

Wireless Measurement and Control Opportunities

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ABSTRACT

Wireless measurements can reduce maintenance and noise problems in addition to installation costs by the elimination of wiring problems and electromagnetic interference. Less recognized are the opportunities afforded by wireless measurements for troubleshooting and optimizing measurement locations as well as developing and prototyping process control innovations. However, battery life and network integrity raise reliability, security, and maintenance questions. Communication interruptions and discontinuous updates can cause oscillations for traditional PID controllers. This paper addresses these concerns and discusses the potential use of wireless pH measurements for minimizing noise, maximizing sensor performance, selecting sensor technology, predicting sensor life, and developing inferential measurements. An example of the use wireless conductivity and pH measurements as inferential measurements of solvent and carbon dioxide is given to enable the optimization of absorber operation. The advantage of using spare wireless transmitters instead of lab meters for communicating test data for inferential measurements and calibration data from standardization methods with grab samples is offered. A simple enhancement of the PID algorithm for wireless control to extend battery life is explained and test results are presented for measurement failures, setpoint response, load upsets, and valve stiction. The effect of wireless transmitter settings such as “default update rate” and “trigger level” on control loop performance is estimated for unmeasured disturbances in terms of the additional deadtime added by wireless settings.

ABOUT THE SPEAKER

Gregory K. McMillan is a retired Senior Fellow from Solutia/Monsanto and an ISA Fellow. Presently, Greg contracts in Emerson DeltaV R&D via CDI Process & Industrial in Austin. Greg received the ISA “Kermit Fischer Environmental” Award for pH control in 1991, the Control Magazine “Engineer of the Year” Award for the Process Industry in 1994, was inducted into the Control “Process Automation Hall of Fame” in 2001, was honored by InTech Magazine in 2003 as one of the most influential innovators in automation, and received the ISA Life Achievement Award in 2010. Greg is the author of numerous books on process control, his most recent being Essentials of Modern Measurements and Final Elements for the Process Industry and Advanced Temperature Measurement and Control. Greg has been the monthly “Control Talk” columnist for Control magazine since 2002. Greg’s expertise and virtual plants are available on the web sites: www.modelingandcontrol.com and www.processcontrollab.com.