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WHERE WILL MANUFACTURERS FIND TOMORROW'S WORKERS?

Companies Struggle to STEM Receding Workforce Tide

By Aaron Hand, Managing Editor

Manufacturing is the key driver to U.S. economic prosperity, according to Rob Atkinson, president of the Information Technology and Innovation Foundation (ITIF, www.itif.org), a non-partisan think tank for advancing technological innovation and productivity. But will manufacturing be the savior for the U.S. job market? No, says Bill Strauss, senior economist and economic advisor for the Federal Reserve Bank of Chicago (www.chicagofed.org).

Atkinson and Strauss both gave keynote presentations Tuesday morning at Manufacturing Perspectives, a forum for the industrial press corps at Rockwell Automation's Automation Fair this week in Chicago. Although Atkinson and Strauss were at odds on a few key points, they agreed that there is a serious lack of talent available to fill vacancies within the science, technology, engineering and math (STEM) sector.

Coming out of one of the worst economic recessions in history, U.S. manufacturing has recovered half of the output loss since its peak year in 2007, Strauss noted, but the industry has added back only 300,000 of the 2.3 million lost jobs. That is not likely to change anytime soon, if ever. Unemployment stands at 9% today, with estimates that it will still be at 7% by 2014. "That's horrible," Strauss said. "If there's something that we can do to bring that lower, our president of the Chicago Fed thinks we should."

In fact, manufacturers say that they'd like to be hiring a whole lot more engineers and technicians, but the market lacks the skilled workers necessary to fill those positions. According to recent statistics, about 600,000 STEM-related vacancies remain unfilled in the United States, Strauss said, because manufacturing companies cannot find the skilled workers to fill them.

Automation really began taking off in the late 1970s. Those workers who were part of that first automation movement are now part of an aging workforce that is beginning to retire. "There is a lot of domain expertise beginning to abandon our space," noted John Nesi, vice president of market development for Rockwell Automation and moderator of a panel discussion on developing the future manufacturing workforce. In replacing those workers who understand what makes a company profitable as well as productive, the industry faces an educational dilemma as well as a PR problem with our young folks, Nesi added.

"Education plus experience equals skills." GenMet's Mary Isbister, together with other panelists, discussed the need for experiential learning as well as the continuing shortage of qualified workers for today's advanced manufacturing jobs.

The skill set necessary is a combination of both education and experience, said Mary Isbister, president of GenMet, a metal fabricator based in Mequon, Wis. "They have to have the basic education necessary, but should also have the experience component," she said, noting how hard that is to find among today's young workers. "Most of them come without the work readiness skills on day one. They don't have the basic understanding of math, science, problem solving or even the basic work readiness skills of arriving to work on time."

There are issues with the education system in the United States, panelists said, based largely on a system that puts more importance on academic learning than on hands-on experience. Introducing applied learning in our schools could go a long way to helping kids get the practical experience they need, and also to get them excited about engineering, Isbister said. "It's a very important point to realize that kids these days sitting in a classroom watching a teacher up at a smart board don't appreciate math and science the way they would through applied learning," she said. In contrast, kids involved in hands-on education courses are excited about math. "They understand the connection between the work they're doing and trigonometry."

Irv McPhail, president and CEO of the National Action for Minorities in Engineering (NACME), agreed that hands-on, project-based learning goes a long way in capturing the imagination of students. The issue, however, runs even deeper, from his perspective. "Here in the United States, there is another demographic reality," he said, explaining that there is an increasing number of minorities that are not adequately participating in STEM workforce categories.

There is perhaps a STEM stigma in which the younger generation still sees manufacturing as a dirty job. "But larger than that, there's an engineering awareness conundrum," McPhail said. Many young minorities don't have an engineer in the family, or one living next door, he said, so they're simply not aware of the opportunities that are available.

There is a cultural challenge in the United States when it comes to turning young people on to the industrial sector, said Tom Duesterberg, executive director of the Manufacturing and Society in the 21st Century program at the Aspen Institute. "There's a cultural challenge not only with recruiting students, but with recruiting educational establishments as well."

That's not the case in Germany, where students can get practical experience working with companies through apprenticeship programs. "They do things to train people that we ought to think seriously about," he said. "There's a very clearly beneficial result, and you come out with a degree. Most students are almost guaranteed at least a couple of job offers." Japan, meanwhile, has a series of technical colleges that work closely with the industrial sector, Duesterberg explained, giving students practical experience.

Although there are "many, many reasons we can't just adopt the German model or any other foreign model," Duesterberg said, we do need to understand at a national level that the industrial sector is an important part of the economy.

That said, the United States certainly isn't the only country hurting for technical talent. "Even in places like China there are issues," Duesterberg said, explaining that the workforce is aging in the developing world as well as the developed world. "We often think that in India and China they're churning out engineers and technical workers. The population in China is not growing, though, and will actually begin to decline."

Alberto Alfonso, engineering manager at Goodyear Tire & Rubber, has been based in Pulandia, China, since 2009. "One of the things we discovered…was the same lack of skill in China," he said. "We have the same lack of mechanical, electrical, hydraulics knowledge." To find the technical skills it needed for a greenfield plant in China, Goodyear partnered with a local vocational school to create a training program. The program has developed 140 technicians so far, and Goodyear has plans to extend it to 200-250 technicians, Alfonso said.

Isbister expressed interest in a similar program in the United States. She seemed bothered, for example, when Alfonso detailed how Goodyear brings American teachers over to China to help develop the technical workforce there. "Why aren't they teaching our kids in the United States?" she asked.

The United States is not training enough scientists and engineers, Duesterberg agreed, although the country does at least have immigration as a competitive advantage. "But the quality of workers we need to fill these positions," he said, "is not what it should be." ■

OPTIMIZATION PANELISTS LIGHT PATH TO MANUFACTURING REVIVAL

Technology Innovation Key to Agility and Competitiveness

By Jim Montague, Executive Editor

Because economic dangers seem to loom around every corner, it's good to have a few experienced guides to help us avoid them. Luckily, a tailor-made squad of broad shoulders to stand on showed up in Chicago this week at the Rockwell Automation Manufacturing Perspectives media event, just before the opening of the company's 20th annual Automation Fair. The panel's theme was "Optimized Plant and Supply Networks: The Next Frontier," and was moderated by John Nesi, vice president for market development at Rockwell Automation.

"The four main keys to successful manufacturing today are keeping the pipeline of innovations open and viable, managing rapidly diversifying markets and workforces, maintaining efficiency and improving production, and keeping up on sustainability," reported Nesi.

First up, Nagesh Nidamaluri, senior general manager at Mahindra & Mahindra Vehicle Manufacturers Ltd., reported that his company's 13 greenfield auto plants in Chakan, India, already are working with the company's IT department to connect the manufacturing execution system (MES) on its huge and expanding plant floors to its enterprise resource planning (ERP) system.

"We're connecting all of our many varied components and production equipment with IP addresses, which gives us the flexibility to be lean and expand as needed," explained Nidamaluri. "This method also gives us visualization for our plant managers, so they handle production in real-time, and shift or expand production lines more quickly in response to supply-chain issues and other situations."

Nidamaluri added that traditional IT versus control engineering conflicts mostly are resolved by the fact that he oversees both departments, and so he's been able to encourage them to work together. "We're even merging our digital manufacturing capabilities to the point that we're creating a digital bill of materials, and we're hoping to seamlessly link it with our MES system instead of relying on the old Excel worksheets."

Fritz Quitmeyer, director of manufacturing and controls engineering at AAM, formerly American Axle & Manufacturing, added, "Production data needs to be treated as a natural resource that's mined, refined and put to work. This information can be used to optimize operating systems, perform proactive maintenance, identify quality issues or just reduce costs. All this

"It gives us the flexibility to be lean and expand as needed." Mahindra & Mahindra Vehicles' Nagesh Nidamaluri explained how the vehicle-maker's plant-floor IP networks are being used to flexibly integrate operations across 13 plants.

data can come from sources that are in-house, but instead of using it to react to situations, we can now use it to improve capacity ahead of time. It's been six years since we implemented a new controls architecture based on ControlLogix controls and EtherNet/IP networking on final assembly applications at about 10 sites. This approach has taken us from 52 weeks to 26 weeks to design and build a new manufacturing system, and from 24 weeks to six weeks to launch it on a plant floor."

Similarly, Stolle Machinery Co. recently worked with Rockwell Automation to develop a telemetry program, and add remote sensing functions to assist users of its "body making" machines, which extrude and form aluminum beverage cans after they arrive from an upstream cupping machine. "These machines can produce 3,000 cans per minute and need to run 24/7 for weeks at a time, and so we're trying to come up with a way to go from preventive maintenance to proactive maintenance. That's why our project goal was to drive and secure more intelligence," said Robert Isaman, CEO at Stolle. "We're also trying to have our customer standardize on just five can designs, instead of the 36 types they've been making worldwide, which should increase their satisfaction and keep costs down."

Likewise, Marquis Management Services operates several ethanol refineries in the midwestern U.S., and so it's also seeking long-term sustainability and to be the low-cost provider in its industry. "We're on the process side, but we also have a lot of data to collect and analyze to better predict operating parameters and reduce variability," explained Jason Marquis, president of Marquis Management Services. "Even small, 1% improvements in production can mean millions of dollars in savings, and so with help from Rockwell Automation engineers, we're creating multivariable process control models that can help us produce the highest-quality product at the lowest cost."

