References

Tailored renovation solution



Uponor involvement

- 890 metres of VipLiner modules DN 375, with 23 drains made to measure

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The Vierimaantie road, located close to the town centre of Ylivieska, Finland has a concrete sewer line constructed in the 1960s and 1970s. A decision was taken to renovate this sewer using a tailored solution, and the product developed for this purpose is now also available to other customers.
Uponor Infra's tailored VipLiner module provided a solution to enable the renovation of a concrete sewer line located close to the centre of Ylivieska. In addition to a new diameter size, modules were manufactured with a shorter length than standard modules, enabling the tight curves in the line to be implemented without difficulty.

Project Facts:

Location
Ylivieska, Finland

Completion
2015

Building Type
Municipal

Product systems
Renovation

Project Type
Renovation

Partners

Planner:
FCG Design and Engineering Ltd
Contractor:
Uponor Infra Ltd

Every year, the municipality of Ylivieska renovates approximately 1–2 kilometres of its concrete sewer network, which was built in the 1960s and 1970s.

"More than three kilometres of concrete lines are still to be renovated. In recent years, the renovations have also focused on renewing the concrete drains in plastic pipes," says Karoliina Mustonen, Project Engineer from Ylivieska's infrastructure unit. The intention is to carry out almost all of the renovations using a trenchless process. This was also the starting point for the Vierimaantie road in the vicinity of the town centre when planning began on renovation of the trunk line, which was built in the 1960s and 1970s. Wastewater flows into the line from the nearby residential areas of Toivonpuisto and Pyörreperä, as well as the Puuhkala industrial area and part of the town centre.

"The 890-metre section that has now been renovated was imaged for the first time a few years ago. A very large amount of water was flowing into the line, so steps were taken to reduce the amount of leakage by renovating the upper section of the line. The amount of leakage was reduced by approximately one third on the main line. After this, the pipe was imaged again. "The images showed that some parts of the sewer line were in very bad condition," says Karoliina Mustonen.

Clear savings

Reducing the amount of leakage enabled the internal diameter of the 400-millimetre concrete pipe to be reduced as part of the renovation. "Analyses were carried out in collaboration with a consultant and it was concluded that the diameter could be reduced by up to 15 per cent. However, we had to take into account the potential for additional land use in the future, so Uponor Infra's solution – a 375-millimetre VipLiner short reliner pipe – was a superb choice for this project. The internal diameter of the renovated pipe is only five per cent smaller using this solution."

"There were also clear cost savings in comparison with solutions such as sleeve relining. Using short reliner pipes meant that there was no need for trenches and the line remained in use throughout the renovation. It was only necessary to dig trenches around three covered drains," says Asko Polvi, the project supervisor from FCG Design and Engineering Ltd.

Solution leads to a new product

VipLiner short section relining is a quick and easy way to improve the condition of old, leaking concrete sewers. A new pipe consisting of interlocking modules of 50 centimetres in length is inserted into the old pipe. If necessary, the area between the old and new pipes can be filled with autoclave foam concrete. As the renovation is completed using modules from one drain to the next, there is almost no disruption to traffic or the local environment. There is also no need for wastewater to be diverted as the pipeline can be in operation throughout the renovation. A new diameter size was developed for the VipLiner module at Uponor Infra's factory in Vaasa, Finland.

"We had ready-made modules with diameters of 315 millimetres and 355 millimetres for pipe renovations of this size. However, this would have reduced the internal diameter of the pipe in this project by an excessive amount. A new product was developed and tested at the Vaasa factory, and it is now available for use in similar projects in the future," says Kimmo Sjöman, Sales Manager at Uponor Infra. The length and diameter of the module were customised. In addition to the standard, 50-centimetre module, Uponor manufactured 25-centimetre modules for the site.

"Approximately 40 metres of the renovated line had such a tight curve that modules of normal length would not have been suitable. The shorter modules provide a couple of degrees of curvature, so this section was also completed without problems. The location would also have been highly complex to excavate." Sjöman considers this renovation an excellent example of how suitable solutions can be identified for challenging sites by customising products.

A quick and efficient job

The renovation on the Vierimaantie road began at the start of July. "Work progressed quickly and without any problems, even though the line was large and the location was challenging."

The section with the greatest curvature was completed with flying colours, as was one collapsed section of the line on the Savontie road underpass. One underpass of 30 metres in length was made below a ditch. A separate project was initiated for

this as the work was completed by directional drilling, says Asko Polvi. During the project, 23 concrete drains were replaced by plastic drains and three hidden drains were renovated.

"The drains were built on-site by welding polyethylene elements. Ready-made drains would not have been suitable for the old line because was no sufficiently accurate information on the drains," says Kimmo Sjöman. VipLiner section relining is a familiar process in Ylivieska: it has been used for renovations for 20 years. Asko Polvi and Karoliina Mustonen consider the key strength of VipLiner to be that there is no need to plan diversion pumping and the line can remain in use throughout the renovation.

"The ring stiffness of the pipe is also sufficient to ensure that the pipe does not need to be supported, even at its weakest points," says Polvi. The renovation was completed in seven weeks. Final imaging of the line is still to be carried out. "A quick and well executed project," say Mustonen and Polvi.

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GF Building Flow Solutions

Headquarter:
Ilmalantori 4
00240 Helsinki
Finland

Phone +358 20 129 211
Contact us

Email for communication requests: communications@georgfischer.com
Contact for Headquarter, PR, Offices in Australia, Dubai, International Sales and for Singapore

W www.uponor.com