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It's back-to-school time for **FIELDBUS TRAINING**

Why specialized training is becoming so important and what programs are available to fill the need.

by Paul Miller

Today's process control operators, technicians and engineers are better educated than at any time in the history of the industry. However, the technology being applied in today's process plants is becoming increasingly more sophisticated and complex, creating a knowledge gap.

The recent proliferation of fieldbus technology in new process installations has certainly contributed to this gap. To show you what we mean, we took a look at training for Foundation fieldbus. Foundation fieldbus—and other fieldbus protocols— require a whole new way of approaching the commissioning and maintaining of field devices, arranging process control loops and using all the data you can now extract from your field instrumentation.

According to John Pittman, former president and CEO of the Fieldbus Foundation, Austin, Texas), “We need better educated and better trained process engineers and operators than we have today. Foundation fieldbus puts all kind of information into the operators’ hands that we’ve never had before. This provides opportunities and challenges.

“Another problem is that the operators are aging. I hear this from the industry all the time. Operators and engineers are approaching retirement, and we need well-trained people to fill their shoes.”

Generic vs. Vendor-Specific Fieldbus Training

To help meet the need for fieldbus-specific training, several technical institutions offer Fieldbus Foundation-certified courses in fieldbus technology. Generic (non-vendor-specific) process fieldbus training is also available from commercial consulting and training companies, such as BusCorp (www.buscop.com) and Fieldbus Inc. (www.fieldbusinc.com).

Most major automation vendors also offer vendor-specific courses in the application of fieldbus technology. John Rezabek, a controls specialist at ISP Corporation’s plant in Lima, Ohio, current chair of the Fieldbus Foundation’s End User Advisory Council and the author of *Control’s* monthly column, “On the Bus,” commented, “Fieldbus Foundation emphasizes the need for specialized training and has a few certified providers. While many users are still making up their minds, those who have a wide variety of installed host systems and field devices prefer these providers to the understandably more biased vendor-provided fieldbus training.”

Educators Speak Out

Chuck Carter, director of the fieldbus training center at Lee College, sees a large knowledge and skills gap relative to implementing fieldbus. “Prior knowledge and attempting to adapt fieldbus to fit a traditional model for



(Courtesy of Lee College)

Figure 1. Tex Woodall, Jessica Winans and David Aleman take advantage of some of the hands-on training resources at the Lee College Fieldbus Center.

instrumentation and control just does not work. Many of the methods and practices applied to traditional I&C systems do work, but the learner must adopt new methods that often require unlearning established practices. I also see some attempts to fit fieldbus along traditional work lines. People can argue this as much as they want, but I am certain that those lines will not adequately work for fieldbus. All levels must learn how to work much more closely with each other.

“Data management skills clearly play a strong role in student success. Many have excellent experiences in working with systems that call for a linear approach in troubleshooting. I believe fieldbus calls for a much more holistic approach in regard to design, troubleshooting and even operations. In this regard, fieldbus is not technically difficult. It is, however, different enough that some of today’s workers may not be able to adapt to working with large datasets or with the highly interactive environment. They likewise may not survive the change.”

According to Mark Skovmose, an instructor at Southern Alberta Institute of Technology’s (SAIT, www.sait.ab.ca) MacPhail School of Energy, “A lack of fieldbus knowledge sometimes leads to a DCS philosophy being applied to fieldbus. But, fieldbus is not simply DCS on a digital bus and requires new knowledge.”

Some End-User Perspectives

Joe Moody, an instrument/electrical technician at GB Bioscience in Houston, recently completed a fieldbus course

at Lee College, Baytown, Texas, (www.lee.edu) to complete the requirements for his Instrument Technologies degree. “Just as pneumatic control gave way to DCS control, it appears DCS control is giving way to fieldbus control. I/E technicians are often the first to respond when there is a problem with the process. The better understanding I have of not only the field instruments, but also the tools available within the fieldbus system, the more efficiently I can resolve such matters.

“The need to stay competitive in the job market was a real driver for me. Employers are looking for technicians with diversified portfolios. Many sites along the Houston ship channel are running old pneumatic loops along side or within DCS-controlled systems. Now fieldbus systems are going in. The ability to work within all of these systems certainly creates opportunities.”

Jean-Francois Jobdon, a controls engineer-in-training at Nexen, the Canadian global energy company, is working with the Colt Engineering team on the Long Lake Project in Calgary, Alberta. Jobdon recently completed all three Foundation fieldbus courses offered at SAIT. The Long Lake project uses mostly Foundation fieldbus devices, and Jobdon wanted a better understanding of how the technology works.

