the municipal pipeline infrastructure in South Africa was starting to deteriorate to such an extent that there was an urgent need to start rehabilitating these valuable assets for water, sewer and stormwater systems.

Following an in-depth study of the trenchless rehabilitation market overseas and locally, Tuboseal was able to select and offer the most suitable techniques as well as the best choice of imported and locally available materials to suit the burgeoning municipal and industrial pipeline rehabilitation market in South Africa.

The company comes from humble beginnings, based on marketing and introducing new but simple rehabilitation technologies to as many municipal officials and decision-makers as possible. Since then, the range of services offered has grown to such an extent that Tuboseal can offer nearly all of the trenchless techniques available in developed countries. The core services offered are condition assessments, CCTV inspections, pipe cleaning, pipecracking and upsizing with HDPE and CIPP relining, using all available resin-curing methods (ambient, hot water, steam and ultraviolet).

What are the current challenges in the South African water sector with regard to infrastructure and how is Tuboseal positioned to overcome them?

It has taken 30 years to reach a point where a reasonable proportion of officials and engineers involved in municipal pipeline maintenance know about trenchless rehabilitation work and accept it as the norm. However, it would appear that civil engineering students and technicians do not receive adequate exposure to trenchless pipeline rehabilitation techniques at academic institutions.

At Tuboseal, we are constantly engaging with officials within municipalities and government



structures, as well as consulting engineers, to share our knowledge and experience in the field of trenchless rehabilitation. It is a long-term approach that is appreciated by many of our clients and their engineers.

To date, Tuboseal has successfully completed a large number of rehabilitation projects of various sizes and technical complexities, and has a large body of satisfied clients. This goes a long way towards motivating and winning the confidence of new clients.

Much disruption is experienced in the market, usually caused by contractual disputes, appeals and other hostilities between tenderers and municipalities. Tuboseal strives to avoid these matters and prefers to facilitate smooth contract work to the satisfaction of all parties involved.

TOP Daniel Bruwer, operations manager and Jean-Louis Frey, founder

ABOVE LEFT Curing of CIPP liner on the NAS project

ABOVE RIGHT NAS sewer relining project

What are some of the benefits of trenchless technology when compared to open trench work, and what are the finer points of the economic benefits in the short, medium and long term?

Generally, the use of trenchless technologies offers less disruption to the public, residents and traffic flow. In most cases, trenchless work results in easier solutions, especially



when the existing pipelines are either very deep or in difficult to access locations.

We are seeing greater uncertainty and inflexibility of budget allocations at municipalities. Funds are often released very close to the end-of-budget period, which then places enormous pressure on officials and contractors to complete projects at short notice. Because trenchless rehabilitation projects can often be completed in a fraction of conventional pipe replacement timelines, officials are offered far greater flexibility to rehabilitate pipelines while satisfying budgetary requirements. For instance, Tuboseal recently rehabilitated a water reticulation network of over 17 km for a municipality in only four and a half months – this equates to rehabilitating nearly 900 m of pipeline per week. In this case, Tuboseal was able to mobilise the necessary resources to make it possible to achieve such production.

What products and technological solutions do you offer for pipe rehabilitation?

- CCTV
- cleaning
- pipecracking
- upsizing
- CIPP (ambient, hot water, steam and UV cured)
- patch lining
- robotic cutting
- injection grouting
- technically difficult point repairs
- lining of 90-degree bends.

What are the advantages for customers in choosing Tuboseal as their provider of pipe rehabilitation services?

Tuboseal is one of the most experienced trenchless rehabilitation companies in South Africa. We offer many different techniques and products; therefore, we are in a position to deliver what is best for the client. We take pride in sharing our knowledge with clients and the other stakeholders involved

in our projects. This is the key to future success. We place a high premium on developing our techniques and their combined applications and, in so doing, offer benefits to our clients and to the trenchless industry as a whole.

Tuboseal is a well-established company with a long-term focus. Our reputation means everything to us and we simply won't take shortcuts or compromise on quality.

Which of the services you provide to municipalities are the most sought after?

Currently, CIPP has grown into the most sought-after rehabilitation technique due to it being fully trenchless, competitively priced and quicker than other, more traditional trenchless techniques.

What sets your offering apart from the rest?

Tuboseal's depth of experience and installation success rate is unparalleled in South Africa.

Our volume of installations also enables us to keep a stock of imported materials and, therefore, we are often able to avoid shipping lead times during projects.

We have built some of the best CIPP equipment in South Africa, which provides a technological advantage and gives clients peace of mind.

How does Tuboseal ensure that the technical expertise it provides is always up to date?

Over the years, Tuboseal has continuously built and maintained an in-depth knowledge of the European, Australian and American trenchless rehabilitation markets. Key trade relationships, testing new methods and years of experience allow Tuboseal to select and offer the most robust and appropriate products for the municipal and industrial pipeline market in South Africa.

There is a wide range of materials,

FROM LEFT TO RIGHT Diameter 675 mm stormwater pipeline before and after CIPP lining

Installation of CIPP liner in confined area
UV light curing system

equipment and techniques available worldwide, yet some of these products are not well adapted for the unique South African climate and conditions. Tuboseal specialises in researching and adapting international technology to suit local conditions.

What typifies Tuboseal's approach to dealing with challenges and finding solutions in consideration of client needs and desired outcomes?

At Tuboseal, we strive to find the best possible solution for each project in terms of feasibility, risks involved, pricing, duration, longevity of the rehabilitated pipeline and client satisfaction. It is also an approach where claims or disputes with clients are not part of our vocabulary. We always try to provide a full package, which provides the client with peace of mind and involves less time spent on project management. We are proud of the high level of satisfaction among our clients.

What defines Tuboseal's customer service philosophy?

Tuboseal seeks to fully understand the problem, and to offer and realise a long-term, professional solution while making it a pleasure for customers to deal with the company. Creating an environment of trust where clients know they will be offered the best solutions for their particular set of circumstances is our goal. **35**



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Award-winning trenchless technology

MEMBERS OF THE Southern African Society for Trenchless Technology (SASTT) once again competed for the coveted Joop van Wamelen Award of Excellence by nominating their best projects.

The PRASA Park Station Sewer and Stormwater Upgrade was selected as the winning project for 2015, at SASTT's 25th AGM held at Johannesburg Water's Zandfontein Depot earlier this year.

Consulting engineering firm SMEC South Africa, in partnership with contractor Trenchless Technologies, showcased some

groundbreaking work while completing the R37 million project on behalf of client PRASA Corporate Real Estate Solutions (Prasa CRES).

Conventional trenching techniques were not an option as the line that had to be replaced ran underneath the railway lines at Park Station; for this reason, horizontal directional drilling (HDD) was selected as the solution.

HDD was used to drill a new 250 mm HDPE pipeline diagonally underneath the train tracks at Park Station in order to connect existing manholes with the new main-line

manhole constructed on platforms PF11 and PF12. A new 250 mm HDPE line was also drilled from the new manhole on PF11 to PF12 to the municipal connection manhole under Harrison Avenue Bridge.

All sewage flowing from the aboveground shopping outlets and toilets between PF1 to PF10 is now collected by four 110 mm diameter uPVC pipelines, supported by a service tray for easy access and visible inspection.

Four 110 mm uPVC pipelines drop vertically and offload sewage into platform manholes, as well as a new manhole constructed on PF9 to PF10.

In order to prioritise effective maintenance, the new reticulation network was structured for easy accessibility that will ensure effective operation of the sewer network for years to come. **35**

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