SUCCESS STORY

UNDERGROUND WATER LEVEL MEASUREMENT OF DAMS IN THE CZECH REPUBLIC

COUNTRY:

Czech Republic

SECTOR:

Dams

PROJECT TYPE:

Underground water level monitoring

MAIN PRODUCT:

Loadsensing | The Wireless Monitoring System

loadsensing
WORLDSENSING

Challenge

The Olešná and Slezská Harta Dams located in the Odra River Watershed in Northern Moravia, Czech Republic are used to supply drinking water to nearby residential and industrial areas, to generate electricity and to subdue floods on the Moravice River.

The main dam structure was being monitored through sensors connected by cables. However, the data from the piezometers measuring the water level in the standalone boreholes outside the dam body and surrounding areas was still being collected manually and infrequently - from once a week through manual measurements to twice a year from the single channel dataloggers.

The piezometers could also be connected through cables to the existing monitoring system installed in the dam galleries, but this would require digging cable trenches between the boreholes and the nearest multiplexers.

Solution

The Loadsensing wireless monitoring system was selected in order to be able to gather the data more frequently without having to dig cable trenches.

The pilot projects started with 1 gateway for each dam and 7 nodes. Eventually, a total of 29 nodes are to be included in the expansion plans.

Each Loadsensing Vibrating Wire node is equipped with a reference barometer for a barometric pressure changes compensation. Also, 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 nodes are able to successfully transmit the data without the need for repeaters. The data collected and

Loadsensing data nodes and gateways have been recently deployed to perform wireless underground water level measurements at the Olešná and Slezská Harta Dams. With this deployment, the wireless sensors can connect to an existing monitoring system and gather real-time data to send to a visualization software, without the need to dig cable trenches.

Advantages

- More cost-effective and less obtrusive versus monitoring using cables that require digging trenches
- Strong data node signal even through steel covers
- No need for repeaters even for nodes installed in the dam structure with no line of sight to the gateway
- Centralized data and file management through the gateway that can be easily connected to the Internet or local customer network
- Compatibility with various types of monitoring software and secure data transmission
- Minimal maintenance needed due to the low power consumption of the nodes

sent securely to the private network of the dam operator is used in order to prepare real-time reports and visualization through Vista Data Vision.

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

Loadsensing data node installation at the Slezská Harta Dam

Benefits

The real-time data collected and displayed in the visualization software enables the configuration of different alarms and alerts which can be used not only for emergency situations but also for the long-term maintenance of the dam structure.

" 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.

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Loadsensing data node installation at the Olešná Dam

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