



APPLICATION REPORT Water & Wastewater

Leak management system with GPRS remote monitoring in the Rio de Janeiro drinking water network

- Flow measurement rated to IP68 to check water consumption
- GPRS wireless transmission of readings to create consumption profiles
- Integrated pressure measurement for redundant leak detection

1. Background

In light of the 2016 Olympic Games, expanding the infrastructure in the Brazilian city of Rio de Janeiro is extremely important. Modernising water supply and wastewater disposal is also a focal point. In this context, the Technische Universität Darmstadt (Darmstadt University of Technology) is overseeing a pilot project focusing on improving the ecological efficiency in the Brazilian water industry. The objective is to pinpoint measures to increase energy efficiency when it comes to the supply of water, in cooperation with partners in science and economy. Leak detection is the focal point of the pilot project. Leaks mean water loss – water loss means energy loss – energy loss means high but avoidable additional costs. This was one of the main starting points. The campus of the University of Rio de Janeiro, located on an island near the mainland, was chosen as the venue for the pilot project. The municipal provider made the local water supply system available for the purpose of analysis. This system supplies around 2000 residents in a selected neighbourhood with drinking water.



University of Rio de Janeiro campus

2. Measurement requirements

The pilot project will involve investigating how flow technology can be used to determine the actual water consumption as well as any potential water loss caused by leaks. This application required a leading technological measurement solution suitable for continuous and highly accurate flow measurement and that features an integrated pressure sensor for redundant leak detection. The readings should also be provided via GPRS remote transmission to a control centre where exact consumption and supply pressure profiles are created. Since installation is to take place at freely accessible measuring points and the equipment will thus be exposed to environmental and other influences, the measuring instrument used had to be sturdy and feature an integrated GPRS module and maximum water tightness as per IP68.



WATERFLUX with GPRS module KGA 42 in aboveground part of the pipeline

3. KROHNE solution

KROHNE was selected as the technology partner for the pilot project. They supplied two WATERFLUX 3070 C electromagnetic water meters and two KGA 42. The devices were provided in the IP68 version in order to operate them under water. The measuring instruments were installed in the aboveground, easily accessible parts of the main supply line (DN 100 / 4") and in a bypass (DN 50 / 2") of the water network in the neighbourhood. Both water meters are equipped with integrated pressure and temperature sensors.

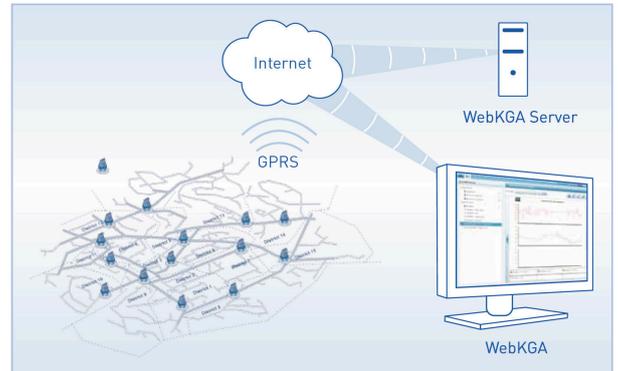
Based on flow and pressure measurements, the WATERFLUX provides continuous information about the daily and nightly water consumption as well as the supply pressure in the water line. An external GPRS module KGA 42 serves to wirelessly transmit the readings for the pilot project. To analyse and visualise the readings both the internet-based system WebKGA as well as the software-based mini SCADA system PCWin will be tested at the same time. Possible errors, critical battery levels and preset thresholds trigger an alarm in the control room via SMS or email.

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Replacing the WATERFLUX later for safety reasons with a device variant featuring an integrated GPRS module was defined as a milestone for the project. In addition to accurate flow measurement, the fully compact measuring device in protection category IP 68 offers an integrated pressure and temperature sensor, an integrated data logger and a GSM module. The readings are then transferred to the control room via GPRS. Wiring outside of the measuring device is now no longer necessary. Sealing options and a software menu lock provide protection against manipulation or unauthorized access.



