Reducing Capital Project Costs

Combining wireless with wired automation systems can save you money without sacrificing control or reliability.

By Peter Zornio

In reviewing the recent growth of wireless field communications to monitor or gather data from smart field devices, you may develop the notion that the use of wireless is limited to existing chemical process plants. However, two recent studies show that this technology is also very well suited to capital project applications.

Wireless has already made a substantial impact with hundreds of successful installations in existing plants, but this technology definitely has its place in the design toolbox for upgrading or constructing new facilities. The most compelling reason is that wireless instrumentation can be implemented at a significantly lower cost than traditional wired systems, and without a loss of control capability or reliability. A study by JDI Contracts of Cohasset, MN, working in conjunction with an engineering procurement contractor and major U.S. chemical company, concludes that wireless devices could replace wired instruments for non-safety-related low-speed control and monitoring applications on about 25 percent of the points in a proposed process plant. The study furthermore projects a savings of about 10 percent on the overall cost of engineering, construction and startup when compared with the costs for wired HART®-enabled devices the most prevalent wired method in use today. According to Roger Hoyum, principal engineer at JDI, the largest cost contributors to wired systems are the conduit from junction boxes to field devices and labor for terminations, both of which are essentially eliminated with wireless implementation. In addition, the study indicates certain variable time savings, the largest component of which is "interest during construction." Hoyum points out that starting a major capital project just one day early can save as much as $500,000 per day of capitalized interest cost. Any improvement in the date can obviously produce significant savings, and since the automation portion of projects is often subject to delays, reducing start-up and commissioning times can be beneficial. Hoyum continues, "Our study complied with the best practices required to meet owner objectives, schedules and budgets, as well as less tangible outcomes, such as ease of maintenance and use. With wireless infrastructure as a key component of new projects, we can deliver a better plant." In a separate study, Emerson wireless consultants calculated that wireless devices could be used on up to 44 percent of all points. Using data from a nearly 6,000-point greenfield project, WirelessHART networks enabled up to a 36 percent savings on engineering and construction costs of the process automation system. The savings with wireless amounted to as much as $1,376 per signal, or up to $3.6 million on the project under study, without a loss of control efficiency. In determining which wireless devices may reasonably replace wired instruments, the Emerson analytical team considered only technology that would be available by the end of 2010 and took the conservative position of including no-feedback control points. A substantial number of field devices met

these criteria, including those used for pressure and temperature measurements, discrete inputs, vibration and position monitoring, analytical instrument inputs and stranded diagnostics on wired HART® devices. Each wireless device in such a network can act as a router for other nearby devices, passing messages along until they reach their designated wireless gateway. Interference is minimal, and transmission reliability is greater than 99 percent. Non-quantified savings from using wireless on capital projects accrue from simpler engineering and training, less required I/O capacity, the ability to mount devices in difficult-to-reach or remote locations, the ease of temporary installations and late changes, and facilitated future wireless point additions. The study based wireless costs on Emerson's smart wireless self-organizing mesh technology, which meets the industry-approved WirelessHART standard. I believe that this study supports wireless as an advantageous alternative to wiring in many automation system instruments, thus eliminating the costs associated with running cables through, around or under a dense infrastructure, while avoiding interference with primary process control functionality.
Peter Zornio, Emerson Process Management chief strategic officer, directs initiatives like the expansion of PlantWeb digital plant architecture to include process and plant networks, delivering a complete solution for processing facilities.Wireless has its place in the design toolbox for upgrading or constructing new facilities.
Emerson Process Management Chief Strategic Officer Peter Zornio

Source URL (retrieved on *03/12/2014 - 5:44am*):
http://www.chem.info/articles/2009/03/reducing-capital-project-costs