



Sediment Monitoring

With flow measurement RISONIC *modular*

Add. features (optional)

- Ultrasonic flow measurement
- Leak Detection monitoring
- Turbine efficiency monitoring

Advantages

- Cost effective sediment monitoring solution
- Additional protection of the plant, especially the turbine
- Optimization of turbine operation in sediment containing geology
- Optimization of turbine maintenance and thus reduction of maintenance costs

Cost-efficient monitoring

When it comes to hydro power plant operation, maximum productivity and assured revenues come first. Therefore, it is essential to detect potential reasons for equipment damage at an early stage. This protects operators from the high costs due to power generation outage and the time-consuming and expensive replacement of damaged turbine parts. Sediments floating in the water are one of these potential risks for water turbines. They can scuff turbine parts and ultimately lead to a complete outage in the worst case.

Monitoring sediment is important for the management of water resources, too. Sediment monitoring data can be used to determine effectiveness of sediment reduction actions in the watershed and guide adaptive sediment management.

Research at the Swiss Federal Institute of Technology in Zurich (ETH Zürich) and the University of Lucerne have shown that the ultrasound pulses can also be used to monitor the amount of suspended particles in the water. This feature has many technical, economical and ecological importance for the operation of a hydropower plant as it can reduce turbine scuffing.

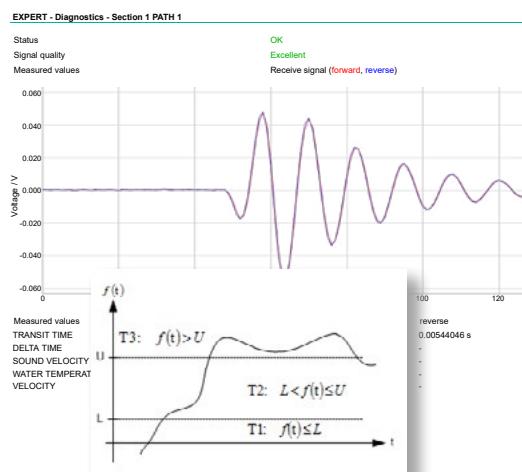
In addition to closed pipe systems, this feature can also be used for sediment management programs for open channels such as canals and rivers.

Sediment Monitoring



The flow measurement is based on the acoustic discharge measurement (ADM) method. Sensor A and B alternately send and receive an ultrasonic waveform. The measured transit time difference of the two waveforms is directly proportional to the mean path velocity. From the mean path velocity in conjunction with the pipe geometry the flow can be determined.

If there is suspended sediment in the water, the acoustic signals get attenuated. Normally, this existing information from the measurement is not evaluated



RISONIC modular enables this evaluation and provides a powerful and easy way to monitor suspended sediments in the water. Individually galvanically isolated I/Os and communication ports allow the system to send alarms via SMS using an external GSM/GPRS modem.

The key of the new feature is that there exists a site specific correlation table between the signal attenuation and the sediment concentration. To create this table, initial measurements of the suspended sediment in the water have to be done. With every later measurement, the sediment concentration and the signal amplitude is stored in the conversion table and the monitoring will be more accurate.

Based on the correlation, 3 thresholds values can be defined for the RISONIC modular to send alarms if the sediment concentration is too high.

The threshold levels can be determined by:

- A reference instrument such as a laser refractometer
- Experience from practice

With RISONIC modular, Rittmeyer offers a flow measurement solution that includes sediment monitoring. Turbine abrasion due to sediment concentration can be reduced in a simple and cost-effective way and the plant can be additionally protected.

We would be pleased to advise you personally and help you to optimize your operation. We look forward to hearing from you