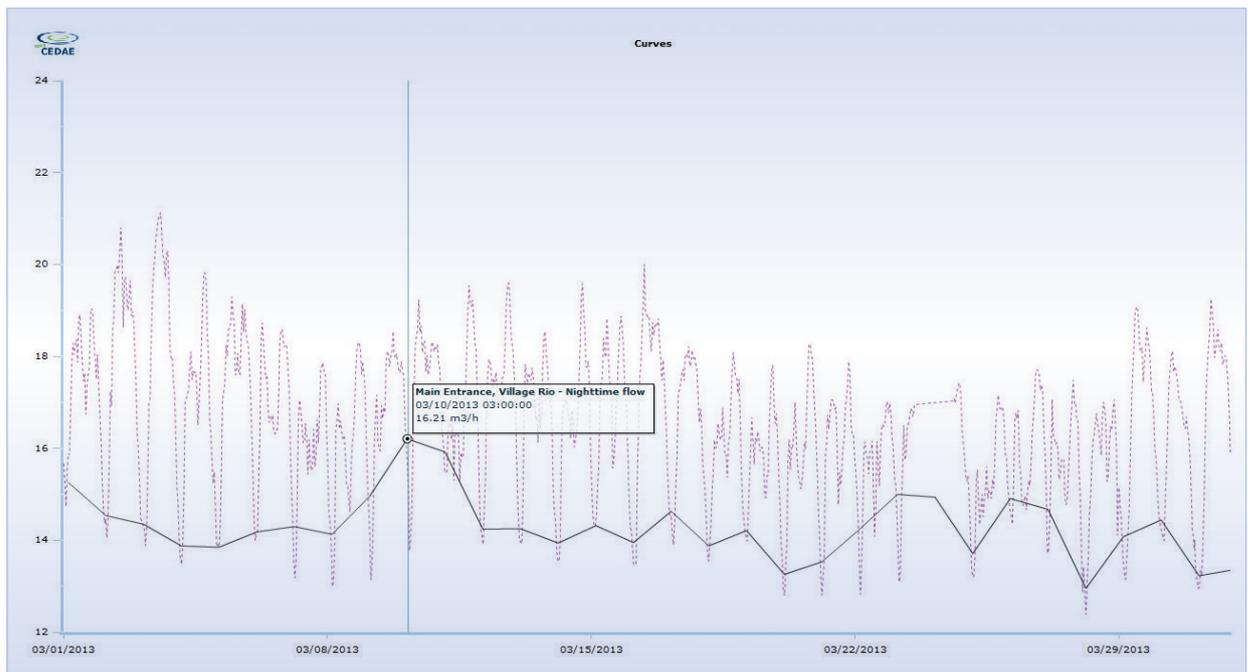
Schematic layout of measuring points with GPRS module



GPRS transmission with WebKGA

4. Customer benefits

The WATERFLUX 3070 C can be used to accurately analyse water consumption during the day and overnight. The KROHNE device helps properly determine usage patterns for about 450 households. For example, after just a short time using the WATERFLUX readings it was possible to create accurate consumption profiles, which pointed to unusually high but constant night consumption. Using the WATERFLUX integrated pressure measurement it is possible to check for connections to leaks or other process interventions. In this way, the WATERFLUX indicates how to efficiently manage the water supply network, detecting water losses quickly. This permits resource protection and permanent cost reductions.



Load curve (consumption profile) in a month (Day = red / night = black)



Use of WATERFLUX in partially flooded areas



Measuring tube supported by gravel bed

5. Products used

WATERFLUX 3070 C

- Battery-operated stand alone water meter with integrated pressure and temperature measurement
- Suitable for custody transfer according to OIML R-49 and MI-001
- No wear, no deposits
- Bi-directional measurement; no inlet and outlet runs necessary
- Compact version in protection class IP68
- Sizes DN 25...600 / 1"...24", Rilsan polymer coating
- Remote monitoring with integrated GSM module or external KGA 42 (GPRS)
- Data analysis by way of web-based system WebKGA or software-based mini SCADA system PCWin



KGA 42

- Data logger and GSM antenna for remote transmission of readings
- 4 digital and 2 analogue inputs
- Strong GSM signal specially designed for manholes
- For installation sites with no power supply
- Standard protection category IP68



WebKGA

- Secure server-based remote monitoring system for small and large water networks
- Access via any PC with internet browser
- High data security thanks to redundantly secured data processing centre
- Unlimited number of measuring points can be monitored

PC Win

- PC-based remote monitoring software with local GSM modem
- Comprehensive mini SCADA system
- Up to 250 measuring points can be monitored with one workstation

Contact

Would you like further information about these or other applications?
Do you require technical advice for your application?
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Please visit our website for a current list of all KROHNE contacts and addresses.