For example, because many bio-refineries are located in remote, small towns, Marquis is even connecting key, offsite engineers with these facilities by giving iPads to some of its some local operators, which gives everyone access to the data they need. "This is also empowering people who have been using mostly wrenches for much of their careers," added Marquis. "Now, instead of the maintenance guy having to radio in from the field and then wait for actuations to come out from a central control room, he can take the iPad into the field and make direct adjustments as needed." ■

SAFETY HAS DIFFERENT TACTICS, BUT IDENTICAL GOALS

Leaders from L'Oreal, PepsiCo and General Motors Share Safety Best Practices

By Joe Feeley, Editor in Chief

No matter what market your company serves, the keys to successful safety programs are pretty much the same, even if the scope, complicating factors and elements of implementation are widely different.

The Tuesday morning general session presentations at Rockwell Automation's Safety Automation Forum by health and safety leaders of L'Oreal's Little Rock, Ark., facility; PepsiCo and General Motors, made that pretty clear.

Tommy Short of L'Oreal stressed the importance of moving along a line away from a management-driven safety system, through individual values, to a group culture of safety, where he says incident rates are dramatically lower. "But first of all, your company has to truly believe that you can look one or two or five years down the road and see zero injuries," Short said. "Is that possible? If you say no, that's not possible, things happen, then you're probably not very far down that line. You can be there, but it's going to take a lot of work--a commitment to get out there, roll up your sleeves and get to work at all levels."

Short says when you get to the group or interdependent safety culture stage on that line, then people are not only looking out for their own safety, they're now looking out for each other.

A key element to the L'Oreal Little Rock approach that gives employees ownership of the process is the 60-second observation.

"The goal is for every employee to complete one observation per week," Short said. "They go out on a scheduled, pre-planned visit to understand how a particular job should be done. Nobody's name goes on a form; they're not reporting anything--they're looking at how the safety culture is. Do we 'get it'?" Short says it's important not to bog down on process, so focus on what's important.

Short makes it clear that this is all-encompassing. "Safety360 is an important element of our safety culture, and it means we include safety at home, at school and on the road. It's about child safety as well. It's for your coworkers' families too."

Then there are the challenges that Craig Torrance from PepsiCo faces in what it takes to implement global safety success across 800 manufacturing sites that are parts of widely different businesses that operate as autonomous divisions with established cultures, located all over the world, and in a

"If you can't afford to do the project safely, then you can't afford the project." PepsiCo's Bill Torrance discussed the need for safety to rise above a company's list of priorities to its list of values.

market where things change fast because consumer product preferences demand rapid response.

"Safety can't be just a priority," Torrance said. "It should be a value. It's not on a list competing with other needs. A value is part of everything we do."

The results of improved machine safety seriously affect safety culture, Torrance argues. "It's visible. The impact of investing in making machines safer is huge." The employees have done the "soft" stuff, he says. They've read the manuals; they've heard the importance of safety from management. "We had a machine that was operating without interlocking guards for 30 years, Torrance admitted. "So, when you install interlocks and can show [workers] that this machine is safer now, that has a much bigger impact."

Leadership was, of course, identified by all the speakers as critical. There has to be accountability driven from the top. "There's accountability for sales, for profit, for operations," Torrance pointed out. "Why would there not be accountability for safety?"

Regardless, cost always comes up in a project discussion, Torrance said to wide audience agreement. "I get calls from engineers who tell me that when they 'plug-in' the cost of safety, the ROI falls apart" he said. "They'll ask if they can separate out the safety cost piece when they go for funding. My answer always is "No.' It's simple. If you can't afford to do the project safely, then you can't afford the project."

Torrance said it's also important in a global environment to understand that a common safety approach doesn't mean identical. "This is something we struggled with at the beginning, trying to get everything to look the same, but it doesn't have to be that way. In a company this size, there already were risk assessment tools out there. You don't need a new template if the old way is working."

Global standards are important, Torrance said, as a place to find commonality and arbitrate disagreements. They try to simplify their own standards to focus on what must be done, not necessarily how. "Let the businesses take ownership and work out the details."

Torrance also faces regional differences in the maturity level of risk tolerance. Some of that is remediated by the standards, not the safety message. "The standard says we must have safety guarding on every machine. There's no discussion about past records. We can harmonize the risk assessment without having to officially harmonize the risk."

Mike Douglas of General Motors spoke about what he called the continuum of the past 14 years in moving its safety culture forward across functions and areas as diverse as research, manufacturing, dealerships and customer support. "How do you come up with common processes for all that?" he mused to the audience. "You need to be flexible, and in some sense, standards set you back. What risk assessment does for you is performance-based, not prescriptive in nature."

Asked what he thought was the one thing essential to success in a global safety implementation, Douglas offered two thoughts. "Whatever you do, make sure there's respect," Douglas quickly said. "When people feel that you respect their local issues, things go better." Language is the other essential, Douglas added. "If you can translate into local languages, that's good. However, make sure it's done in the local language by a local person, particularly in regions where there are many, many languages. But it's another tool to gain the respect that's so important." ■

ROCKWELL AUTOMATION CONTINUES PROCESS INDUSTRY INROADS

Process Revenues Outpace Competitors, as Company Prepares for Growing Consumer Demand on a Global Basis

By Jim Montague, Executive Editor

Much like a pair of teenagers shooting up in height before the eyes of their amazed parents, Rockwell Automation's Process Solutions User Group (PSUG) and the company's own process solutions business have both undergone accelerated growth spurts in the past few years.

For instance, the annual PSUG gathering, being held in Chicago this week in the run-up to the company's Automation Fair event, has swelled from 50 members in 2001 to more than 800 now, largely thanks to the efforts of its hands-on customer advisory board (CAB), according to Steve Pulsifer, director of process market development at Rockwell Automation. In fact, more than 500 customers per year vote on the development direction and features of Rockwell Automation's PlantPAx process control system, Puslifer said.

Likewise, the revenue of Rockwell Automation's Information Software and Process Business (ISPB) grew fives times as fast as the rest of the distributed control system (DCS) market during its Oct. 1 through Sept. 30 fiscal year (FY 2011), and achieved the best overall growth rate among all of the major DCS competitors, according to John Genovesi, ISPB's vice president and general manager, who cited the recent "DCS Worldwide Outlook" study by ARC Advisory Group (www.arcweb.com).

Overall, Rockwell Automation's sales grew 24% in FY 2011, passing $6 billion, and finally eclipsing the $5.7 billion it earned before the recent economic slowdown began in 2008. Despite the difficulties of this period, Rockwell Automation's investment in process automation has exceeded $500 million during the past five years, during which it has formed substantive partnerships with Cisco, Endress+Hauser, IBM and OSIsoft, as well as acquiring ICSTriplex, Pavilion Technologies, Hiprom and Incuity, among others.

"Rockwell Automation has a long history of process automation solutions, but I'm especially proud of the fact that we added 25 new products, system features and capabilities in FY 2011," said Genovesi. "These included a new HMI look and feel, diagnostic and library objects, advances in high availability, operations and design productivity, device integration and asset management for power devices, and expanded process OEM capabilities. We also added 33 new

"More than 70 million people per year are crossing the threshold into the middle class, and virtually all of them are in emerging economies." Rockwell Automation's John Genovesi put the company's process automation growth prospects in the context of the $8 trillion increase in global consumer spending soon to come.

system integrator (SI) partners, including many in Asia Pacific and Latin America. This brings us to 134 process solution providers and SI partners worldwide."

ISPB's new products have included its FactoryTalk Pharma Suite 3.0 software, FactoryTalk CPG Suite 2.0 software, FactoryTalk Vantage Point 4.0 and FactoryTalk Historian ME.

To put ISPB's performance in context, Genovesi also reported on some of the findings in McKinsey Co.'s recent study on global economic forces, The Great Rebalancing, including the projection that more people will exit poverty in the next decade than have done so in all of human history.

"More than 70 million people per year are crossing the threshold into the middle class, and virtually all of them are in emerging economies. As a result, the global middle class is going to double, adding $8 trillion in consumer spending," reported Genovesi. "So, roughly 40% of the world's population will achieve middle-class status by global standards in the next 10 years, up from less than 20% today. In fact, the coming decade will be the first in 200 years when emerging-market countries contribute more growth than the developed ones, and traditional Western economies will likely have a smaller share of global GDP in 2050 than they had in 1700."

Because global growth will increasingly come from emerging economies, Genovesi explained that about half of worldwide industrial production is also going to happen in these emerging areas. This means most manufacturers will have to shift their production mix, which will have a profound affect on process control and automation users and suppliers.

He added that Rockwell Automation is addressing four primary challenges:

- Facilitating globalization with extensive global support that meets local standard requirements;
- Improving productivity with continuous improvements to better provide asset utilization and system performance;
- Supporting sustainability initiatives with extended product lifecycles, safer environments and reduced energy use; and
- Cultivating innovation with increased visibility and knowledge capture.

"Likewise, the challenges our PSUG customers face each day include reducing operating costs and commissioning times while achieving continuous improvements and increasing quality and yields at the same time," said Genovesi. "They must also conform to a wide range of global regulatory and safety requirements. The global economic environment is uncertain, so it requires improved business responsiveness."

To give its many customers the tools they need to survive and thrive, Rockwell Automation and its PlantPAx process control system deliver a single control architecture that enables plant-wide optimization from raw materials and primary processing and onward to packaging and warehousing. For users in the consumer-driven industries, Genovesi reported that PlantPAx provides:

- Plant-wide control that drives total cost of ownership savings;
- Batch management that allows scalable and integrated batching from the controller layer to the enterprise;
- Manufacturing intelligence that enables continuous process improvements;
- OEM scalability that allows cost-effective skid design, development and deployment.

