Job Report

Rehabilitation of a 6 km DN 500 asbestos cement potable water trunk main

Client:
Abbanoa Spa, Sardinia, Italy

Year of Construction:
September 2019 – June 2020

Type of Construction Measure:
Rehabilitation of 6 km asbestos cement pipe DN 500 including bypass work

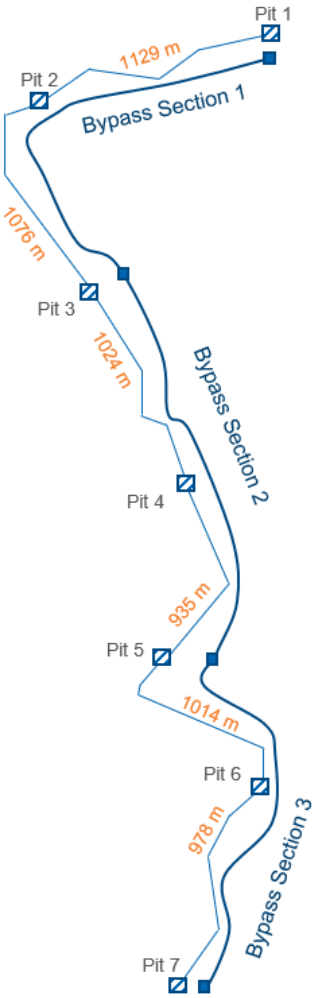
Our Services:

- Delivery of 6,178 m flexible Primus Liner DN 450 PN 16 and corresponding Primus Line connectors DN 450 with wall mounting plate
- Delivery of 1,000 m Primus Line® DN 400 PN18 medium pressure liner and 1,300 m Primus Line® DN 350 PN20 medium pressure liner for the bypass during renovation works

Situation:
In the region around Bosa, Sardinia, an ageing asbestos cement pipeline, suppling around 8,000 inhabitants with potable water, was in need of rehabilitation. Frequent breaks and leakages repeatedly led to interruptions of the water supply, since this pipe is the only supply line in the area. The pipeline running through the Temo river valley to a dam is located in a difficult-to-access area with no public access roads. The mountainous terrain is also protected by numerous environmental regulations. Under these conditions, an open rehabilitation of the pipeline was impossible and ruled out from the start. A variant study was conducted considering different trenchless solutions such as sliplining with HDPE, CIPP and Primus Line®. The variant study concluded that significant technical and economic advantages could be realised using the Primus Line® system over other methods. In addition, installation risk at the site was reduced significantly using a fully factory produced and quality-controlled product. Furthermore, the construction time frame could be minimised. The network operator therefore opted for a trenchless renovation with Primus Line® and Primus Line partner company Benassi was the successful bidder and contractor of this job.

Technical Details:

Material of Host Pipe:	Asbestos cement
Transported Fluid:	Potable water
Diameter of Host Pipe:	DN 500
Operating Pressure:	PN 16
Primus Line® System:	DN 450 PN 16 (renovation of main line) DN 400 PN 18 and DN 350 PN 20 (bypass)
Total Length:	6,178 m DN 450 (main line) 1,000 m DN 400 and 1,300m DN 350 (bypass)
Number of Sections:	6 installation sections for main line / 3 for bypass



Rehabilitation System:

The Primus Line® system consists of a flexible, multi-layer aramid-reinforced high-pressure liner and specially developed end fittings. With the system, pull-in lengths of up to 2,500 m with several bends in one piece as well as nominal pressure of up to PN 40 can be realised. The force-fit connector technology can be adapted to the individual project needs. For example, end fittings with integrated wall mounting plates can be installed in existing chambers to save space and to minimise excavation works. Due to its high flexibility and because it accommodates the operating pressure independently of an existing conduit, the liner can also be used as an above-ground bypass.

Project Description:

Access to the pipeline was provided via several existing manholes along the route, so that excavations could be completely avoided. After the preparation of the bypass, the existing host pipes were drained, inspected and cleaned. Then, the liner was pulled in, inflated and the customised wall-mounting connectors were installed. Finally, the pressure test was carried out and the installed lining was disinfected using chlorine before the line was put back into operation. The bypass was then emptied and prepared for the next installation segment.
Overall, the project was divided into six sections corresponding to three bypass segments. For each section, the same installation steps were carried out. In this way, the drinking water supply could be maintained without interruptions during the entire construction period.

Application asbestos cement pipes:

The choice of the rehabilitation method and the implementation were also influenced by the nature of the pipe made of asbestos cement. In Italy, as in many countries, asbestos cement pipes were used for water mains as of 1916. It is estimated that about 125,000 km with diameters ranging from 150 to 500 mm are made of asbestos cement.

Today, in particular the small asbestos fibres are considered extremely hazardous to health. The effort involved in renovation measures and the costs of disposal are correspondingly high. Compared to the classic open construction method, the risk of spreading asbestos fibres is much lower with trenchless rehabilitation technologies, since most of the pipe can remain in the ground. To further reduce the risk of dispersing asbestos fibres, the appropriately trained staff of Benassi used a mobile cleaning system to clean the winch cable after it exited the pits. In this way, the dangerous fibres which were released by sliding the winch cable along the walls of the old host pipe during the liner insertion were immediately bound and made harmless.

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