Job Report

Rehabilitation of a DN 450 sewage rising main with a length of 360 metres

Client:
Drainage Services Department (DSD), Hong Kong

Year of Construction:
January 2020

Type of Construction Measure:
Rehabilitation of a DN 450 sewer pressure pipe located on Hong Kong Island

Our Services:
- Planning
- Delivery of the Primus Line® system DN 450 PN 16 and connectors
- Supervision

Situation:
The DN 450 sewer pressure pipe located on Hong Kong Island had reached the end of its useful life. Current techniques were technically and economically not suitable for its repair since it would have meant temporary traffic diversion for a prolonged period of time.
The network operator had to overcome the following obstacles: The ductile iron pipe stretches under a high traffic street with two lanes and a length of 360 m. It has several bends of 22.5 and 45 degrees, the latter with a bend radius of 1.5xD, and ends close to a golf course at Deep Water Bay.
The starting point of the section to be rehabilitated is located at a pumping station and the destination point at an air valve placed in a maintenance chamber. The pipe is operated with 3 bar. From an execution point of view, the complete rehabilitation work including CCTV inspection, pipe cleaning, rehabilitation and reintegration into the network had to be completed in less than one week.

Technical Details:

Material of Host Pipe:	Ductile iron
Transported Fluid:	Sewage
Diameter of Host Pipe:	DN 450
Operating Pressure:	3 bar
Primus Line® System:	DN 450 PN 16
Total Length:	360 m
Number of Sections:	1
Installation Time:	50 hours

Rehabilitation System:

Compared with traditional excavation methods, the Primus Line® system offers the following benefits: No obstruction to traffic, durable and stable product, widely applicable to host pipe and certified for drinking water. Since the construction does not require large-scale excavations of the surface, it is especially suitable for sensitive areas. The middle structural layer of the Primus Liner is made of seamless Kevlar®-fibre reinforcement and the three layers have a total wall thickness of 6 mm. Therefore, the flexible liner can be used for higher working pressure with higher flow capacity. The flexible liner is transported on reels and the layout area on site is more compact. The design and application of the Primus Line® conforms to ISO11295 which can be applied to media such as water and gas. The especially designed end connector is a patented product.

Project Description:

Since the installation had to be done from chamber to chamber with limited space, it was decided to place the transport reel T-210 with the pre-folded liner at the pumping house. A small opening was made into the chamber to feed the liner into the host pipe without additional excavation works. Since the termination point is also located in a chamber with confined space, the pull-out angle would not have been suitable and the pull-out forces would have increased significantly. Hence, an excavation pit was created behind the chamber to pull out the liner in a maximum flat angle without damaging the existing chamber. The host pipe was secured. The liner was inserted by means of a pulling winch within one hour and turned into its original round shape with compressed air. The connectors were installed in the chambers and reintegrated using a spool piece. Thanks to meticulous planning, preparation and commissioning, the pipeline could be put into operation again at the intended deadline.

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