For users in the resource-driven industries, Genovesi added that PlantPAx delivers a premier integration of power-control components via EtherNet/IP networking, including variable-frequency drives and motor-control centers that help reduce energy use and system lifecycle costs. PlantPAx's primary benefits for resource-based applications include:

Operational excellence, high availability and safety by providing critical asset health and performance information for optimization;

Sustainability by delivering cleaner, safer and more energy-efficient operations to help users achieve business goals;

Security by helping to protect people, assets and information from accidental or malicious threats. ■

OEMS EXPLORE "SMART MACHINE" AUTOMATION NEEDS

Global Machine Builders Share Capabilities and Concerns

By Joe Feeley, Editor in Chief

Of the three D's of bringing an industrial machine to market, companies are finding that Deployment is becoming harder and more expensive faster than Design and Development, said Chris Zei, vice president of Rockwell Automation's global OEM industry group, in his welcoming remarks at this week's Global Machine Builder Forum at Automation Fair in Chicago.

Indeed, machine builders are looking to reduce the costs of effectively supporting far-flung machines via open networks, real-time monitoring and remote troubleshooting tools, a panel of international machine builders from the United States, Europe and Asia reported. But that's just one of the issues OEMs are struggling with.

The panel discussed the key issues of sustainability and integrated machine safety, but we also heard quite clearly that there's still a pretty big gulf of understanding between the machine control camp and the IT group.

Regarding the value of remote monitoring capability for customers that have critical uptime needs, Scott Bivens, engineering manager at Oystar, summed it up well, saying "You can't fix it quickly or easily if you can't see it."

Jim Barry, electrical engineering manager of Ixmation-US talked of the tangible value of remote diagnostics by recalling a time when he was in Florida with a customer and received a call from a California customer with machine vision system problems. "I pulled over, pulled out my laptop, made a WebEx phone connection over my cellular network, and I was looking at live images of the vision system on that customer's floor and within five minutes had the problem solved."

Remote data access also is important to Jim Chapman, electrical engineering manager at Stolle. "Remote capability is a key part of our after-sales support strategy," he said. "Being able to take an 'over the shoulder' look at the machine is important to better advise our customers. Even if we have to dispatch a field technician, he's better equipped to address the problem."

Some customers are specific about some of the data they'd like to see access to. "We have more customers asking for diagnostic help on things that deteriorate over time," reported Howard Dittmer, vice president of engineering and technology at ARPAC. "Looking at the current draw on shrink-wrap heaters, which can predict when it might fail,

"Within five minutes, I had the problem solved." Ixmation's Jim Barry was among the machine builders at this week's Global Machine Builder Forum who touted the time-saving utility of remote access and collaboration tools.

is one example of the important things that can reduce downtime for customers."

All of the panel members agreed that remote data access can be a game changer. "The exciting opportunity is to provide a higher level of support than what's out there," said John Dillon, divisional vice president of Wynright Control Solutions. "The opportunity is there to provide a corrective-monitoring program with real-time diagnostics and on-site camera systems."

The consensus of the panel is that the current "disconnects" between the concerns of the IT group and the machine level is impeding further progress.

Rather than use WebEx, Barry would prefer to have VPN connections to his equipment, "but the IT group always seems to be concerned with the machine-level data being part of their IT layer," he said.

Dittmer also is chagrined to find cases where IT folks don't realize that the machine side needs to be able to talk to the world. "They are spending more time blocking activities. We used to have capacity to email information out from the machine regarding maintenance or supplies, but that is opposed by the IT people. Even when we can show them it's not causing them a problem, they become intractable to allowing that access."

Dittmer adds that he's stunned to find that even in Fortune 100 companies, the maintenance and operations staffs often don't have mobile devices needed to receive important messages. "They [corporate and IT] just don't get it."

Customers have responded very well to Wynright Control Solutions's initiatives for data access, Dillon said. "There are people who are telling us they want this, but 'we can't get past the secure access provisions we have to deal with.'"

As the panel session wrapped up, an audience member asked a question that doesn't always accompany the usual conversations machine builders have regarding price. He asked the panel if there are certain things that customers are willing to pay a premium for.

"Our customers really value reduction in setup time of the machines," responded Bivens. "That usually means converting over to electronic servos from a pneumatic solution, and some customers are willing to pay more for that."

A single line of responsibility for larger systems seems to be another area where the machine users are willing to consider paying a premium. "Just this past week, we began installing a larger system that has 25 pieces of equipment, and we were responsible for integrating it all together," said Dittmer. "Only half of them were our machines. The customer paid a significant premium for us to ensure that all these pieces of equipment worked together seamlessly and provided the performance they wanted." ■

USERS SLASH ENERGY COSTS WITH OPTIMIZATION TOOLS

Rockwell Software Helps Boost Visibility, Too

By Jim Montague, Executive Editor

Seems everybody who's anybody is waking up to energy—wide awake, cold-bucket-of-water-in-the-face awake. Of course, they've always known the basic consumption details, but with prices rising and growing awareness of the environmental effects of greenhouse gas emissions, they're digging into the details, seeking every possible path to manage their energy effectively and reach new levels of optimization.

Not surprisingly, many are relying on Rockwell Automation to guide them to this new energy nirvana. Several acolytes presented their experiences during the Energy and Environmental Industry Forum at this week's 20th annual Automation Fair in Chicago.

For instance, Steve Poniatowicz, senior vice president at Energenic, reported that his company designs, owns and operates mid-sized combined heat and power (CHP) plants fueled by natural gas, biomass, renewable and other sources. It and its parent, Marina Energy, began an ongoing partnership with Rockwell Automation in 2000 when they built a chilled and hot water facility enabled by variable-frequency drives (VFDs) for the $1 billion Borgata Hotel and Casino in Atlantic City, N.J. The facility started up in 2003 and was updated in 2006 and 2010.

"We've achieved 15% savings." Energenic's Steve Poniatowicz explained how his company has cut fuel costs and increased efficiency at the company's combined heat-and-power plants.

"Last year, we added a CHP project at the casino and integrated it into the existing system. We also included some new equipment, such as solar turbines, heat-recovery boilers and absorption chillers. Rockwell Automation helped us integrate all of it," said Poniatowicz. The latest update includes VFDs and motor control centers (MCCs) for the cooling towers, chilled water pumps, condenser water pumps and hot water pumps. These devices are managed by the recently bundled FactoryTalk VantagePoint software and RSEnergyMetrix software for real-time monitoring, alarming and control, process data logging and reporting, real-time web page displays and utility data logging and reporting for 14 individual sites.

In fact, FactoryTalk VantagePoint's visualization capabilities and RSEnergyMetrix energy data repository functions will soon be tied closely enough that they will be jointly renamed as FactoryTalk EnergyManager. "This is the first bundled software that we're doing, but we may add more software functions to this umbrella in the future," added Philip Kaufman, business manager for Rockwell Automation's industrial energy management business.

"These new controls have provided us with real-time monitoring of business-critical parameters to minimize energy costs and access to information for billing and operational analysis—all on one platform from

the executive floor to the plant floor," explained Poniatowicz. "We've achieved 15% savings with this highly efficient CHP system. We can even get key alarms via cell phone and real-time, web-based analytics, which show us how efficiently we're running in each facility."

In the future, Poniatowicz reported that Energenic plans to use Rockwell Software's Pavilion8 for data mining, performance modeling and capacity forecasting to secure more efficiencies and savings. "We'll do model performance assessments of each boiler, turbine and chiller, and combine these with load forecasts and current energy pricing to decide, for example, which combination of chillers to run for the most cost-effective operations," he explained.

Similarly, George Paterson, utility systems specialist at the University of Iowa, reported that the 129 buildings on his campus, including a teaching hospital, spend abut $30 million per year on energy. The university operates a primary co-generation plant and two substations that are powered by a combination of coal, natural gas, biomass, purchased electricity and some internally generated power. It also has three chilled water plants with 16 total chillers. About 90 of the buildings also use steam for heating, so the plant also runs three steam turbines. As a result, the university's utilities have more than 100,000 live data points, including building and plant automation systems, DCSs, PLCs and external sources. Fortunately, the university recently finished 10 years of infrastructure improvements, which gave it real-time steam, electric and chilled water metering on a campus-wide private network.

"We just needed to turn data into information and make it available to all," said Paterson. Also, we presently use 15% renewable energy by burning oat hulls, but we were recently assigned to use 40% renewable energy by 2020. And we also need to have zero net energy growth from 2010 to 2020, even though the campus is growing by more than 250,000 square feet per year. To achieve these goals, we need easy, reliable access to energy consumption data and flexible analysis tools."

As a result, Paterson and his fellow Hawkeyes implemented Rockwell Software's FactoryTalk VantagePoint Enterprise Energy Management in a pilot project at nine buildings about three years ago and then deployed it over the whole campus. "We now have a web-based energy dashboard for individual buildings, which becomes a very powerful tool when people can see that it costs $300 per hour to energize one building or $14,000 to $16,000 per hour to energize the whole campus," added Paterson. "We can also compare actual dollars per thousand square feet of space to predicted energy costs, and then show what we're really saving by changing fume hoods or ventilation methods."

Meanwhile, Evan Hand, electrical and controls director for supply chain engineering at ConAgra Foods, added that his firm is using Rockwell Automation's solutions to pursue its sustainability goals. These include reducing greenhouse gas emissions by reducing the energy and water used to make its products, while still meeting financial targets.

"We're really using Rockwell Automation's solutions as a second set of eyes to save energy and reduce our carbon footprint," said Hand. "We first identified a pilot plant for each of our four main product platforms—snack foods, frozen foods, shelf-stable foods and refrigerated products—and performed an energy assessment for each one. The pilot project was completed this past May, and it found 34 potential improvement projects for the four facilities. Of the 34 projects that potentially met the hurdle rate, 10 have gone on to execution after agreement by the plant on the total scope and cost reductions. The average payback period was 2.9 years." ■

ROCKWELL AUTOMATION STREAMLINES SERVICES DELIVERY

Simple, Flexible, Worry-Free and One Flat Fee

By Walt Boyes, Editor in Chief

"Rockwell Automation has been in the services business a long time," said John Lohmann, Rockwell Automation's director of market development for services and solutions, as he explained the breadth of the company's current services offering. "Our customers struggle to prioritize their asset lifecycle needs, and we are working to help them with maintenance and lifecycle services that are more financially predictable. This is what they've told us they want, and we are determined to support them."

