



Placement of GSC bags on the beach as part of a GSC revetment structure in KwaZulu-Natal

specific environmental and engineering requirements of the designed structure.

To date, Fibertex SA has produced GSC bags for local projects, as well as for large-scale revetment structures in Africa, the Indian Ocean Islands, Europe and Australasia.

Fibertex GSC bag manufacturing, at the company's plant in Kwazulu-Natal, adheres to the stringent quality control policy of Fibertex South Africa, which is held to international geosynthetics manufacturing standards.

► INFO

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CAPE TOWN'S FIRST MICRO-TUNNELLING PROJECT WINS MAJOR AWARD

AECOM (consultant acting as employer's agent and engineer), the City of Cape Town (client) and CSV Construction (main contractor) have been awarded the annual Joop van Wamelen Award of Excellence for 2016 by the Southern African Society for Trenchless Technology (SASTT). The combined submission was for the construction of Phase 2 of the Cape Flats 3 Bulk Sewer, which included micro-tunnelling on a scale not yet previously executed for bulk infrastructure pipelines in South Africa.

The award was presented at an official ceremony as part of the SASTT AGM in Sandton on 14 February. Joop van Wamelen was a key founder of SASTT 25 years ago, serving on the board until he passed away in 2015.

While the micro-tunnelling work was completed during the course of 2016, other aspects of the construction work are ongoing, but these are on track for

hand-over to the City of Cape Town in October 2017.

Commenting on the challenges posed by the project, Timothy Hotchkiss, project engineer at AECOM, stresses that finding a feasible pipeline route through a densely-developed urban area is always difficult. As part of the design process, 12 route options were evaluated in detail and given a weighted score, with preference to highest. Some of the routes were not feasible due to clashes with existing major services, such as high-voltage electrical cables. Even the highest scoring route traversed some challenging areas that were unavoidable.

Although micro-tunnelling was considered early on during the design phase, the cost compared to conventional pipe jacking and open trench pipe installation was at that stage estimated to be too high, according to Hotchkiss.

Following extensive technical and financial evaluations, it was found that

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A TBM was used to mechanically cut and remove soil from the jacking face by means of a rotating cutting head and pumped slurry conveyance system

micro-tunnelling some sections of the Cape Flats 3 Bulk Sewer rising main would not only mitigate social and environmental impacts, but would also offer the City of Cape Town a cost-effective alternative at reduced risk and higher end-product quality.

A contributing factor making the micro-tunnelling method more technically favourable was the recent introduction of ductile iron jacking pipes to the market, which are pressure pipes that can be jacked directly into the ground behind a tunnel boring machine (TBM). This offered a more cost-effective and operationally sustainable

system compared to the conventional system, whereby the pressure pipe would be installed through a micro-tunnelled concrete 'sleeve'.

"Technically, micro-tunnelling was an obvious choice, but we had to ensure that available budgets would not be exceeded before we were able to contractually approve the micro-tunnelling proposal. Following the successful completion of the micro-tunnelling work, the City of Cape Town is now convinced that this technology is one of the best solutions for the installation of other bulk pipelines in

the City. The work went ahead without any unforeseen incidents and, importantly, no unforeseen costs," Hotchkiss says.

The micro-tunnelling undertaken as part of the Cape Flats 3 Bulk Sewer project is a specialised pipe-jacking operation making use of a TBM that mechanically cuts and removes soil from the jacking face by means of a rotating cutting head and pumped slurry conveyance system.

The TBM can be operated remotely from a control centre on the ground surface, and is monitored constantly in terms of its position with a laser system. After the TBM has entered the ground from the jacking shaft, special jacking pipes are inserted behind the TBM, and also jacked into the ground one after the other, until the pipeline reaches the receiving shaft where the TBM can be retrieved.

There have been a number of tunnelling projects undertaken around South Africa in the past, e.g. tunnels for water transfer schemes, railways and roads through mountains. However, this is possibly only the second micro-tunnelling operation of its kind in an urban area in South Africa, and the first in Cape Town.

"What makes this project exciting is that the technology was not used out of necessity, but rather a conscious choice to reduce impacts and risks to the community, as well as providing a high-quality final product to the client," Hotchkiss points out.

The TBM deployed by CSV Construction was the Herrenknecht AVN 800 XC TBM, the first of its kind to be owned and operated by a southern African company. The micro-tunnelling project was undertaken with the support of a specialist technician from Herrenknecht of Germany.

► INFO

Timothy Hotchkiss

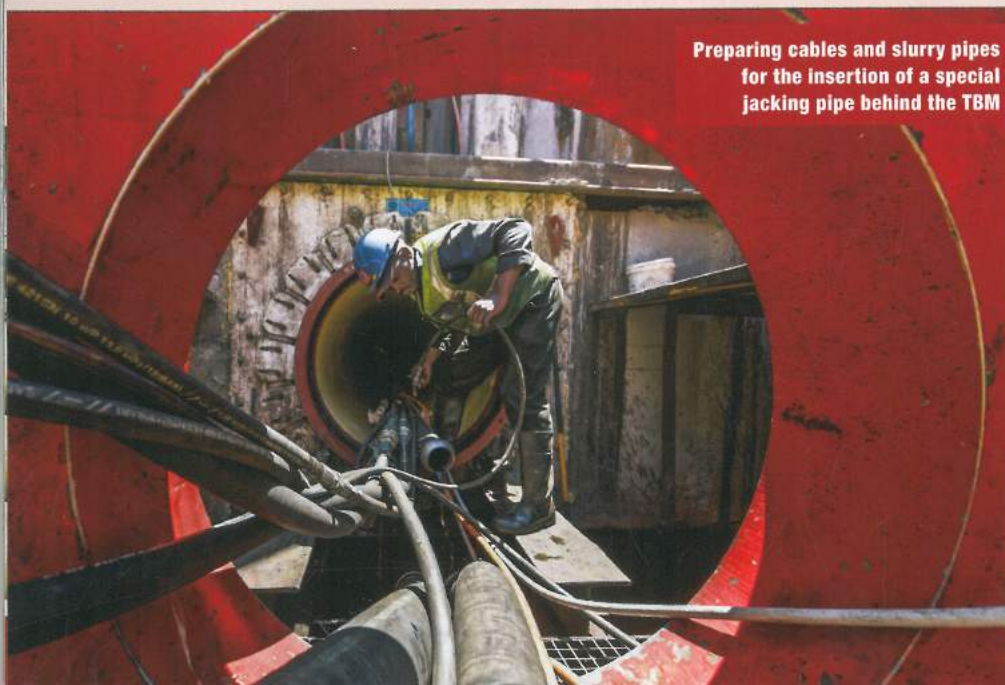
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WOMEN IN THE FAST LANE

According to the Ministry in the Presidency responsible for women, the current strategy to promote women's economic empowerment is through education, training and skills development. In a country where just over 50% of the population is female (2015 World Bank



Preparing cables and slurry pipes for the insertion of a special jacking pipe behind the TBM