Relining of a DN 700 sewer main with Primus Line® DN 500

Client:
BRAWAG GmbH, Wasser- und Abwassergesellschaft, Brandenburg - Havel

Year of Construction:
March 2013

Type of Project:
Rehabilitation of a steel sewer main DN 700 PN 10

Our Services:
- Cleaning of the existing pipeline DN 700
- Supply of the flexible Primus Liner DN 500 PN 15 and the Primus Line connectors
- Installation of the Primus Line® system
- Pressure Test

Task:
The steel sewer siphon pipeline DN 700 PN 10 runs under the river Havel in Brandenburg, Germany. The pipeline is in an early stage of corrosion and already shows leaks, which could cause the discharge of waste water into the river. The siphon pipeline was built in 1966 from welded steel pipes DN 700. As a prerequisite for the renovation works of the siphon pipeline, the shipping traffic must not be disturbed and the
Renovations works must be finished within a very short time frame, since the capacity of the neighboring sewage reservoir is limited. According to the demands of the client, the renovation system Primus Line® had to be able to negotiate four vertical bends of 22.5° and stand an operating pressure of 10 bar. An additional demand of the client was, that the renovation system had to be installed in a pipeline filled with water that was ingressing from the river into the pipeline.

**Technical Details:**

- **Host Pipe Material:** Steel without coating
- **Transported Medium:** Waste water
- **Host Pipe Diameter:** DN 700
- **Operating Pressure:** 10 bar
- **Primus Line® System:** Primus Liner DN 500 with a nominal pressure design of 15 bar; Two connectors DN 500 with double-sided flange DN 700 PN 10 and DN 500 PN 10
- **Total Length:** 93 m
- **Bends:** 4 vertical bends of 22.5 degree
- **Number of Construction Sections:** 1 Installation section with 93 m
- **Installation Time:** 1 working day

**Rehabilitation System:**

The client opted to install the Primus Line® rehabilitation system. Primus Line is a flexible Kevlar reinforced high pressure liner that is produced seamlessly at the Primus Line factory in Germany with lengths of up to 4,500 m. Numerous certifications permit the installation of the Primus Line® technology in high pressure pipelines, both in the oil and gas industry. Additional certifications around the world make the product also suitable for the rehabilitation of drinking water pipelines. With respect to the transport of service water, the Primus Liner was equipped with an extremely resistant coating on the inside. Due to the flexible construction of the Primus Line® system, bends of up to 45 degree can be negotiated. Installation lengths of up to 2,500 m for the Primus Liner are feasible. Primus Line® can also be installed in host pipes that are still flooded with water, since the Primus Liner is not glued to the wall of the host pipe. The installed single-layer Primus Line DN 500 PN 15 medium pressure for service water can accommodate an operating pressure of up to 15 bar.

**Project Description:**

After construction of the two pits, the client performed a CCTV inspection. Both excavation pits were built close to the river. Due to a continuous water ingress a pumping unit was installed. The camera inspection showed debris along the entire pipeline. The pipe cleaning was done mechanically with the aid of a pull through rubber pig DN 700. After a subsequent camera inspection, the cleaned pipe was ready for the insertion of the Primus Liner. The Primus Liner was pre-folded at the factory and coiled onto a transport drum. Due to the folding technique and the associated reduction of the pulling forces, the Primus Liner DN 500 was installed with a maximum pulling force of 7 kN. The maximum permitted pulling force for the Primus Liner DN 500 is 100 kN. The Primus Liner was turned into round shape by applying compressed air. After assembling the Primus Line connectors, the rehabilitated section was leak tested successfully. With the reintegration of the renewed siphon pipeline into the existing pipeline network, the rehabilitation works of the service water pipeline were completed successfully without any major interference into the daily routine of the network operator and shipping traffic.