"We have been listening to our customers, and we understand their pain points," Rob Nugent, director of services contracts added. "The competition is producing service offerings in a sort of ad hoc way, but we believe that the asset owners need to be protected from budget unpredictability. So we've created four service packages with a simple contract that we call Assurance Integrated Support."

"It is simple, flexible, worry-free, and we provide it for one flat fee," Nugent said. "We don't charge extra for parts, for phone support, for on-site visits or the on-site health checks and asset audits we perform as part of the contract. This will be something unique in the automation space." Currently, the company is rolling the service out in Canada, with a global roll-out to follow in 2012.

"We took the customer approach and worked backwards—from what they wanted to what we can provide," said Jane Barr, plant services business manager for customer support and maintenance. "We developed a disciplined, four-step approach, and we encourage our customers to take this approach with us as their trusted partner and advisor.

"We took the customer approach and worked backwards—from what they wanted to what we can provide." Rockwell Automation's Jane Barr explained how the company has designed its new services offering to satisfy customer needs for delivery—and budget—predictability.

"First there is an assessment phase in which we do audits of the state of our customers' assets," Barr explained. "Next we and our customer together design a strategy that mitigates their asset management risks. Then we together implement a predictive maintenance and support system that supports the strategy. Finally, we measure, optimize and repeat as we get better."

Barr noted that Rockwell Automation's global capabilities in services and asset management have been greatly augmented by the recent acquisition of Lektronix, one of the largest third-party repair houses in the world. "We provide competent in-language support anywhere our customers are," Barr said.

"What we're looking for is a partnership, a co-ownership of our client's asset management needs," Lohmann said. "Above all, we want this disciplined approach to be attainable. If a customer can only do the assessment portion, that's what we will encourage them to do. We want to help them grow into predictive asset management."

"In the old days, we provided telephone and on-site support," said Jon Furniss, Rockwell Automation product manager for global remote support. "Now we have multiple channels including email, social media, web-based forums and help sites. We even do online service support chat. We're trying to respond to our customers' service needs in all the ways they want us to. This is one of the reasons for the application-based contracts we're introducing."

Training services have changed dramatically too, according to Nick Goebel, Rockwell Automation global training services business manager. "We used to be event-driven. We'd put our annual training course schedule up on the web and in the literature, and we'd wait for customers to register for the courses. Now, through our Global Workforce Solutions we are optimizing training for our customers. Now we are process-driven." ■

BIG FEATURES NOW COME IN SMALLER "PAC-AGES"

OEMs and Users of Smaller PACs Have Fuller Access to Rockwell Automation Integrated Architecture

By Joe Feeley, Editor in Chief

Rockwell Automation has expanded its Integrated Architecture portfolio for smaller applications with a series of scalable CompactLogix programmable automation controllers (PACs), servo drives, I/O, visualization and simplification tools. With high-performance features, such as integrated motion, safety, EtherNet/IP connectivity and re-usable development tools, Rockwell Automation offers users the ability to standardize on a single control platform for small- to large-scale applications.

On display in the Integrated Architecture booth of the Exhibit Hall at this week's Automation Fair in Chicago, Rockwell Automation's platform offering is aimed at providing the foundation to drive plant-wide optimization efficiently and effectively, helping companies to respond competitively to the economy and changes in consumer demand.

"It's based on five core foundations," explained Mike Burrows, Rockwell Automation director of market development for integrated architecture. "It involves multiple disciplines that offer functionality for a full range of automation applications with common equipment and standards. It involves scalability for offerings that are right-sized by product, architecture and core multiple-discipline functionality. EtherNet/IP is the third core foundation, providing a single network of IT-friendly Ethernet for information, I/O and motion. Next is real-time information for live data and open access throughout your power and control system. Finally, there is knowledge integration of devices and systems to maximize and secure intellectual property."

A big part of this year's focus is scaling the technology with an eye toward the needs of industrial machine builders of all sizes. "The core challenge for my team is to take the integrated architecture capability and scale it into a platform designed for small-to-medium sized applications with medium to high complexity," said Kelly Schachenman, Rockwell Automation business manager for CompactLogix & SLC. "We're bringing those core foundation values to a smaller package and are introducing 12 new CompactLogix controllers with the same underlying technologies as the ControlLogix."

Schachenman says the controllers are twice as fast, have much greater communication speed and provide standard and integrated motion on EtherNet/IP to provide

"We're bringing those core foundation values to a smaller package and are introducing 12 new CompactLogix controllers with the same underlying technologies as the ControlLogix." Rockwell Automation's Kelly Schachenman explains how the company is extending its Integrated Architecture platform into its lower end controllers.

scalable motion options for a wider range of machines.

"OEMs want to design in one platform and then easily move it to another platform," said Schachenman. "When we sat down to design these new controllers we were able upfront to ask what was important to them about scalability. So these new controllers all have an embedded Ethernet switch; they all have embedded SD flash. So it's a pretty easy move to another platform with just a little bit of reassignment of the I/O points."

"Each of the platforms has at least one module to support integrated motion," said Schachenman. "In the past, integrated motion was available only in the L4, which was aimed at higher-level, more sophisticated applications." That segued to the Allen-Bradley Kinetix 350 Single-Axis EtherNet/IP Servo Drive. "Bringing motion to the masses was a big part of our thinking. This is a single-axis controller, designed to support safe operations on low-axis-count machines. It simplifies the network architecture by eliminating the need for a separate motion network, providing a high-performance, cost-effective solution. This new drive will also feature a power range up to three kilowatts."

Showing Rockwell Automation's integrated drive/motor combination, Schachenman explained, "We've taken the servo drive out of the cabinet and mounted it directly on the motor. You get simplified wiring that can include integrated cabling to carry both three-phase power and SERCOS signals together. A lot comes out of the control panel, and there's no longer heat concerns that can outsize the panel volume needed. We're doing SERCOS today, but we'll offer EtherNet/IP in the near future."

"We've made a lot of enhancements to optimizing the electrical, mechanical and control systems with our Mechatronics system, including integration to 3-D Solidworks," said Schachenman. "We've always had a good set of tools to size the motors, the inertial load, to choose the right motors, but now we've coupled that so you can do full simulations of that design in software."

These enhancements to Motion Analyzer 6.0 Software will help machine builders obtain the full benefits of a mechatronic design approach by making it faster and easier to analyze, optimize, simulate and select motion control systems. In version 6.0 of Motion Analyzer, said Schachenman, it is easy to evaluate design alternatives to facilitate a reduction in the size of the motor and drive with new enhancements in the workflow and additional products included in the selection menus.

Other products being featured this year in the Integrated Architecture booth include PanelView Plus 6 and PanelView Plus Compact Human-Machine Interface. The cost-effective, operator interface provides advanced integration with Logix-based controllers and Rockwell Software RSLogix 5000 Design and Configuration Software. This is a single development tool that integrates Rockwell Automation control and information products on a single network. It's designed to deliver world-class control capabilities for all disciplines, including process, batch, discrete, drives, safety and motion.

Attendees at Rockwell Automation Fair can get a full understanding of these products in the Integrated Architecture Booth (#343) on the exhibit hall floor. ■

21ST CENTURY SCADA FOR WINDSOR WATER PLANT

From Full System Redundancy to Wireless Roving Operators, Canadian Municipality Shows What to Look for in a Next-Generation SCADA System

By Walt Boyes, Editor in Chief

May 15, 2000, was not a good day in the small town of Walkerton, Ontario.

Nearly half the population fell ill—and seven ultimately died—from an e coli outbreak traced to the community's water supply. The incident triggered a wave of stricter quality assurance and reporting requirements for the Canadian province's water and water treatment facilities.

And for the Windsor Utilities Commission, the new regulations were just one factor driving the municipal water treatment authority to upgrade its aging controls infrastructure, according to John Stuart, chief operating officer. The system had last been upgraded in 1994, "so it was due," he told the Water Wastewater Industry Forum at this week's Automation Fair gathering in Chicago. "Our HMI was 'glued together' and our compliance reporting function was insufficient to the task," Stuart said. Plus, the imminent retirement of many of its most experienced workers had the commission casting about for a more sustainable path forward.

"Not all SCADA projects go well," Stuart said. "But this one did."

The utility settled on Rockwell Automation as sole-source supplier for a top-to-bottom refurbishment of its control infrastructure, including many of its medium- and low-voltage drives and motor control centers (MCCs). Key strategic objectives included easier regulatory reporting and trending, as well as building in higher system availability through a redundant controls infrastructure.

"If the plant had kept its original control system and had lost an I/O card, such as the one running the dosing pumps, the control system would fail to add chemicals to the water, which would have compromised the water quality," Stuart said. "In a redundant system, two processors and associated I/O cards would have to stop working for such a failure to occur. With the Walkerton incident fresh on everyone's minds, we were better off safe than sorry."

Stuart wanted a plant control system that could provide accurate track-and-trace capability, real-time collection and recording of historical data, improved knowledge transfer and employee flexibility.

"Our operators are all in their fifties," Stuart said, "and over the years they've known which combination of pumps works the best, for example. We wanted to distill that knowledge and embed it into

"You name it, they've got it. They're mobile." A wireless infrastructure for mobile operators is one essential feature of the SCADA system update that Windsor Utilities' John Stuart described to Water Wastewater Forum attendees.

the control system." Further, the company developed a wireless mobility solution that allows operators to interact with the control system when they are out and about in the plant.

