Products In Action

Meters

Insertable Electromagnetic Flowmeter Solves Difficult Piping Problem

A difficult piping arrangement that included limited distance between the metering site and pipe fittings posed a dilemma for the engineering staff at a city of Frederick, Maryland, raw water pumping station. Frederick is Maryland's second largest city.

The city previously had installed a full bore magmeter but found that it was unreliable due to continuous fluctuations that in turn provided erroneous flow readings.

Since the Marsh-McBirney Multi-Mag Electromagnetic Flowmeter was originally designed for difficult applications such as installation near bends and elbows it was felt that it be a perfect fit for the city of Frederick. The insertable flowmeter was initially installed on a trial basis.

The patented flowmeter has an array of electromagnetic sensors strategically located on the insertable probe that spans the entire pipe diameter. The insertable probe detects and compensates for shifting profiles unlike spool-piece meters and flowmeters that only provide a single point flow measurement. Typically, accuracy is better than the 1 percent specification.

Sealed within the probe are five electromagnets and mounted adjacent to each magnet is a pair of electrodes which are used to measure the velocity of each of the five locations. Each electrode measures the velocity within a region of equal area, so that the measurement of each electrode will have equal area weighting. The electrodes are connected in parallel, so that the velocities measured by each electrode pair are averaged and effectively deliver the average velocity of the flow through the pipe.

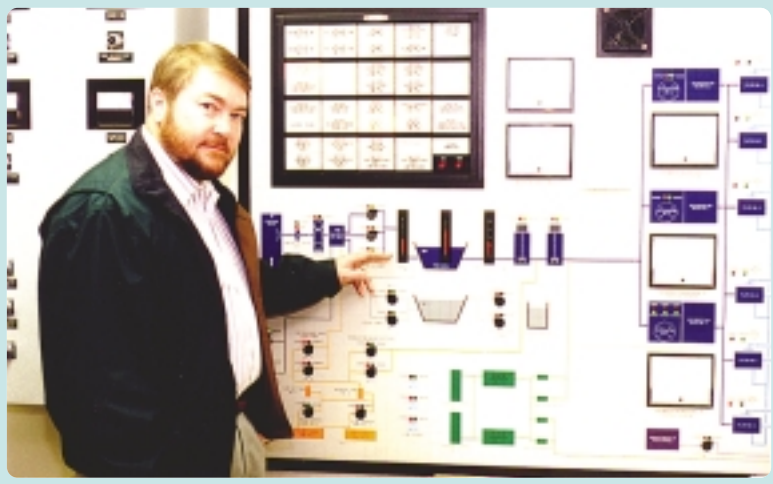
The streamlined sensor shape minimizes flow disturbances, thus providing minimal pressure drop. Multi-Mag requires significantly less energy to operate than many other flowmeters. Although costs for most flowmeters, including spool-piece magmeters, increase substantially as pipe size increases, this is not the case with Multi-Mag.

Flow is calculated in the instrument via the Continuity Equation by multiplying the average velocity by the cross-sectional area of flow (calculated from the pipe inside diameter). The sensor has no pressure ports to clog.

Both initial installation and removal are simple and can be done while fluid is flowing and the pipe is under pressure. No site calibration or velocity profiling is needed. The sensor is inserted through a tap in the pipe wall and reaches across the interior of the pipe to the opposite wall.

Bill Luhn, the water plant superintendent, reported that the flowmeter immediately began collecting accurate flow data and eliminated all erroneous fluctuations in flow that had been reported with the full bore magmeter.

The ease of installation, dependability and the minimal amount of maintenance were the determining factors that sold the city of Frederick on the Multi-Mag™ flowmeter for this pump station monitoring requirement.



Jim Darby, MMI – Multi-Mag product manager and senior staff engineer

Bill Luhn, city of Frederick – water plant superintendent

For additional information, phone Marsh-McBirney at 800-368-2723 or write in 1200 on this issue's Reader Service Card.