References

Relining to the rescue in Kajaani



Uponor involvement

- During the project, bypass pipe 250 mm Profuse pressurised sewer PN 10, 1.2 km

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Over 40 years is not yet a bad age for plastic pipes – however, not even the best pipe can withstand mechanical stress forever. In Kajaani, a pressurised sewer that has broken down due to faulty installation will be renewed by relining. This reliable and fast method will also be cheaper than excavating for the site.

Project Facts:

Location	Completion
Kajaani, Finland	2015
Building Type	Product systems
Municipal	Potable water
Project Type	
Renovation	

The pressurised sewer in the Purola and Katiska residential areas in Kajaani got off to a boisterous start in the new year. The pipe burst and some of its content leaked into the surrounding ground. According to Kajaani Waterworks' network manager Markku Piirainen, this was the proverbial last drop. – It was already the fourth time in the last few years that the same pipe had caused problems. Kajaani Waterworks decided to renovate the whole line, for a total pipe length of over a kilometre. – The line was built in 1973, which means that the plastic pipes are not that old yet. However, the use of plastic pipes had just begun to become more common and there was still a lot to learn about their installation. The old pipe was installed based on the know-how of that time. The burst pipe in the Purola and Katiska areas rested directly on top of rocks and bedrock. The proper way is to use an installation base under the pipe and fine soil around it. The base and the surrounding area must also be carefully

compacted. – The problems were caused by the fact that the pipe installed on top of bedrock and rocks did not withstand external mechanical stress, says Piirainen.

Relining 300 metres at a time

The old plastic pipe will now be renovated by relining. A 500-millimetre, 10-bar pipe will be installed inside the 630-millimetre, 6-bar pipe. – Therefore, the old pipe will remain as a protective shell for the old pipe. Capacity will slightly decrease due to the smaller pipe size. However, we have calculated that the system will take it well, says Piirainen. Uponor Infra will be responsible for the site's comprehensive contracting. Fitter Mikko Kallioinen from Uponor Infra says that the pipe will be relined 300 metres at a time. – Excavations will be made at both ends of the line, and the new pipe will be winched inside the old one by a lorry. The winch has a pulling force of 15 tonnes. Kallioinen fully agrees with Piirainen on what caused the problems. – There are hundreds of rocks in the ground.

Reliable and fast

– The advantage of relining is that there is no need to dig up the ground throughout the length of the line in sensitive surroundings, states Markku Piirainen. The line partly runs near Renforsin Lenkki, a popular outdoor recreation trail. – Relining is a reliable and fast method. For this site, it will also be slightly cheaper than excavating. – The installation method is always chosen on a case-by-case basis. Removing old pipes and replacing them with new ones is a sensible alternative, for example, when streets have to be opened up for other reasons. Before January's leak, Kajaani Waterworks was already aware that the sewer in the Purola and Katiska residential areas was in urgent need of renovation and had been preparing for it. – I had determined beforehand that relining was the best way to renovate the line. We had already taken part in tenders related to similar projects. Therefore, we were able to start working immediately and we knew where to get help quickly. According to Piirainen, Uponor will be responsible for all of Kajaani Waterworks' renovations to be carried out with the capacity-reducing method and without excavation for the entire duration of the contract period (3 years).

New line by directional boring

A total of 4,000 cubic metres of wastewater, accounting for 60 per cent of Kajaani's wastewater, flow daily through the pressurised sewer to be renovated. – All wastewater installations must obviously continue to function also during the renovation. Bypass pumping has been arranged for the duration of the work through a small pipe laid on the ground, says Piirainen. However, while connecting the new pipe, the line will have to be cut off for a total of three times. Pumping will also be temporarily interrupted. During outages, wastewater will be collected by suction vehicles and transported to the treatment plants. – All cut-off and connection work will be carried out at night from midnight onwards, when the amount of incoming wastewater is at its lowest. At seven in the morning, the flow is strong again, states Kallioinen. A smaller 250-millimitre branch from another pumping station has been connected to the main sewer line. The connection will now be closed permanently, and the line will be routed directly to its destination well. The about 400 metres to the well will be bored directionally through two excavations. – The ground is moraine and sand. Therefore, directional boring works well, says Kallioinen.

Importance of continuous maintenance

Markku Piirainen says that Kajaani Waterworks has invested EUR 1.5–2 million in water supply networks every year. According to him, the situation in Kajaani is very good thanks to this. Elsewhere renovations may not be carried out as regularly. – Due to the difficult financial situation that the country and the municipal sector are facing, many waterworks have accumulated a significant amount of restructuring debt. On the other hand, a major role is also played by the fact that politicians do not always consider infrastructure sufficiently important and do not understand the importance of ongoing maintenance. After all, the pipes are conveniently out of sight under the ground. The renovation of the pressurised sewer in the Purola and Katiska

residential areas was completed in March. How long a lifecycle can be expected for the renovated line? – Today's toddlers will still use the pipe when they are old. It will last at least a hundred years, says Mikko Kallioinen.

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Address

Uponor UK
The Pavilion, Blackmoor Lane,
Watford, WD18 8GA

Phone 01923 381212
E-Mail
customerservice.uk.bfs@georgfischer.com
W www.uponor.com