In addition to Rockwell Automation, the utility selected Insyght Systems, a consultant, and ONYX Engineering, a system integrator, to help upgrade the SCADA system.

ONYX installed ControlLogix PACs to replace the aging controllers in the system and gave them redundant power supplies. The PACs are fully integrated to help the operator access plant-wide production information with real-time visibility of water quality, trending loads, levels, clarity and alarms. "Ultimately," Stuart said, "this leads to better plant management."

ONYX also installed FactoryTalk VantagePoint software as the visibility engine. With VantagePoint, Windsor Utilities has unified access to virtually all plant information sources. By tapping into the data gathered by FactoryTalk Historian software, VantagePoint provides visibility into historical production data and puts the information into context through Web-based reports.

"So we gather our last data points on December 31 at 11:59 p.m.," Stuart said, "and by midnight we have the report we need to send to Environment Canada covering our year of activity. These prompt reporting capabilities will facilitate us staying ahead of regulations and allows real-time changes to plant processes. This ultimately avoids downtime, fines or worse."

"We finished this SCADA project on time and on budget," Stuart said. "We got exactly what we asked for—and more." ■

IMPROVED VISIBILITY SHEDS LIGHT ON THE BOTTOM LINE

Rockwell Automation Unifies Information Flows in the Manufacturing Enterprise

By Aaron Hand, Managing Editor

Different manufacturing industries face varying requirements, whether that's complying with federal regulations in pharmaceuticals manufacturing or keeping costs as low as possible in consumer goods. But what they have in common is a growing need for improved visibility from the plant floor on up to corporate management, and all points in between.

As far as data itself goes, today's ubiquitous networks are making it easier and easier to collect more and more of it. At the Global Machine Builder Forum this week at Rockwell Automation's Automation Fair, Jeff Reed, vice president of Cisco's Unified Access Business Unit, warned of the "zettaflood" of data—not gigabytes of data, not terabytes, not petabytes, not even exabytes, but zettabytes. Manufacturers have been collecting reams of data for years, but are now finally learning how to leverage that data, bringing the pockets of information together in a more meaningful way to increase machine and plant performance.

At the Information Software booth at the Automation Fair this week, Rockwell Automation was helping machine builders, system integrators and end users better understand how their software products can help bring together all those pieces of information. "There's information coming out of every machine from the OEMs," says Mike Pantaleano, business manager, information software, for Rockwell Automation. "We can layer software over the whole plant to bring it all together."

Traditionally, corporate executives would get reports full of data coming out of the SAP warehouse to show what was going on a month ago or a even quarter ago, which wasn't very helpful for making truly informed decisions about plant efficiency, says Ian Tooke, business solutions practice manager at Grantek Systems Integration, which works closely with Rockwell Automation to provide integrated manufacturing automation services. Now they can access that data from the past hour, or even the past five minutes, if need be, to get a much better view of what is happening with production; they can be much more real-time, he says.

Meanwhile, at the lower levels of an organization, a machine operator can get a better understanding of not just overall equipment effectiveness (OEE), but how everything affects the business. Operators can see, for example, how substituting a particular material will affect final cost, based on

"We can layer software over the whole plant to bring it all together." Rockwell Automation's Mike Pantaleano explains how the company's information software platform can unify automation, execution and enterprise data flows.

real-time data on the current cost of that material. "They can see costs, profit margins, and how downtime affects the bottom line," Tooke says. "You can really hone in on what's costing you money."

The joining together of information is being enabled by a framework that overlays all aspects of an organization, Tooke says, bringing together offerings that plants have typically already invested in, such as SAP, SharePoint and Rockwell Automation's MES and metrics capabilities. "The SAP data flows down, and can integrate with line information from the MES," he says. "It's a mash-up of finance and manufacturing KPIs together in one place. It's a game changer."

Microsoft SharePoint, used for sharing files and collaborating on documents, has become ubiquitous, Pantaleano says, so Rockwell Automation has found that it's sometimes easier for customers to view information through a corporate IT SharePoint application rather than through a Rockwell Software portal.

Meanwhile, FactoryTalk VantagePoint software connects to disparate data sources—real time, historical, relational and transactional—to create a single resource that can access, aggregate and correlate information into a common, unified model that allows trends, reports and dashboards to help customers make fact-based decisions. Web-based dashboards and reports monitor KPIs to help users better manage their operations in real time.

FactoryTalk VantagePoint 4.0, which Rockwell Automation announced today, now includes enhanced connectors, configuration and reporting tools to reduce the time, complexity and cost of developing meaningful reports, visualization and analytics for manufacturing operations. The latest version also provides native integration to Microsoft SharePoint 2010, which will help to expose plant-floor data to the enterprise, and many other capabilities like business intelligence, collaboration and communications typically not found in a real-time manufacturing operation.

It all comes down to getting the right information into the hands of the right people so that a plant can be optimized to run as efficiently as possible. What data is the right data can vary from industry to industry. In pharmaceuticals manufacturing, for example, regulatory compliance makes it important to have the data that shows exactly how a product was made. "If you don't have the data, you can't sell the product," Pantaleano says.

In precious metals, meanwhile, it's become common for purchasers to demand information on exactly what conditions its expensive purchases have been subjected to, Pantaleano says. "They want to know heat treatment information for the entire time the product was in the furnace." Data can provide the necessary process variable genealogy.

For consumer packaged goods (CPG), products are low-cost, margins are very low, but the inventory needed to make those products is often expensive, explains Mike Gay, CPG industry manager at Rockwell Automation. So the data provided through Rockwell's software suite helps to shed light on the effects on the bottom line of how much raw material is being used, how long it takes to make a product, etc. "They need to make products at the least cost possible," Gay says. ■

MANAGING THE WORLD'S OIL & GAS RESOURCES

From Deep Ocean Water to the Deserts of Africa, Rockwell Automation Is Helping Companies Bring New Sources of Energy to Light

By Jim Montague, Executive Editor

Seems nothing is out of reach anymore. Not only are there few process control capabilities beyond the scope of Rockwell Automation's PlantPAx process automation system, there apparently are few corners of this wide world where Rockwell Automation technology's not already at work for oil and gas producers.

For instance, oil platforms in ultra-deep water off the coast of Brazil, sandstorm-swept tank farms in the heart of Africa and even natural gas compressor stations in the wilds of Pennsylvania are using the company's process control solution and many other Rockwell Automation components to help run and reinvigorate their oil and gas applications. Several users of these systems showed up at Automation Fair this week in Chicago to describe their experiences at the event's Oil and Gas Industry Forum.

Alexandre Maia, engineer and production manager at Petrobras, reported his company is on track to become one of the world's biggest oil producers by 2020, and that a large measure of its growth will come from oil in pre-salt fields in the newer Santos Basin off the coast of Sao Paulo. This region is southwest of the established Campos Basin off the coast of Rio de Janeiro. Pre-salt is a geologic condition in which an oil field is covered or interlaced by thick salt formations in addition to existing bedrock, which can make it extra difficult to secure the oil. Maia explained that, "Not only can the salt layer's weight cause destructive pressure variations during recovery, but the salt can also act like a sponge, further hampering extraction. The oil is there, but it's also twice as deep as usual, and so we have to do some things differently."

To develop these new areas and increase overall production from 2.7 million barrels per day (mb/d) now to 5.3 mb/d by 2020, Maia reported that Petrobras is using a variety of solutions from Rockwell Automation on its production platforms and other field facilities and also at its Caraguatatuba Gas Treatment Unit (UTGCA) that processes 12 million cubic meters of natural gas per day. For instance, its devices are being used beneath the sea on Petrobras' gas-lift manifolds at the Roncador field and on production manifolds at the Albacora field. The oil company had also equipped 100 wells at its land-based Uruco Basin production and gas treatment plant in Caraguatatuba with Rockwell Automation's SLC-5/04 PLCs with radio modems and SLC-5/05 with fiber-optic networking.

"We want to do pretty much what we've done before—just a lot more of it." Petrobras' Alexandre Maia explained how the Brazilian oil company plans to be among the world's largest by 2020, in part by leveraging Rockwell Automation technology.

"We want to keep these systems simple and do pretty much what we've done before—just a lot more of it. Rockwell Automation had been great in helping us so this," said Maia.

Likewise, Wang XingYi, deputy chief engineer of China National Petroleum Corp. (CNPC), reports that his firm is growing equally quickly, so it's also deploying solutions from Rockwell Automation to get the job done. For example, the CNPC International Refinery in Chad is transferring oil from the Ronier oilfield over a 311-kilometer crude pipeline to the N'Djamena refinery and then operating a tank farm with crude oil tanks, product tanks and fuel gas tanks.

"The challenge in Chad is that it's very hot; there are frequent sandstorms; it's hard to transport part and supplies; and there's a shortage of parts and support," said Wang. "We're using the PlantPAx process automation system, and it's given our tank farm the safe, reliable and stable operations, flexible and expandable networking, and low-cost maintenance we needed." Wang added that benefits of using the PlantPAx system include:

- An open system that can accept all standard communication protocols without authorization;
- ControlLogix 1756 hardware platform that's reliable and enables low-cost maintenance;
- Flexiblity and expandability by supporting many kinds of network protocols and I/O types;
- Acceptance of all kinds of application services, such as data gathering, historical and real-time data warehousing, asset management and system optimization;
- Strong controls that can handle continuous, discrete control and safety system functions.

"This tank farm has been running for several months, and it's been keeping a low fault rate and high operation rate. We've saved a lot on maintenance, too," said Wang. "In fact, we've cut about 20% of what we estimated we were going to have to pay for a traditional DCS and its maintenance, spare parts and expansion."

