

Trenchless Technology Choice for Sewer Rehabilitation under Govan Mbeki Avenue Upgrading

Project Description

The contract involved the rehabilitation of two parallel sewers located beneath heavily trafficked Govan Mbeki Avenue in the heart of Port Elizabeth's CBD.

Client: Mandela Bay Development Agency
Consultant: Africoast Consulting Engineers (Pty) Ltd
Contractor: Trenchless Technologies cc
Material Supplier: Ribloc Australia
Specialist Consultant: PIPES cc
Sub-Contractor: Sightlines (Pty) Ltd

Why Trenchless?

Due to time constraints rehabilitation of sewers had to take place concurrently with an urban environmental upgrading project involving decorative paving and resurfacing works. Hence only trenchless non-disruptive techniques could to be employed for rehabilitation.

Pipeline Assessment

At the preliminary stage a thorough condition assessment of the two sewers was undertaken. This involved a theoretical analysis of the sewers based on effluent and operating conditions, a CCTV inspection and cutting of windows from the sewers so that they could be physically inspected. By combining this information it was ascertained that:

The 450 Sewer was severely corroded around its whole circumference due to acidic effluent. The measured pH values were as low as 3.3. This sewer was very old and was cast in 2 sections with horizontal joints running along its full length. The mortar had corroded out of the construction joints and it was no longer water tight.

The 840 Sewer was severely corroded above the water line and the reinforcing was exposed and corroded away at places. The most severe deterioration occurred at the sides of the sewer due to a combination of corrosion and erosion and was particularly severe along those sections of sewer where the velocity was high. As a result there was a 50 to 60 mm wide sill either side of the sewer just above the low flow level. This corrosion was typical of what occurred in a sewer downstream of a rising main where there had been an accumulation of gas due to long retention times. It was estimated that sections of sewer would collapse within 10 years.

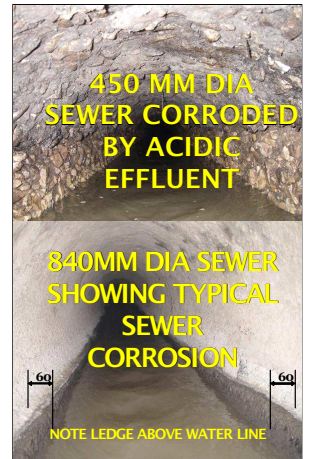


Trenchless Techniques

Sliplining appeared to be the most economical, but there was limited space for launch pits and storage of long lengths of HDPE piping and flow capacity would be reduced.

CIPP would not have influenced the hydraulic capacity and lining could be continuous through some manholes. However the sharp edges of the sills running along the sewer did not allow for an economic technically sound design.

RibLoc solutions kept circular shape so were unaffected by the sills while allowing for lining through manholes. In addition to no excavation, the solution was design compliant and risk was lower as process could be reversed in the event of unforeseen problems.



Challenges and Solutions

Problem	Solution
Maintain continuous Sewer flows	Construct by-pass to divert flow from 450 to 840mm pipe
Removal of encrustations in cast iron pipe	Backreamed using HDD and 430mm OD backreamer
Accommodating the winding equipment in 840 manholes that had no concrete base	Reline manhole base with quick set mortar and mesh to prevent erosion of earth base
Bends found within 840 sewer interrupted winding of MH to MH sections	Winding shorter sections that could be pulled though bends and hand welded in position
Concurrent surface works competed for work space	Night and Weekend work become modus operandi
Required "point repair" by open excavation on 840 line	Removal of props & beam by works within 840 sewer
Diameter reduction in 450 line where it crossed 840 sewer	Constructed new manhole on 840 line, and connected 450 to 840 with short section of 450

Conclusion

- True no-dig solution limiting surface contract disruption.
 - A first for these rehabilitation techniques in Africa.
 - Extends range of rehabilitation solutions available in RSA.
 - Unforeseen occurrences encountered were resolved
- The overall contract success can be attributed to the know-how and skill of a team that contributed their ideas and solutions to overcome the challenges cost effectively and efficiently.

Scope of Works

RibLoc Expanda
Spirally Wound uPVC Profile Expanded to be a Close Fit
570m by 450mm
RibLoc Ribline
Spirally Welded Steel Reinforced HDPE Profile Grouted In Place
560m by 840mm

