

# Appleton reduces costs using field-based information



**Data from smart instruments triggers 50-75% reduction of calibration and configuration costs, and 50% man-hour reduction for documentation**

CHRIS VAN SAMBEEK

**W**hen planning to install smart, microprocessor-based instrumentation as part of the upgrade project on a large paper coating machine at the Appleton plant, we began investigating ways to obtain and use the diagnostic information those instruments were expected to generate.

We were looking for a simple, reliable means of gathering field data related to the condition of those devices, so operating personnel could be informed of impending problems and take action to prevent unexpected downtime.

We also hoped to use the information to improve instrument configuration and calibration, tracking of potential problems, and troubleshooting, in order to reduce maintenance costs while extending the longevity of the equipment. The immediate goals were more reliable operations, improved maintenance and more accurate documentation to support the company's ISO 14001 certification.

While diagnostic information is routinely retrieved from smart instruments on distributed control system (DCS) networks or more advanced architecture, the challenge here was to access information generated by HART®-enabled smart instruments mounted on the paper coater to serve the machine's programmable logic controller (PLC). These are mostly Micro Motion mass flow meters and Rosemount pressure transmitters.

## THE SOLUTION

Diagnostic information generated by smart field devices can be "picked" right off a DCS network through the use of "multiplexer cards" wired to the network terminal blocks. Those cards transmit the information to an Emerson AMS Suite application designed to monitor the condition of the devices, upload changes to a database encompassing every device on the network and generate status screens for use by instrument maintenance technicians.

Then, we found a unique way to "pull the multi-variables" out of the HART instruments. We call the solution a "virtual multiplexer," because that's the way it works, but it's actually a HART smart card made by Spectrum Controls to be inserted into a rack in the PLC. This special card provides access to the HART device diagnostic signals so they can be extracted by the AMS Device Manager. With this arrangement, we didn't need the expensive multiplexers often employed with a DCS, and we saved roughly \$25,000 on wiring alone.

About 100 HART instruments on the paper coating machine are monitored continuously, collecting, processing and archiving information about their condition and that of associated equipment. The online system serves as an active, highly accurate instrument database. It also raises alarms when a potential problem is identified early on, enabling maintenance personnel to practice predictive maintenance.

Under the concept of predictive maintenance, the current condition and performance of production equipment is considered in determining

just what maintenance that equipment should receive. The best information for making this determination is generally derived from the machinery, by listening for changes in vibration levels, examination of lubrication fluids or accessing instrument diagnostics. Maintenance costs can be avoided if this type of information shows that no work is needed at a given time, versus performing preventive maintenance on a rigid schedule, needed or not. On the other hand, field-based information may show that a machine or instrument needs immediate attention to prevent costly unplanned downtime. Under predictive maintenance, machinery tends to be more reliable, so productivity is maximized.

## THE RESULTS

Before initiating the paper coater project, every instrument-related task was manual and very time-consuming. We had no electronic database of field instrument specifications and operating parameters to use in configuration and calibration. Use of the AMS Device Manager has greatly reduced the man-hours required by automating at least part of this work.

Since the database now includes every instrument in the plant, not just those serving the online system, we save at least 15 minutes on every instrument calibration. Multiplied times 3,000—the number of instruments in this plant that have to be calibrated every six months—this amounts to an annual savings of about



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**– Chris Van Sambeek, Control Systems Technician, Appleton**

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The software is also very useful for configuration. When an instrument must be configured for any reason, its data can be downloaded to a 375 Field Communicator and quickly transferred to the instrument in the field, cutting the time required for this procedure in half or even three-fourths. Perhaps even more importantly, documentation of all instrument-related maintenance is automatic and error-free, which is essential for us to maintain our ISO certification.

The online system has resulted in better diagnostics, improved loop-control validation, increased plant availability, higher product yield, and lower operating and maintenance costs. Product quality is also affected because healthy Micro Motion mass flow meters are crucial for the proper application of paper coatings.

This system has also paid off in ways that are yet to be realized. In the past, our technicians generally reacted when a problem was reported to them. Now, they're usually the first to know of issues that may be developing on the coater. Occasionally, they are able to go into the plant, locate the source and fix whatever needs fixing to prevent a serious mishap before the operations folks even know anything might be wrong.

That very thing happened recently with a piece of machinery that shares runtime with another machine. The AMS Device Manager began issuing status alerts that a flow meter “was not responding.” In fact, the electronics had failed to come back after a power outage. Our technicians were able to find and replace the instrument before the machine was needed. If the problem had gone unnoticed until that machine was called upon, production could have been halted until the problem was found through normal troubleshooting procedures. That could have been very time-consuming and costly.

We anticipate that the AMS Device Manager application will be expanded as other machinery and their controllers are upgraded and to bring more of the existing field instruments online. Using the HART smart card, this is relatively easy and inexpensive to do with little additional wiring. When those diagnostic signals run right through the PLC to the AMS Device Manager, it changes our whole operation. 

*®HART is a registered trademark of the HART Communications Foundation.*

*Chris Van Sambeek is an Appleton control systems technician. Contact him at [cvansambeek@appletonideas.com](mailto:cvansambeek@appletonideas.com).*

## Appleton turns 100

Appleton, headquartered in Appleton, WI, produces carbonless, thermal, security and performance packaging products through development and use of coating formulations and applications, encapsulation technology and secure and specialized print services. The company, which is celebrating its 100th anniversary in 2007, has manufacturing operations in Wisconsin, Ohio, Pennsylvania, Massachusetts and the United Kingdom, employs approximately 3,100 people and is the 35th-largest majority employee-owned company in the United States based on total company employment.

The value of company stock has increased 236% since employees completed an \$810 million buyout of the company in November 2001. In November 2007, Appleton reported net sales of \$272.9 million, and net income of \$7.3 million, for the third quarter ended Sept. 30, 2007. For more information, visit [www.appletonideas.com](http://www.appletonideas.com).