Finally, National Fuel Gas in Williamsville, N.Y., recently partnered with engineering integrator EN Engineering in Woodridge, Ill., to upgrade a few of the 40 compressor stations that move natural gas over its 2,877 miles of pipeline that bring gas to its 728,000 customers in western New York and northwestern Pennsylvania. The upgrade was also needed to help National take advantage of increased development and gas recovery in the local Marcellus Shale region. In addition, Simplex System Controls fabricated the station's new control panels, and Evets Electric provided installation services. EN Engineering also was just named as a Rockwell Automation Solution Partner.

The initial project upgraded 12 compressor units at two compressor stations, one in Roystone, Pa., and the other in Independence, N.Y. The Roystone station has eight Ajax compressor units, five headers, six operating configurations and a storage field of 2.5 billion cubic feet (BCF). The Independence station has four Ingersoll-Rand compressor units, four headers, 10 operating configurations, a gas dehydration unit and 4.0 BCF storage field. The upgrade's scope included:

- Designing and installing new station-level control systems at the Roystone and Independence compressor stations;
- Integrating the new station controls with the pipeline's SCADA system, local safety systems and existing measurement and control systems;
- Designing and installing new compressor unit control systems;
- Installing a new plant-wide, fiber-optic control network;
- Fabricating control panels;
- Installing new instrumentation systems.

The upgrade's main challenges were to understand and replicate functionality of the existing controls, integrate new control systems with existing systems, interface new control panels to existing equipment and instrumentation, and prevent disruption of operations throughout installation. "We used a unitized design concept and then employed ControlLogix PLCs with FLEX I/O, as well as redundant PC-based HMIs with FactoryTalk View SE (Supervisory Edition) at the station level and PanelView operator interfaces with FactoryTalk View ME (Machine Edition) at the unit level," reported Jennifer Shaller, National's lead electrical engineer.

Shaller added that the upgrade has given National's two stations more consistent and reliable control, fully automated and more efficient operations, enhanced data collection, improved diagnostic and troubleshooting capabilities, improved reliability of the control systems, improved mechanical protection of integral compressor units and opportunities for additional control functions.

"This was a big team effort by National Fuel, EN Engineering, Rockwell Automation, Simplex Systems Controls and Evets Electric," added Mark Adelmann, EN Engineering's vice president. "Retrofits are always especially challenging because you have to understand and replicate all of the existing controls functions, but National coordinated every step of the way, and Rockwell Automation provided all the equipment, panels and technical support."

Shaller added that, "The new compressor controls have all the legacy look and feel that our operators needed, but they no longer have to deal with the stress of continually babysitting them." ■

WITH VERSION 2.0, PLANTPAX COMES INTO ITS OWN

A Compelling Package for Process Manufacturers and OEMs, New Release Combines Scalability, Integration and Services

By Walt Boyes, Editor in Chief

"Our current DCS would have been cost-prohibitive to upgrade," said Jeremy Kouw, general manager of Nyrstar Hobart's zinc-smelting operation in Hobart, Tasmania, Australia. Hardware for the distributed control system (DCS) was failing, and repairs were becoming expensive and requiring longer lead times.

Nyrstar turned to Rockwell Automation's Global Solutions team, which developed a migration strategy to replace the smelter's aging controls with Rockwell Automation's PlantPAx process automation system. "The Rockwell Automation solution provides us with better integration and improved diagnostics, maintaining plant uptime and delivering improved plant performance reporting," Kouw said.

Som Chakraborti, director of Rockwell Automation's process business, also cited a recent $6-million award from Daewoo Shipbuilding and Marine Engineering to provide emergency shutdown and fire and gas safety systems, together with engineering services, for four new offshore drilling ships.

These high-profile contract wins, together with enhanced functionality needed for demanding processing applications, point to gathering marketplace momentum for Rockwell Automation's solutions set for process manufacturing. "PlantPAx has established itself as a market-leading DCS and more," Chakraborti said, addressing more than 800 users gathered for the company's Process Solutions User Group (PSUG) this week in Chicago.

Chakraborti noted that PlantPAx version 2.0 can now handle projects of any complexity, and is fully scalable from small to very large projects. "We are extending the PlantPAx application space into the OEM market," he said. "We see more OEM activity in the process industries as the asset-owner companies lose engineering and integration resources. So we are increasing the level of PlantPAx support for OEMs and integrators."

Chakraborti added, "We are also rolling out new contractual service models for lifecycle management of PlantPAx systems. We're calling this Assurance Integrated Support. We believe that we've found a differentiable way to provide tightly linked service support to our customers in a way that will help them manage their service budgets more easily.

"We have also made our integrated process control and power control differentiated

"PlantPAx has established itself as a market-leading DCS and more." At this week's Process Solutions User Group meeting in Chicago, Rockwell Automation's Som Chakraborti set the stage for 26 customer testimonials from a broad range of process verticals.

from the competition," Chakraborti said. "By giving the system EtherNet/IP enablement all the way down to the devices and motor controls, we have made a more tightly integrated and robust system than a typical integration with multiple bridges and protocol converters."

Steve Pulsifer, director of marketing for Rockwell Automation's process solutions business, said, "Users now can tie intelligent motor devices into this unified control architecture, making an immediate and measurable impact on asset availability, operational efficiency and energy management. The tight integration between process automation and motor control is especially beneficial in heavy industrial applications with considerable mechanical investments, such as metals, mining, cement, power, oil and gas, water/wastewater, and pulp and paper applications."

Important new additions to PlantPAx v2.0 include end-to-end high availability on EtherNet/IP from the supervisory level to the controller, a flexible and robust device-level ring topology and detailed I/O diagnostics. "We've taken advantage of the high level of diagnostics in our ICS Triplex safety systems and moved that feature into our PlantPAx I/O," Chakraborti said.

"We have included a controller-based Logix Batch and Sequencing Manager instead of requiring that the batch manager be located at the supervisory layer," he added. "This allows us to take full advantage of the very fast response of the Logix controller, and it provides even more value to the OEM, with more flexibility and less complexity." ■

SUSTAINABILITY TOPS FOOD INDUSTRY CONCERNS

Stories of Water Conservation and Risk Management at the Food & Beverage Industry Forum

By Joe Feeley, Editor in Chief

Sometimes sustainability objectives uncover the need to apply automation and controls in areas where they weren't needed previously. Such was the conclusion of Tom Lindley, industry development manager for beverage at Nalco, who shared his discovery with the Food and Beverage Industry Forum gathering at this week's Automation Fair in Chicago. Lindley's presentation explained Nalco's role in enabling water optimization in the beverage industry.

"Reducing water usage is a Top 2 or Top 3 sustainability goal in the beverage industry and probably in the food industry too," said Lindley.

He pointed to three key categories of effort toward that end, starting with the easiest. "The first area to attack is to reduce the use," he said. "That's simply not using water you really don't need."

The next ones are a bit more involved. "Next is water re-use," he said. "That's based on capturing water that's been used and repurposing it, perhaps to the cooling water system, rather than use more fresh makeup water. This is relatively easy to accomplish."

The third approach--recycling water--poses more problems. "This water is of such a quality that it will require treatment, either mechanically or chemically or maybe both," Lindley explained.

Regrettably, most companies with water-use-reduction initiatives already have grabbed the "low-hanging fruit" of simply using less, minimizing waste from leaks and reusing relatively clean water streams. "But when it comes to reuse of condensate returns or CIP rinse water or bottle-washer effluents, the quality of these streams is such that you have to do something to them first," Lindley said. "This is where the rubber meets the road. When you treat, no matter how well you do that, you can introduce a new variability into the operation that is using this as feedwater."

That doesn't go over well with operations people. "Variability is bad," Lindley recognized. "In boiler feed, this can produce increased levels of scale, corrosion and added cost."

Lindley explained a real-world boiler feedwater condition that resulted from using a recycled water stream of varying quality. "The up-and-down condition of the water will likely lead to scale and corrosion," Lindley said.

The answer here, Lindley said, was a move away from traditional monitoring and

"We're not waiting for near-misses anymore." Malt-o-Meal's Scott Kluegel explained how, with Rockwell Automation's help, the company was able institute a culture of pro-active risk management.

treatment techniques to the use of real-time monitoring, with appropriate automation and control measures to manage the dosing and feed rates of boiler chemicals.

"That type of adaptation and response means you can have both," Lindley concluded. "Sustainablity goals can be achieved while maintaining the quality of process operations."

Scott Kluegel of the corporate electrical engineering group at Malt-o-Meal, drew laughs from the audience by reading from a 1942 Manual for Electricians Handbook uncovered during an update of the group's arc-flash reduction initiatives: "Electricians often test for the presence of voltage by touching the conductors with the fingers. This method is safe if the voltage does not exceed 250 V. Some men can endure the electric shock that results without discomfort while others cannot." Another excerpt Kluegel read indicated, "Sometimes low voltage can be determined by tasting the wires. If voltage is present a mildly burning sensation will be experienced."

So even if safety practices have come a long way, there's no room for complacency today. In his presentation about how his company's safety initiatives have become more sophisticated and effective, Kluegel said it helps to know when to get expert external advice and help. In the process, unsafe procedures that you just didn't see coming get fixed.

Kluegel said that an increased safety attitude resulted from a few uncomfortable near-misses about three years ago. "Our assessments of equipment safety risks were too random, too subjective and often left to the individual installing or operating the equipment," he said.

"That gave us the rationale to construct a comprehensive risk analysis team made up of company employees and experts from Rockwell Automation."

During review of the specific risk that caused the near misses, the assessment also uncovered several other areas of potential risk to remediate as well.

They followed best known practices and a little advice from Rockwell Automation to assess and rank risk severity, frequency and duration of the task involved, the probability of harm and the potential for the operator to avoid the potential risk. "Our risk assessment is much more pro-active now," said Kluegel.

