Job Report

Rehabilitation of a pipeline: transformation of a gravity pipe into a pressure pipe network DN 400 PN 4

Client:
Commune of Bussigny

Engineering Office:
RIBI S.A.

Year of Construction:
May 2020

Type of Construction Measure:
Conversion of an existing gravity sewer into a pressure pipe

Certified Primus Line® Installer:
Contractor: KFS Service de Canalisation

Situation:
A jointed polypropylene (PP) pipe DN 400 was never put into service.
The difficulty was that this new network had been laid for a gravity network, but that in the meantime it had not been possible due to the hardness of the soil to pass a tunnel boring machine to continue the network downstream.
RIBI S.A. had been commissioned by the Commune of Bussigny to carry out the mission to transform the existing gravity network into a pressure network. The Primus Line® system made it possible to quickly pass through the existing bends with ease and without additional excavation.
The Commune of Bussigny opted for a trenchless solution to minimize the environmental footprint, have a solution without any joints in between and therefore a safe and reliable long-term solution.

Technical Details:

Material of Host Pipe:	PP DN 400 PN 16
Transported Fluid:	Sewage water
Diameter of Host Pipe:	DN 400
Operating Pressure:	PN 4
Primus Line® System:	Reinforced liner DN 400 PN 18; connections DN 400 with DIN flanges DN 400 PN 16
Total Length:	190 m
Number of Sections:	1 section
Installation Time:	Preparatory work with camera inspection + 1 day and a half for pulling, fitting of connectors at the ends and pressure test at 12 bars

Rehabilitation System:

The Primus Line® system complies with EN ISO 11295:2017 - Classification and information on the design and application of polymeric pipe systems for rehabilitation. The system consists of a reinforced Kevlar® layer and specially developed connectors. This reinforced layer withstands the operating pressure of the pipe alone and is not bonded to the old pipe, leaving an annular space. The reinforced liner is manufactured seamlessly in an ISO 9001-certified plant in Germany and then transported on a reel. Thanks to its flexibility, the liner can pass through bends of up to 45°, be laid over lengths of more than 1,000 m in one piece and at a speed of up to 600 m per hour.

Systematic tests for complying with highest requirements:

At Primus Line, systematic factory acceptance testing is performed: the production batch of the DN 400 liner for this project was successfully accepted with a burst pressure of 54 bar. This was recorded on an inspection certificate which was sent to the end customer. Long-terms tests as stipulated in DVGW VP 643 derived a fabric factor of 2.0 for a service life of 50 years. An additional safety factor of 1.25 is added. Therefore, the network can be safely operated with an operating pressure of 4 bar.

Project Description:

The camera inspection found that the liner could be pulled into the existing pipe without the need for any cleaning since the pipe has never been in service. A steel pulling wire connected with a rotation joint and the cable of the pulling winch allowed the liner to be pulled into the host pipe. The inserted liner was inflated with compressed air of around 1 bar and returned into its original round shape. The connectors equipped with flanges were finally assembled in less than 3 hours. The service life of the system is extended by at least 50 years.

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