The Automation Vendors' View

“Foundation fieldbus knowledge and skills are important to engineers that design and understand control strategy; they are also essential for technicians that support operations,” said Mark Dimmitt, curriculum development manager at Emerson Process Management (www.emersonprocess.com). “However, a knowledge and skills gap has resulted between the expertise of engineers that are receiving the training and operations technicians, who are often overlooked. As a result, technicians develop some level of fear and distrust. Yet, we know that Foundation fieldbus technology is not difficult. It's simply different than the traditional 4 to 20 technology. Time and again, we see technicians warm to the new technology once they have some basic training.”

“One of the challenges with fieldbus is that many students initially do not understand the engineering methodology for fieldbus systems, which is different than that of conventional I/O systems,” said Rolf Vahldieck, a process industries consultant at ABB (www.abb.com). “This knowledge gap causes

about 80% of fieldbus issues. Because of it, the full functionality of fieldbus technology in both operation and maintenance is often not used, so the full benefits are not realized.”

“We've found that most users and EPCs have very little Foundation fieldbus knowledge when they walk in for training,” commented Charlie Piper, a fieldbus program manager at Invensys Process Systems (www.invensys.com). “As a result, they often want to focus more on the basic engineering aspects of the technology, such as the mathematical calculations needed to determine the length of segments and voltage drops, than on how they are going to extract value from the technology. Beyond these technical details, users of fieldbus technology need to be taught how to use new tools to better perform maintenance activities for the field devices within their plants.”

End-User-Certified Training

To help meet the need for consistent, high-quality end user training on various aspects of Foundation fieldbus technology, the Foundation has collaborated with leading technical education institutions to create Foundation-certified training programs in locations around the world. Individuals who complete the appropriate programs at any of these institutions are recognized as a Fieldbus Foundation Certified Professional.

The Foundation-certified programs in North America are at:

- Lee College, Baytown, Texas, USA
- Southern Alberta Institute of Technology, Calgary, Alberta, Canada
- Tri-State University (TSU), Angola, Indiana, USA.

Here's a quick overview of the programs offered at each of these colleges. Many of these programs can also be brought on-site to an end-user facility or customized to meet site-specific requirements.

Lee College

The Fieldbus Center at Lee College offers fieldbus offers four different courses in fieldbus applications. These range from a basic, one-day introductory course to an intense full-week course. Three courses are certified by the Fieldbus Foundation. The facilities include a multi-million pilot plant that allow students to build fieldbus segments, configure devices and develop control strategies.

Joe Moody recently completed a fieldbus course at Lee taught by Carter. “This was an all around great class with a lot of hands on instruction. I found the troubleshooting instruction very beneficial,” said Moody. “The problems are plugged into a running unit and students must identify and solve the problem. This simulated real world challenges faced by technicians in the field, allowing students to put into practice everything covered throughout the semester. This also provided students an opportunity to get a better understanding of systematic troubleshooting techniques.

“Having no past experience with any fieldbus systems I took a lot away from this class. I found that fieldbus is a different type of control system with several benefits. The ability to trend, troubleshoot, and diagnose remotely was very impressive. However, the most valuable feature I found was the amount of information available from devices to quickly check a status and possible failures. There’s an unheard of amount of device information available at the console.”

SAIT

SAIT offers three different fieldbus training courses. These include a one-day “Essentials” course, a two-day “Discovery” course, and a three-day “Practices” course. The Foundation fieldbus Certified Certificate is awarded upon successful completion of all three courses.

“The small class size at SAIT made the training very interactive and enjoyable for me,” said Jean-Francois Jobidon. The presentations had excellent visual animations which made some complex topics easy to understand. The hands-on labs aided and confirmed the topics learned in the course. I took away a very thorough understanding of how Foundation fieldbus works. I especially enjoyed learning how the fieldbus devices communicate to be able to implement control in the field.

The training course also used state-of-the-art equipment one could only dream of having all at once.”

Tri-State University

The TSU Technology Center offers Foundation fieldbus training that is standardized, but yet can be focused for the industries in the Great Lakes region. To provide this training, TSU currently relies heavily on a license agreement with the Lee College Fieldbus Center announced in April 2007. Under the agreement, TSU gained the right to use Fieldbus Center course materials and other intellectual property in its training curriculum. The two facilities also collaborate on educational development work, construction of lab facilities and demonstration equipment, and scheduling of fieldbus training classes.

Where’s It All Heading?

While the Foundation has examined and certified the individual fieldbus training programs at Lee College, SAIT, TSU and other facilities, each of these programs approaches the training differently. As a result, there’s little uniformity between programs or interchangeability between the different courses.

According to John Pittman, who in addition to his previous critical role at the Fieldbus Foundation, currently serves as Chairman of the TSU Board of Trustees, “The Foundation is working to make sure that there is a common core curriculum across all certified facilities to allow interchangeability across the different programs.”

Rezabek concludes, “In my mind, perhaps the biggest and most valuable benefit of formal training, today and into the future, is to establish a uniform fieldbus vision which might not otherwise evolve naturally as well as to help create to buy-in from the Luddite fringe.” ■

Paul Miller is a contributing editor to Control.