

Electromagnetic Flowmeter Survives Floods

When the Village of Windsor, New York replaced its mechanical flowmeter with an electromagnetic flowmeter in 2003, it was with high hopes that the newer technology would be less prone to failure and require less maintenance. Those high hopes were more than fully realized, as the product was put to the test after being fully submerged in two damaging flood events. The AQUAFLUX electromagnetic flowmeter, provided by KROHNE, performed flawlessly while under the noxious flood waters, even though submersible capabilities had not been one of the intended qualities of the original design.

Village seeks reliable flowmeter for water use tracking and regulatory reporting

The Village of Windsor, New York was seeking to replace an older mechanical flowmeter that continually failed and needed constant maintenance. The flowmeter, installed in the Village's water pump-house, is used at the aquifer source for potable water distribution. It measures the volumetric flowrate of all the water extracted from the wells and pumped into the village distribution system and storage tank. The Village pumps from two 30-Hp submersible wells.

The flowmeter is the main monitoring device used to track usage and meter what is dispensed to people's homes. "The flowmeter is a very valuable device that enables us to know how much water we pump, conduct daily tracking, and alert us to when things are drifting," said Ron Harting, Deputy Mayor of the Village of Windsor and Technical Director at O'Brien & Gere Engineers. For example, if usage increases inexplicably, they look for a leak somewhere in the system. At the end of the year, they use information collected from the meter for required reporting to the state and the Susquehanna River Basin Authority.

The Village opted for changing technology in the hopes that an electromagnetic flowmeter would be more reliable than the previous meter, a paddle wheel sensor with a small propeller that stuck down into the pipe and spun as flow traveled by. Through a series of gears the meter would drive a mechanism that recorded and totaled the flow. "Obviously moving parts tend to wear out, and that meter was very expensive to repair each time," explains Harting.

Image 1: Building on the Aquaflux legacy, the OPTIFLUX 2100 is the latest magmeter version to accurately and reliably measure water flows



After reviewing the options, the Village selected the AQUAFLUX electromagnetic flowmeter, manufactured by KROHNE. The rugged AQUAFLUX is made with a fully welded housing, and is extremely tight and resistant to corrosion. It is lined with an extremely durable polypropylene or KTW-approved hard rubber. It comes standard with IP 67 (equivalent to NEMA 6), and is suitable for ground burial.

According to Harting, many municipalities may be hesitant to use new magmeter technology, feeling most comfortable with older mechanical flowmeters that might have been installed in the 1960s. Some are concerned that electronic devices can be reset, whereas the trusty old mechanical meter that just sits there and cogs away may be safer from interference. In Harting's view this concern is not

justified and the electromagnetic flowmeter is a quantum leap in technology that is well worth the investment.

Placed in service in 2003, the new magmeter immediately made a difference. “The cost of each mechanical meter repair was about as much as the total cost of the KROHNE magmeter,” said Harting. “With no moving parts and the rugged design, I’m guessing the life expectancy of the AQUAFLUX magmeter will be close to 20 years.”

Extreme floods test magmeter durability

After working reliably for three years, in June 2006 the new technology faced its most important test, as the Village of Windsor was hit by a major flood. The magmeter was totally submerged in the river flood water for three days. The total water depth was about four feet, with the magmeter somewhere around 2 feet below the surface of the water. After the three-day flood finally receded, Harting re-entered the pump house and found that, after merely wiping off the mud, silt, and debris from the AQUAFLUX meter transmitter’s face, the display was fully functioning.

Harting explains that normally systems are designed to avoid this situation at all costs, since submergence typically equates to equipment failure. “I have witnessed countless magmeters and similar instruments fail when subjected to submergence. Although the flow tube and transmitter were purchased as NEMA 4X, the inherent IP 67 rating provided by KROHNE was a feature and benefit we gained without additional cost or effort.”

In 2011, the magmeter was again fully submerged for about two days, with the same results. The facility is about 150 yards from the river proper and the flooding was due to heavy rain events. Harting believes this type of storm event is happening much more frequently and flooding issues are becoming more expected.

In both storm events the Village maintained pumping until they believed the chlorination system stopped working, and then shut down the wells, which stops the flow through magmeter, but they never physically shut the power off to the magmeter.

All in all, the Village is extremely satisfied with the AQUAFLUX, which is performing more or less without maintenance. Harting expects this will continue as long as there is no coating of the material or erosion of the inside lining. He is even more pleased with the unexpected fact that the magmeter performs so well in a situation that it was not necessarily designed to accomplish – exceeding NEMA ratings by being submerged. Harting concludes, “Purchasing KROHNE’S AQUAFLUX flowmeter was an investment that delivered results beyond my expectations.”