

Appl Notes



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DISCHARGE MEASUREMENT IN ROSENHEIM

OTT SVR 100 installed under challenging conditions at the gauging station in Triftbach

Background

The gap between urban and rural areas is widening all the time - the number of inhabitants per city is continually increasing: on the one hand, demographic change with the ageing of many urban regions is contributing to this, but at the same time more and more young people are moving to the city. Urbanisation, i.e. the multiplication and expansion of cities in terms of number, area or inhabitants, has ever greater challenges for people and nature: The overexploitation of nature does not go unpunished and causes - in combination with climate change - sometimes terrible catastrophes with great damage.

Floods and high water have been among the worst urban natural disasters in Europe in recent years. They were caused by short-term heavy rainfall events or long-lasting precipitation and thaw. Waters overflowing their banks can cause millions in damage to settlements and infrastructure. This damage potential is constantly growing as a result of the development of meadows and floodplains and the conversion of cellars into usable space. Climatic changes are also often the cause of extreme events.

The city of Rosenheim was hit particularly hard at the beginning of June 2013 after a cool and, above all, very rainy spring. At the river Mangfall near Rosenheim, extreme high water discharges, with record water levels since 1899, were observed after precipitation events that lasted several days and covered large areas.



Built-up areas in Kolbermoor and Rosenheim were flooded due to overloaded older dikes. More than 1000 people had to be evacuated.

It is not possible to avoid flooding completely because it is a natural event. However, preventive measures can reduce possible damage caused by floods.

Such prevention includes, among other things, professional maintenance of water bodies and constant and reliable recording of measurement data. The modernisation of the discharge measurement station at Bad Aibling Triftbach near Rosenheim is one such measure.

Task

The measurement station in Bad Aibling Triftbach, which is part of the state measurement network operated by WWA Rosenheim on behalf of the Bavarian State Office for the Environment, has been in successful operation for some time now. In 2018 this station should be refitted with new equipment.

The measuring station in Bad Aibling Triftbach serves flood protection as well as protection against droughts and general assessment. The reason for installing the OTT SVR100 was the backwater caused by the Mangfall during flooding. During such events, the existing rating curve provides erroneous data. Sensors using the ultrasonic Doppler principle would not be suitable, as the station is in the downstream part of a power plant. It is likely that high oxygen levels will occur again and again.

The measurement station in Triftbach is equipped with:

- 1 OTT SVR 100 with accessories
- 1 RLS 24 GHz with accessories

The following infrastructure is planned:

- 1 netDL1000 – existing
- 1 SE200 – existing
- 1 RLS – for redundant I-measurement
- 1 SVR – for v-measurement

Additional acquisition: 1 Software Prodis 2



Monitoring solution

At the Triftbach measurement station, the existing water level measurement is complemented by a discharge measurement. The discharge is determined by measuring the surface velocity with the OTT SVR 100 (Surface Velocity Radar). In parallel, an OTT RLS (radar level sensor) determines the water level by means of radar measurement. Both sensors transmit the measurement data to the OTT netDL 1000 data logger. The data logger stores the calculation of the discharge from the two measured variables. The discharge is stored as a separate channel in the data logger and is available like the measured value of a sensor. Via the PRODIS software, the flow calculation can be calibrated by means of comparison measurements at different water levels/discharges. Until comparison measurements are available, standard calibrations can be used.



The monitoring solution has a modular structure. Existing water level sensors and data loggers can thus be continued to be used and can cost-effectively be supplemented by a flow velocity measurement.

The non-contact radar measurement of water level and flow velocity is particularly advantageous in flood situations and in waters with high biological activity or large sediment loads. As the sensors are not in the water, they are not clogged and require very little maintenance. In the event of flooding, the sensors are safe from damage by floating debris as they are installed outside the water body. In contrary to sensors using the acoustic Doppler method, this solution also works with very turbid water, high sediment loads or high oxygen content and air bubbles, as is often the case with heavy rainfall and flood events.



Summary

The new OTT SVR 100 sensor enables safe and reliable discharge measurement even under challenging conditions. This means that measuring stations can now be used as discharge measurement stations as well, where it was previously impossible or only possible with great effort to measure the flow. Due to the uncomplicated integration into existing systems, existing stations can be easily retrofitted.

The OTT SVR 100 is thus an important addition to the existing product portfolio for discharge measurement and will in future make a major contribution to water monitoring and flood protection, especially in small and medium-sized waters.

OTT SVR 100

- Continuous contact-free velocity measurement
- The metadata of the integrated vibration and tilt sensors identify data influenced by sensor movement (e.g. wind, traffic)
- Sensor detects the flow direction automatically
- Specific filters eliminate/reduce effects of wind, precipitation, vibration or waves

OTT Prodis 2

- Simple, clear and chronological management of site, system and calibration data
- Computes velocity-index-ratings based on theoretical model approach or field comparative measurements
- Step-by-step user guidance
- Various data import interfaces
- Clear and comprehensive calibration report

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