

# Unique underground study for sewer optimisation

**The local authority of Bergen in North Holland wants to limit the management costs of the sewer system. The transport of sediment through a sewer system plays an important role here. Tauw consultancy is investigating the build-up of sediment in a sewer in Schoorl and is doing so in a very special way.**

Eric Kraak, a Civil Engineering student at the Amsterdam Academy who specialises in Water Management, is performing the project: 'The managers of the sewer system in Bergen wanted to gain more insight into the manner in which sediment builds up in a sewer. The local authority forwarded this question to the Tauw consultancy agency and I was then asked to investigate this question in the form of a graduation assignment – I was very enthusiastic to take part.'



*Eric Kraak during the creation of the pit*

## Transparent sewer pipe

'Sediment is present in every water system. You can subject it to many calculations. For managers it is important to know the degree to which sediment influences the hydraulic operation of, for instance, a waterway and to know where sedimentation and erosion occurs. The behaviour of sediment in a sewer is influenced by many processes of which little is known. The result is that there is no clear insight into the behaviour of sediment in sewers. What is the reason for this?'



*The transparent sewer pipe that is being monitored*

A sewer is considered to be a type of dumping place, people defecate into it and also use it to dispose of their food residues and other small items of waste. Therefore, it is difficult to determine the properties of the material in a sewer. So it is impossible to know how it develops. In addition, research is more difficult as the sewer is below ground. Therefore, a test rig in a laboratory normally employs artificially created sewer water or water from a real sewer.'

**'Of course, you hope to obtain a layer of sediment. It had accumulated within a week.'**

'We addressed the problem completely differently and made a 3-metre deep pit from where a camera focused on a 1.5-metre long transparent acrylic sewer pipe. This pipe is connected to a mixed sewer system. At 15-minute intervals, the camera takes a photo of the pipe and therefore of the sediment. This has never been done before and allows us to investigate how sediment becomes deposited on the bottom of a pipe. Does a lot of rain flush out the sediment or does the sediment accumulate? Is there a seasonal influence or one from the daily peaks caused by the connected households? The results of this research will give us considerable insight into what happens in a sewer.'

### Successful start

'At the start of February the monitoring rig was installed and the first camera images analysed. What you hope for is sediment in the pipe and that is exactly what was observed. It also seems to be developing ridges, like those on the bed of a waterway – very interesting. The first part of the project, the execution, is already successful. The results of the camera images, ultrasonic level measurements and flow rate measurements are still to be correlated. Finally, I want to write scientific articles about this research and publish them in various professional magazines.'



*'There seems to be ridges developing in the sediment.'*



*'The project has already surprised me.'*

## A comment from the municipality of Bergen

George Stockell, Civil Engineer at the municipality of Bergen: 'We want to try to limit our management costs. Therefore, we need to know how our sewer system operates. We can use the outcome of this research in the future to optimise our sewer policy. Moreover, for me as civil engineer it is of course an extraordinarily interesting project.'

The project has recently started and will run for two years. However, it has already surprised me because there is more sediment in the pipe than I had anticipated. Of course, this already says something about the sewer system. I still have little experience using the Nivus equipment. However, Harry de Brauw, water management and sewerage consultant at Tauw and the project leader in Schoorl, is enthusiastic about this device. Harry tested it extensively before it was purchased and he is very positive about it.'

## The Nivus PCM4 flow rate meter

For the project in Schoorl, Tauw uses the portable flow rate meter PCM4 with Cross Correlation technology. This kit is extremely suited to taking measurements in (strong) particle-rich water that flows through semi-filled pipes, culverts and/or control flumes. For short-term measurements, it is possible to rent the measuring kit. Interested? Please contact our sales department via +31 313 880 200.



## Review of the Nivus seminar

On 19 April 2012, Eijkelpamp Agrisearch Equipment organised the 'Innovative Measurement Solutions for Flow Rate Measurements' seminar. You can find a review of this successful event at [www.eijkelpamp.com](http://www.eijkelpamp.com) in the news section.