"Now, when we're doing our engineering, we're doing the risk assessment right up-front. We're not waiting for near-misses anymore."

In the early stages of proving out the new plan, Kluegel and team looked at a small segment of a plant-floor process. "With a risk assessment you're looking not just at the equipment, but you also include all the tasks being performed during setup, operation and cleanup."

Kluegel said they realized that during setup, an operator had to climb on top of a rounded-top cooker with a 25-lb. chute to drop into the cooker. "It was clear that this was a real falling hazard," he added. "The analysis showed us that we didn't need a removable chute and made it stationary." ■

CONVERGENCE, FLEXIBILITY DRIVE THE GLOBAL AUTOMOTIVE REALITY

Automaking Poised to Enter Next Stage of Development

By Aaron Hand, Managing Editor

Automobile manufacturers today compete in an increasingly global environment. And they're dragging their machine and component suppliers along. Output and influence is shifting more and more toward Asia. With 40% of automotive manufacturing taking place in China, India and ASEAN countries, suppliers can no longer afford to ignore that part of the world, said Michael Robinet, director of global production forecasting at IHS Automotive, who spoke Wednesday afternoon at Rockwell Automation's Automotive Industry Forum at the Automation Fair in Chicago.

It's not even just a matter of missing out on a considerable amount of business in the Eastern half of the world, Robinet explained, but also losing business from suppliers who are manufacturing across the globe and demanding global solutions. A vehicle could be designed in one location and built somewhere else. Components could come from another location, and final assembly could take place in yet another. "We're already global," Robinet said, adding that it's time to move beyond globalization. The next step includes the convergence of technologies, business practices and lifecycles, and a level of flexibility that enables manufacturers to react quickly.

Fortunately, it's getting easier to work on a worldwide basis, in part because of regulatory and legislative convergence around the globe. From emissions standards to safety standards and recyclability—there is increasing regulatory harmonization, Robinet said. "That provides a tremendous opportunity going forward," he said. "It gives rise to the efficacy of global platforms."

The challenge for automotive suppliers today is not just creating solutions that can be sold around the world, but that can be deployed in a consistent manner, said Frank Kulaszewicz, senior vice president of architecture and software for Rockwell Automation.

Ten years ago, five different vehicles would have been built in five different ways. Today, building the same vehicle around the world drives a lot of economies of scale. Driving toward this type of commonality is part of the new automotive reality, Robinet said, with not just converging standards, but also converging technologies, platforms and even converging cadences—how often vehicles are renewed to meet market demands. In the past, a typical cadence in Brazil, for example, was nine years, in Europe six years, and in

"Inflexibility equals lost opportunities." Elite Engineering's Dan McKiernan discussed how today's automotive lines rely on configurability, distributed control and plug-and-play capabilities to accommodate rapid changes in production requirements.

the United States seven-and-a-half years. "Now it has to all come together, or you lose the advantages of a global platform," Robinet said.

Another part of the equation for competing in today's automotive industry is flexibility. Cadences are tightening to respond to market demands, but manufacturers need to be even more flexible than that. Inflexibility equals lost opportunities, insisted Dan McKiernan, president of Elite Engineering.

At the Automotive Industry Forum, McKiernan described a situation in which a manufacturer tooled up its V6 line and suffered when the market began demanding four-cylinder engines instead, and it wasn't able to react quickly enough. The manufacturer's new, very expensive V6 line was done with its production run by 10 a.m., while the single four-cylinder line worked around the clock and still couldn't meet demand.

Highly dedicated automation and non-flexible assembly was common in the 1990-2005 timeframe, McKiernan said. "Now we've gone back to more flexibility and are moving away from dedicated, highly automated lines."

Today's manufacturing line needs to be flexible and agile, which has come about through configurability, distributed control and plug-and-play capabilities. Manufacturing should be data-driven. Everything should be standardized, including analytics and processes. And everything—from the plant floor to IT—needs to be seamlessly integrated. "Probably most importantly, everything needs to be centered around the process itself," McKiernan said.

To further illustrate the point about the profound need for flexibility, McKiernan showed what happened when a traditional, non-flexible engine manufacturing line decided it needed to make a change to the line. Ultimately, it took three outsourced engineers two months to get through a complex change involving extensive re-coding, with engineering costing about $78,000. In contrast, the same change done on a highly flexible line was done by a staff engineer over one weekend. He spent 16 hours reconfiguring, with no re-coding necessary, and the line was up and running again Monday morning. That project cost about $2,000. "There was less risk, it was less costly, and was done with plant resources," McKiernan added.

"Up until the automotive depression a couple years ago, the industry didn't think too much about risk," Robinet said. "I can tell you now that suppliers, as well as vehicle manufacturers take risk more seriously." ■

PLANTPAx IS MINING READY

Pre-Packaged Mining Solutions Help Streamline Engineering and Optimize Production

By Walt Boyes, Editor in Chief

Like other resource industries, the metals and mining segment is facing the pressures of globalization, heightened competition and higher production—all with fewer qualified people and increasingly stringent governmental regulations. Asset owners are being pushed to both optimize production and to reduce operational risks.

"Our mining process solution helps customers reduce risk by using standardized modules, design libraries and templates developed specifically for the mining industry," said Steve Proctor, operations manager for Rockwell Automation's Hiprom unit and moderator of the Mining & Metals Industry Forum at this week's Automation Fair in Chicago. "We also reduce the amount of configuration and coding necessary to get from design to start-up."

PlantPAx is also well-equipped to handle the complex, model-based optimization schemes needed in many mining and refining operations. "Processes are defined by their constraints," said Quin Dennis, Rockwell Automation global process technology consultant, "outside of which, 'there be dragons.'"

Customers who are pushed harder every day for higher production and higher quality need something more than conventional regulatory control. "Rockwell Automation introduced model-predictive control in the minerals industry many years ago," Dennis said. "These are challenging applications, partly due to disturbances from the raw materials, complex interactions between process variables and the time delays involved."

Rockwell Automation's multivariable predictive control (MPC) implementations have been used in kilns successfully to increase throughput by 6% to 8%, reduce variability by as much as 45% and reduce emissions by 35%. In ball mills, similar results have been obtained. And in bentonite dryers, one customer got such a throughput increase that it shut down the plants where MPC was not implemented. "ROI is typically less than a year," Dennis said.

Rockwell Automation's mining solution is based on the company's PlantPAx process control system combined with industry-specific Logix add-on instructions (AOIs) and high-performance HMI user controls (faceplate and symbol templates). Field devices are directly integrated into the PlantPAx system using EtherNet/IP and ControlNet. "The PlantPAx system is a holistic design approach to every part of a process automation system," Dennis said. ■

"ROI is typically less than a year." Rockwell Automation's Quin Dennis discussed mining applications of the company's MPC technology where substantial improvements in quality and throughput have been documented.

CYBERSECURITY: YOUR GOVERNMENT IS HERE TO HELP

From Training to Emergency Response, the U.S. Department of Homeland Security Stands at the Ready

By Walt Boyes, Editor in Chief

"You know, you really ought to add another 'S' to your 'Smart, Safe, Sustainable" slogan—you ought to add 'Secure.'"

Marty Edwards' dogged focus on security is perhaps to be forgiven, given that he's director of control system security programs for the U.S. Department of Homeland Security (DHS) and director of ICS-CERT (the Industrial Control System Computer Emergency Response Team).

Edwards addressed Rockwell Automation's annual Process Solutions User Group (PSUG) meeting this week in Chicago and described the increasing threat of cyber attack on the nation's critical infrastructure—much of which is controlled by process automation systems.

"Risk equals threat times vulnerability times consequences," he explained to the engineering-heavy audience. "In the beginning, when I first started as a controls engineer, we had systems that were isolated," Edwards said. "This made them reasonably safe."

Modern control systems, however, use commercial off-the-shelf (COTS) computing and networking technologies, wireless in the rack and remote configuration systems. Control system security is now "a huge challenge—and readily exploitable," he said.

Modern connectivity extends the perimeter of the system, and connectivity is now ubiquitous. Some companies think they can get away with airgaps, but as the space program has shown, even an airgap as large as from the Earth to space isn't enough to protect the International Space Station from being infected with viruses, not once, but multiple times.

"We don't have the security and alarm systems to detect intrusion into systems and report it automatically the way we have alarms for process variables," Edwards said. "And many plants have either no, or really poor, policies and procedures for safety. So people can just stick a USB stick into a process control computer, and suddenly you're infected."

"There is some really low-hanging fruit," he said. Make your password policies actually work. Develop permissions for people to access various parts of your system. Do the basic blocking and tackling, and you'll lower the level of risk you face."

"Remember the risk equation," he went on. "There is no way to eliminate risk completely. There is no way to completely eliminate threats. We can only build procedures to reduce our vulnerabilities."

"Risk equals threat times vulnerability times consequences." The DHS's Marty Edwards reviewed the process control system security landscape and how the U.S. government is attempting to help companies manage their risk.

The consequences of a successful industrial control system attack can be large, he noted. Attack sophistication is increasing significantly while the required knowledge an intruder must have to make an attack is decreasing. There are now cyber-attack "tool kits" readily available on the Internet that require little or no training or industry knowledge by a potential attacker.

So how can the government help you? There are, Edwards said, mitigation methods that DHS has developed. One of them is a self-help tool called CSET or Cyber Security Evaluation Tool, which includes guidelines for evaluating and suggestions for increasing security. Another tool is the "Security Procurement Language for Control Systems" document. "This document can help you and your procurement department insert the relevant requirements about security in your control system procurement documents and contracts," Edwards explained. "But you can't just staple it to a standard contract—no one can meet all the provisions." DHS also provides training, from web-based modules to an in-person "Cybersecurity Bootcamp" at Idaho National Laboratory.

