

APPLICATION PROFILE

From wired to wireless

Replacing aging system in monitoring hydroelectric dam levels

In determining the amount of available energy and storage volume in hydroelectric dams, reservoir water level height must be continuously monitored.

Yet aging infrastructure in many North American dams is creating challenges for operators — specifically those associated with hydrostatic level sensing systems consisting of hard-wired cables.

Besides being aged and frequently damaged by falling trees, wired systems present problems with ground faults and lightning strikes.

And the installation of a replacement wired level sensing system from the dam to the powerhouse poses physical challenges. To meet redundancy requirements, a second backup would double costs.

Instead, operators are now turning to wireless measurement systems that are able to transmit level data to power generation control systems in a secure, reliable, consistent and cost-effective method.

And in many cases where the distance from the dam to the power station, where the water turbine and generator are located, are upwards of five kilometres downstream, they are doing so at a fraction of the cost when compared to their wired counterparts.

Massachusetts-based SignalFire Wireless Telemetry says it has already seen its products provide dam operators some much needed relief and added reliability.

The company's remote sensing system does not require cabling, eliminating the risk of failure due to lightning strikes and ground faults.

Consisting of a gateway and remote nodes, the wireless sensor control system operates on an adaptive radio network to seamlessly integrate with the hydrostatic transmitters suspended in the dam and send level data to a remote programmable logic controller located at the power station.



Traditional hard-wired monitoring systems can create reliability and cost challenges for operators, leading to increased interest in wireless options. Photo courtesy SignalFire Wireless Telemetry

With a range of nearly five kilometres, the network, with a redundant communications link, is both self-installing and self-configuring. Wireless nodes install themselves automatically into the network and adapt to network changes.

Powered by battery and solar energy, the SignalFire wireless sensor control system also ensures reliability under all conditions as the dam and repeater station have no power, says the company. A backup repeater provides a level of redundancy to ensure the signals and data have the highest degree of reliability.


SignalFire's solution is just one of many being used by today's dam operators. Vega, for

example, offers wireless flow measurement solutions in a range of applications such as the dam of the hydroelectric power plant and reservoir at the pumped storage power plant.

In Western Canada, WirelessHART recently teamed up with SaskPower on the Crown corporation's 267-MW coal-fired Shand station.

SaskPower determined that adding new measurements using traditional field wiring was cost prohibitive. Instead, 165 fieldbus and 67 wireless measurements were added at less than half the cost of traditional wired, reportedly proving reliable since startup in 2009.

SaskPower reports it has since added wireless systems to other facilities, and currently operate more than 200 WirelessHART transmitters in four coal-fired plants with total generating capacity of 1.1 GW.

The system also allowed SaskPower to identify gaps between potential and actual heat rate on a unit-by-unit basis, with the objective of improving average heat rate by 0.5 per cent. 



The configuration of the high-reliable and redundant monitoring and control system designed for hydroelectric dam applications. Illustration courtesy SignalFire.