Potential to increase benefit of production plants

Interview with John B. Berra, President Emerson Process Management and Executive Vice President Emerson, sponsor of NAMUR "Hauptkonferenz" 2006

What are the most important technological trends and emerging areas regarding automation and process control from your point of view?

Clearly our customers are operating in a global and highly competitive marketplace. Demand is high and increasing, while raw materials are more expensive and varying in quality. Regulations are changing.

Compounding these challenges, manufacturers are pressured to do more with less. Their plants and equipment are aging. Their companies have reduced staff and a decreasing number of experienced, knowledgeable people.

Companies are competing by modernizing and building new plants. Smooth startup is expected from a workforce that is often new, and personnel are expected to quickly run facilities at rated capacity. Businesses everywhere are striving for a competitive edge on a world stage.

I believe that these kinds of challenges are driving a trend toward predictive process control and asset management which uses intelligence from the field to enable operations and maintenance personnel to anticipate and resolve process and equipment issues before they impact operations, avoiding unplanned shutdowns.

The predictive approach is enabled by digital field devices like transmitters, valves and machinery health monitors that run diagnostics and deliver information about the health of the process as well as the instruments themselves.

I would point to wireless measurement as a second trend. We are working with users around the world to usher in a new age of wireless that promises orders of magnitude decrease in installed costs of monitoring.

Wireless technology will enable more "eyes and ears" in the plant, enabling continuous monitoring and new applications that were previously unreachable due to economic or physical constraints. More process measurements will be made, and also health measurements for rotating equipment, motors and motor starters. Wireless will expand the predictive approach to process operations and maintenance.

Wireless is one of the trends discussed. Regarding its reliability and the mostly conservative chemical industry, what procedure would you propose to introduce wireless technology?

In addition to wanting the benefits of innovative technology, the chemical industry requires reliable and secure automation technology. That’s how it should be.

We know that it will take time for adoption in the chemical industry, although we expect that our thorough development beginning in 1998, plus 3 years of field trials will accelerate the process. This has led to our planned European introduction of in-plant Smart Wireless solutions in January 2007. These Smart Wireless solutions use carefully developed and proven innovations to ensure reliability, security, compelling installed cost reduction, and excellent power design.

The Smart Wireless solutions use state-of-the-art Time Synchronized Mesh Technology (TSMP) to achieve message reliability demonstrated to exceed 99.9%. TSMP is used in our Smart Wireless field networks to make them "self organizing" meshes of near infinite size, installed easily without site surveys any special tools or software. The self-organizing technology means that the networks are made all the more robust through addition of more and more field instruments, each of which acts as a self-organizing network node with

Fig. 1: Self-organizing Wireless solutions reliable.
Research has shown that more than 50 percent of industry maintenance man-hours are spent on fixing equipment following a failure, whereas less than 18 percent of those hours are spent determining when equipment will fail and acting accordingly. These numbers suggest the major benefit of predictive maintenance of rotating equipment.

"Getting started" can be a matter of starting small and gradually scaling up, treating assets in priority based on criticality. As a rule, the most successful implementations engage professional services to assist with planning and start-up, including initial data collection and baseline analysis. A starting level of cost less than 10 Thousand US $ is possible. The assets included in the AMS project can be expanded iteratively. And the open, interoperable standards basis of AMS will allow mixing of different devices, and bus systems and technologies.

Professional services are vital with projects to help operators and maintenance personnel understand what they can achieve with the AMS functionality, and change their work practices to realize the benefits. i.e. operators and maintenance people have to change their working process, because

This year Asset Management is the topic of the NAMUR Hauptversammlung. In Germany AMS is discussed widely but the benefit may not be clear enough today. Could you give us an idea of the potential and benefit of AMS and how to start with AMS?

To illustrate the tremendous benefit potential of asset management, I'll frame my answer around one of the newer and rapidly expanding areas: rotating equipment, and Machinery Health Management.

Vibration is one of the best set of "ears" in the plant for monitoring rotating equipment. Vibration gives embedded signals of impending failure; we only have to listen. The payoff is great, many times avoiding catastrophic failures. Industry studies have documented the return on investment for a mature vibration monitoring and analysis program as high as 20 to 1.

Fig. 3: Feedback from the AMS Machinery Health Monitor can be displayed on DeltaV process automation systems.

Fig. 2: Wireless architecture extends plant visibility.
they have to understand what they can achieve with AMS. One additional factor of success is standardization in networks (also wireless), e.g. ABB, Siemens, FF, Hart and Profibus.

One major topic in Europe is the efficiency of engineering and the lack of integrated tools or powerful interfaces between best-of-breed tools. What does your company provide regarding this challenge?

To begin with, let's recognize that engineering tools should be easy to use and make engineering easier. Modularity and efficient engineering with appropriate engineering tools is necessary for high engineering productivity.

Automatic configuration of hardware from P&ID drawings has been achieved, but there is a lack of standardization. Emerson has to interface with the design tools of various contractors because they do P&ID diagramming on different packages. It would be great to achieve standardization.

Another very important engineering success factor is knowledge management. Electronic storage of data should enable efficiency by use of designs from one part of the world for application to similar designs in other parts of the world. Re-engineering should be minimized. The problem in the past has been that data has not been stored electronically in a way that similar designs could be found in an acceptable period of time.

I would like to comment also that organization, and teamwork are key to effective engineering. An example where Emerson served as Main Instrument Vendor and used a unique project management approach was that of the Shanghai SECCO 10-plant integrated petrochemical complex project.

The project involved multiple and international suppliers for each of the 10 plants. Emerson and SECCO created framework agreements for all EPC contractors to use, enabling consistency across the site for current and future operations. As MIV, Emerson developed functional design specifications, and communicated and enforced conformance and standardization by every vendor as applicable throughout the facility, a vital step in maintaining operating efficiency in the tightly integrated complex. That facility was constructed in record time - from bare ground to a fully functional world-class ethylene cracker complex in just 27 months, three months ahead of schedule.

What would you like to highlight as most important message to the chemical industry?

Well, I'm a strong advocate of AMS asset management and the predictive maintenance approach that it enables. With it the process manufacturing industry has the chance of securing the plant operation through field intelligence and diagnostics that have the plant continuously monitoring its own health and empowering its personnel to maximize operational performance while minimizing unplanned shutdowns. The technology is here, and wireless solutions are expanding the intelligence about the plant. We have the most terrific opportunity to create even more benefit for the plants.

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