

Underground water level measurement of dams in the Czech Republic

COUNTRY CZECH REPUBLIC	PROJECT TYPE UNDERGROUND WATER LEVEL MONITORING	SECTOR CRITICAL INFRASTRUCTURE	MAIN PRODUCT LOADSENSING
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Challenge

The Olešná and Slezská Harta dams in Northern Moravia, Czech Republic, supply drinking water to residential and industrial areas as well as being used to generate electricity and avoid flooding on the Moravice River. As with any large reservoir, regularly monitoring the integrity of the infrastructure is a key task.

For the main dam structure, monitoring was assured through sensors connected by cables. But for piezometers measuring the water level in standalone boreholes outside the dam and in the surrounding areas, data was collected manually and infrequently—from once a week through manual measurements to twice a year from single-channel data loggers.

The piezometers could be connected with cables to the dam gallery monitoring system, but this would require digging cable trenches between the boreholes and the nearest multiplexers. The dam monitoring company, Geomonitoring, wanted a better option.

Solution

Geomonitoring chose a Loadsensing wireless monitoring system to collect data regularly without having to dig cable trenches. The company ran a series of pilot projects with one gateway and seven loggers for each dam, then extended the setup to include a total of 29 loggers.

Each Loadsensing vibrating wire data logger is equipped with a reference barometer for barometric pressure change compensation. In spite of being installed in boreholes with steel cover caps, or behind the body of the dam with no line of sight to the gateway, the data loggers are able to transmit data without the need for repeaters. Data is collected and sent securely to the dam operator's private network, where it is used for real-time reports and Vista Data Vision visualizations.

Loadsensing uses LoRa connectivity, a long-range, low-power wireless technology used by IoT networks worldwide. The system has a star network topology that can cover a range of up 9 miles/15 km without any repeaters. And wireless data loggers are IP-67 certified and have been tested in temperatures ranging from -40C to +80C, so they are able to withstand the harshest environments.

“ In spite of being installed in boreholes with steel cover caps or behind the body of the dam with no line of sight to the gateway, the Loadsensing nodes are able to successfully transmit the data without the need for repeaters.”

Ludek Novosad,

Senior Instrumentation Engineer, Geomonitoring s.r.o.

Benefits

Thanks to Loadsensing, the dam operator can capture real-time data on the condition of key areas beyond the dam itself. This data is easily displayed in visualization software and enables the configuration of alarms and alerts that can be used not only for emergency situations but also for the long-term maintenance of the dam structure.

Advantages

- Secure data transmission and compatibility with a wide range of monitoring software
- Cost-effective, unobtrusive monitoring without the need for cables or trenches
- No need for repeaters even for nodes with no line of sight to the gateway
- Minimal maintenance as a result of low node power consumption
- A strong node signal that can even get through steel covers



1 - Loadsensing data logger installation at the Slezská Harta Dam

2- Loadsensing data logger installation at the Olešná Dam