



## APPLICATION NOTE Water & Wastewater

### Flow monitoring of wastewater for a sewage treatment plant

- Redundant, non-invasive verification of inline flowmeters and pump capacity
- Ultrasonic clamp-on flow measurement of sewage at the inlet of a wastewater treatment plant
- Cost-effective service tool to identify failed pumps or flow instrumentation

#### 1. Background

A water utility company manages the drinking water supply and wastewater treatment for municipalities in western Poland. Next to treatment plants and potable water reservoirs, the company also operates a sewage network with corresponding equipment such as pump stations and process instrumentation.

#### 2. Measurement requirements

At the inlet to one of its treatment plants, wastewater is pumped from an underground sewer system to the plant's elevated screens and grit chambers. The raw sewage contains sand and other solids. The inlet flow-rate varies between 270...350 m<sup>3</sup>/h.

To have additional data available on flow rates and pump performance, the operator was searching for a cost-effective, yet robust and accurate instrumentation for flow monitoring on one of its pipelines. The pipeline has a diameter of 522 mm (20.55 inch) and consists of old carbon steel vested with a protective bitumen layer at the outside. It has a wall thickness of 11 mm (0.43 inch). Given its age, and to avoid mechanical stress, prevent spillage and leakage and save time, cutting the pipeline was not an option for the company.

#### 3. KROHNE solution

The utility opted for the OPTISONIC 6300 ultrasonic clamp-on flowmeter. In particular, the customer uses the clamp-on flowmeter to verify the readings of its inline flowmeters and to monitor pump performance. The KROHNE meter is perfectly suited for non-intrusive flow measurement of liquids at any location where inline measurement is not possible or desirable. It is best used as a cost-effective service tool and alternative to inline flowmeters where excellent repeatability and long-term stability is required, but not the extremely high accuracy of inline flowmeters.

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It features a robust stainless steel sensor rail. The unit can be installed in the open air and can withstand heavy rain or even flooding. A sensor option for burial installation and hazardous environment of wastewater treatment plants is also available. The latest version of the clamp-on flowmeter has been further optimised for applications with difficult media and pipeline materials. It is ideal for use on new or old pipes and many coating materials. In this application, the signal was so good that it was not even necessary to remove the protective bitumen epoxy layer to obtain reliable flow measurement.

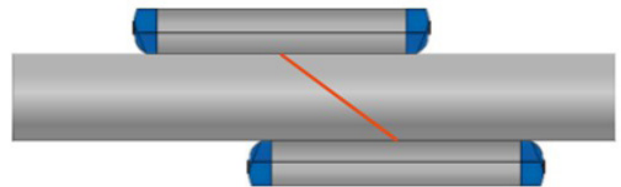
The design of the OPTISONIC 6300 allowed for quick installation and commissioning. It was mounted on the outside of the ascending sewer pipe using two sensor rails, each with one transducer. This provides Z-mode measurement, which is sufficiently accurate for this application. Its field-mounted signal converter (F) was installed remotely to allow for a more convenient on-site flow monitoring and quick access to device and application diagnostics. The actual flow rate is transmitted to the control room via 4...20 mA. Alternatively, the customer could also have opted for the fieldbus communication capability of the OPTISONIC 6300.



Clamp-on flow measurement on carbon steel pipe with bitumen coating



Remote installation of field-mounted signal converter of OPTISONIC 6300



Z-mode measurement using two clamp-on sensor rails



Diagnostic values of OPTISONIC 6300



Wastewater flowrate displayed by Ultrasonic signal converter

### 4. Customer benefits

The utility benefits from a cost-effective and reliable flowmeter which at the same time serves as an effective service tool to cross check the readings of inline flowmeters and pump efficiency. In this way, the OPTISONIC 6300 has already helped the customer identify a faulty pump that needed fixing, contributing to high plant efficiency and availability.

The user-friendly sensor rail system allowed for smooth installation without process interruption or cutting pipes. There is no risk of product spillage or leakage. Due to the non-invasive measurement, no abrasion-resistant tube material had to be considered.

KROHNE has one of the most comprehensive process instrumentation portfolios for water and wastewater utilities on the market. This also includes many inline flowmeters for district metering and custody transfer as well as for heavily contaminated, aggressive and abrasive media. Based on the variety of six different flow technologies KROHNE can always find a solution that fits customers parameters and requirements best.

### 5. Product used

#### OPTISONIC 6300

- Ultrasonic clamp-on flowmeter for flow measurement of liquids
- Stationary device, for installation at any location without process interruption or need to cut pipes
- Robust stainless steel sensor rail for pipes DN15...4000 / 1/2...160"
- 4...20 mA, HART®7, Modbus, FF, Profibus-PA/DP



#### Contact

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