In addition to training, Edwards runs the Industrial Control Security Joint Working Group (ICSJWG) which is a public/government partnership to improve best practices for industrial control security. The ICS-CERT, also directed by Edwards, provides situational awareness, online assistance and even "fly-away" team incident response.

"Your data is protected critical infrastructure information under the Homeland Security Act," Edwards said, "and it is exempt from Freedom of Information Act requests. So nobody will see your valuable intellectual property if you submit it to us."

"We also have subject-matter experts and one of the most sophisticated malware labs available to study malware in control systems," Edwards said. The cyber threat is real, he concluded, and you need to deal with it effectively. DHS, he said, is indeed here to help you. ■

WHERE MAN MEETS MACHINE: LEGAL ASPECTS OF SAFETY

When it Comes to Safety Automation, Liability Law Incorporates Equal Portions of Due Diligence and Common Sense

By Joe Feeley, Editor in Chief

In a wide-ranging discussion of product liability issues facing U.S. manufacturers, Gary Ballesteros, vice president, law, Rockwell Automation, and Don Segal, attorney at law, Segal, McCambridge, Singer and Mahoney, had the clear attention of most of the members of a diverse audience well-represented by manufacturers, machine builders and distributors.

In this Monday afternoon technical session at Rockwell Automation's Safety Automation Forum, the lawyers discussed "Top Legalities Impacting Safety Automation." This is about where man meets machine, Ballesteros began. "Where that happens we have a potential for hazard and a risk that someone's going to be injured."

The presenters explained to the audience that a consensus in the literature among safety professionals has identified the following hierarchy of actions as critical to reducing product liability risks:

1st Priority: Eliminate the hazard and/or risk.

2nd Priority: Apply safeguarding technologies.

3rd Priority: Use warning signs.

4th Priority: Train and instruct.

5th Priority: Prescribe personal protection equipment.

Segal and Ballesteros also stressed the point that this issue can be about far more than just legal liability and paying damages. "These product liability things are very injuring to business reputations," Ballesteros reminded. "Even if you don't have to write a big check at the end of the day, the damage to company reputation is on the line."

Segal and Ballesteros offered four key points of advice on how to minimize the risks of product liability and tried to answer questions of "How do we avoid this morass? How do we build products better?" Ballesteros said.

Number one, know the rules about how you build your products and how you build them safely and comply with standards. "It's tricky, particularly here in the United States, because there are issues about what sorts of rules apply," Ballesteros admitted. "So one common denominator that is effective is to follow the engineering standards associated with machine building and product manufacturing."

Ballesteros reminded the audience, many of whom identified themselves as engineers, that the law knows who knows about these issues the best. "The law follows you engineers

"Sometimes the law actually displays some common sense!" Attorney Don Segal, together with Rockwell Automation's Gary Ballesteros, surveyed the landscape of liability law as it applies to manufacturing automation and safety systems.

on this," he said. "I can't think of any state that hasn't incorporated the National Electrical Code as law. Engineering standards are critical, even if not expressly adopted as the law, as elements of proof that your product is not defective if you followed the standards."

He recognized that standards change and evolve, so it's incumbent to try to follow the changes in standards applicable to your area.

A question from the audience summed up one of the dilemmas here. "I have machines in the field, built to standards at the time, and grandfathered in as okay. But the standard—and our designs moving forward—changed for the better. Are you liable for everything that's out there?"

This issue, said the lawyers, can demonstrate that "Sometimes the law actually displays some common sense!"

"It often fits the criteria for making what's known as 'subsequent remedial measures' that the courts recognize as a well-intended improvement, and "can't be used to prove what I did before was wrong," Ballesteros said. "If the law of common sense says it's the right thing to do today, and even if you implement it only partially because it's not economically feasible to do it all, how can that be a bad thing?"

Warning is also a key element in knowing the rules to follow. "There's not a product liability case out there in which the issue of warnings doesn't come up," Ballesteros said. "It's an area where you want to have good expert advice."

If you want to show a jury or the general public that, in addition to all the appropriate design measures you take, warnings are critical. "You don't want to over-warn because it scares people away," Segal cautioned. "You can't make it too busy because then people aren't going to read it. You want to make references to the operating manual for complete understanding of the hazard."

Reinforcing the need for expert help, Ballesteros added that "It's 'Goldilocks and the three Bears' advice. Not too much, not too little; you have to get it just right."

The second piece of practical advice is that product safety at all stages requires a team approach. "Some companies think if you have a product safety group, then that's who's responsible for designing safety in and getting products safely to market, and you're done," Ballesteros stated. "I think that's a fallacy. What we've found internally at Rockwell Automation is that it requires the inputs of internal and external experts. If there's a problem in the field, you run down the list of people who have interfaced with that product, be it the sales personnel involved, warranty and claims folks, legal. Don't isolate the problem to one element in your organization."

Ballesteros further identified a laundry list of due diligence to-dos that help make hazard analysis thorough. One of those items is a double-edged sword. "We certainly look at what our competitors do, but my word of advice to you is don't assume that they are smarter than you. It's a useful touch point, that's all."

The fourth bullet of practical advice involves implementation. "Once you do a hazard analysis, and because the law does support the implementation of subsequent design improvements without fear of that action being held against you, feel encouraged to continue to re-evaluate design. Don't let it gather dust. Update it from time to time as new technology comes out." ■

PRODUCTIVE OPERATIONS: SAFE AT ANY SPEED

Users Find that Integrated Safety Is Great for Productivity

By Aaron Hand, Managing Editor

Try to talk to a machine operator about plant safety, and many times he will cringe, knowing that safety will just get in the way of his ability to produce enough widgets in time, at the right cost. Operators will too often hop the safety fence—figuratively and literally—sure that they are smarter than the machine.

But as Rockwell Automation has been trying to explain this week at the Automation Fair in Chicago, safety and productivity are no longer mutually exclusive. They go hand in hand, with the safety discussion having much more now to do with increased efficiency and machine uptime.

As Derek Jones, safety business development manager for Rockwell Automation, noted, a machine that is stopped when it shouldn't be stopped is the most dangerous kind of machine. "You'll find that somebody did something completely well-meaning, trying to get production back on track," he said. "But the guy hadn't gone through all the proper steps." Next thing you know, the machine starts up again while somebody's arm is still in the danger zone.

Jones presented at the Safety Automation Forum (SAF) along with Mike Miller, functional safety expert for Rockwell Automation. They explained how integrated safety is not only great for safety, but great for productivity as well. "They absolutely go hand in hand," Jones said.

"In the past, the only way to make a machine safe was to stop it," Miller said later in the week in Rockwell Automation's Safety booth. The problem with that was that stopping production often meant destroying some product in the process. The machine could get out of alignment and then would have to be set up again, not a task that a typical machine operator could necessarily do. The whole process meant a considerable loss in machine uptime and throughput.

With the integrated safety technology available today, though, an operator can easily open a door, stop one process, clear a jam, close the door and be up and running again in no time, Miller said. "That also keeps the operator from doing stupid stuff."

The SAF presentations from Jones and Miller reviewed the basics of functional safety, along with the latest safety standards, such as ISO 13849-1 and IEC 62061, because they find that many users are still getting grounded in the basic needs behind safety and what it means for productivity. "We're trying to show people that safety is not a liability," Miller said.

"We teach them how to fish." Rockwell Automation's Derek Jones, together with colleague Mike Miller, explained how the company is helping end users to adopt a more holistic view of safety and its potential benefits for plant productivity.

Keeping a machine safe means improving machine uptime, improving sustainability, producing less waste and using less energy, they say.

Much as today's faster cars come infinitely more equipped for safety than the 20-mph automobiles of the 1920s, today's machine technology dictates an even greater need for safety than was required in the past. "We didn't really like to think about the probability of failure before. If we had two channels and enough monitoring going on, then we could feel reasonably good about it," Jones said. Now, however, people are realizing that they need to get some data to understand how to apply safety to their processes. "They're trying to calculate, estimate and determine the possibility that something will go wrong so they can apply something proportional to the risk."

The safety standards provide the basic ground rules that engineers should be following. "If you're a good engineer, you might look at these standards and say, 'I already do this.' You're right," Miller noted. "Unfortunately, we're not all at the same level. So standards are written to establish minimum competency. It's very, very easy to continue to do what you're already doing, which is good engineering."

To help meet the standards, Rockwell Automation has the broadest breadth of safety products in the world, according to Tim Robeck, marketing manager, safety systems, for Rockwell's Control & Visualization Business. He was on the Automation Fair exhibit floor, showing off Rockwell's new safety camera technology—easier to use and set up than typical safety curtains, which are prone to misalignment, he said.

Robeck and Miller also discussed Rockwell Automation's next generation of Guardmaster safety relays. The universal relays can monitor a broad range of safety devices in a variety of applications, with six relays able to replace dozens of specialty relays in a typical manufacturing environment, Robeck said. "They provide reduced wiring time, less panel space, less cost and less training."

Besides its products, Rockwell Automation offers safety expertise and training. Miller, for example, is one of only a handful of TÜV-certified safety experts in the world, and has recently trained about 45 new safety engineers. "A lot of our customers don't have the manpower, and safety is still a challenge," Robeck said. "People with safety systems in place are reluctant to change or optimize their systems," he added, because they are afraid they won't understand the new system.

"It's increasingly more difficult, and they're looking to companies like Rockwell Automation that have in-house capabilities," Miller said, "We teach them how to fish."

Increasingly, organizations are becoming aware of the need for safety in automation. "Sometimes it's driven by tragedy," Miller said, "But often it's just an increased safety awareness." ■