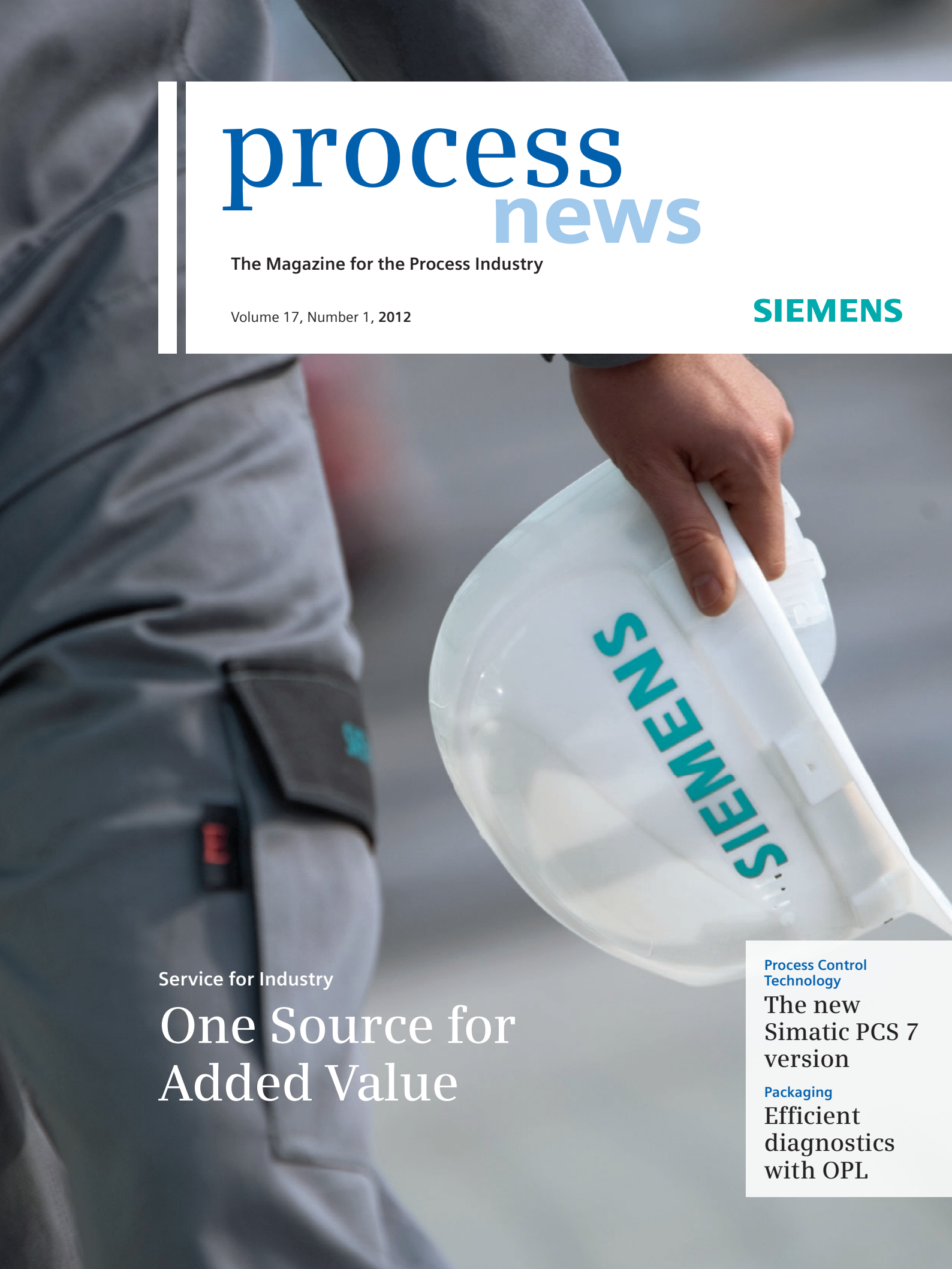


process news

The Magazine for the Process Industry

Volume 17, Number 1, **2012**

SIEMENS

Service for Industry

One Source for Added Value

Process Control Technology

The new Simatic PCS 7 version

Packaging

Efficient diagnostics with OPL

Bayer AG

Bayer MaterialScience collaborates with Siemens to optimize the service of its automation systems

Page 4

Coca-Cola Beverages Vietnam Limited

After migrating the automation technology to Simatic S7, Coca-Cola Vietnam is in a perfect position to satisfy the growing market demand

Page 24

Pierre Fabre Médicament

Higher efficiency, improved ease of use for operators: Pierre Fabre Médicament benefits from Simatic technology

Page 32

"Availability and profitability are key."

Norbert Volk
Industry Sales Director
Central Region
Siemens AG Germany

Good service is a crucial aspect of ensuring the availability and productivity of any process plant – I am certain that any expert would clearly support this statement, and plant operators have always been very diligent about servicing their plants and systems and utilizing the expertise of partners and suppliers for this purpose. To document this fact, we can look at the numerous service contracts that we have with our customers in the Central sales region in Germany, which is one of the country's major process industry hubs. So it is really high time to take a closer look at service for industry, which we do in this issue of *process news*.

What we see is that many companies need to reassess their service activities. The speed of innovation in technology areas such as process control systems has picked up drastically in recent years, and new technologies lead to new aspects that need to be considered in maintaining components such as automation systems. Together with our customers and partners, we actively work on all these issues and improve our systems with a clear focus on serviceability.

You will find some examples of these projects in this issue. I hope that we can provide some valuable insights and that you enjoy the read!

Yours,

■ Lifecycle services

“Aligning Expectations and Requirements”

Many companies are reassessing their service models for control systems – and there are many reasons for this, says Ward Beullens, head of System Technology at Bayer MaterialScience (BMS) in Leverkusen, Germany. We spoke with him and Klaas Kölln, who works on Beullens’s team and whose responsibilities include lifecycle services and enhanced service models, about the background and first results of the service partnership between BMS and Siemens.

Bayer MaterialScience is a world-leading producer of polymers and high-tech plastics, including polyurethanes, polycarbonates, and materials for coatings and adhesives. The company has production facilities at 30 locations around the world

Mr. Beullens, Bayer MaterialScience has a great deal of in-house expertise in control systems maintenance. However, you decided to work with an external partner. Why?

Ward Beullens: Control systems are quite complex and involve many issues. You have to cover not just the system hardware and software, but have a firm grip on all the related aspects. As a company, you have to ask yourself whether you really want to rely on your own resources for this.

So modern control systems are too complex for industry?

Ward Beullens: In some areas, that could be true. For example, the process industry insisted on having open systems – and now we are confronted with precisely the challenges associated with such architectures. We need to keep the systems both secure and serviceable. I think many people may have underestimated this task at first. And there is also a clear trend of manufacturing companies focusing on their core competencies. There are fewer and fewer in-house specialists who are completely familiar with these systems.

Klaas Kölln: You have to keep in mind that the innovation cycles for process technology are relatively short, particularly for software. Computer technology and PC-based systems are not part of the core competencies of a chemical company and require real specialists – and the more specialized the expertise, the more rarely it is required in day-to-day work. This means that we need to keep infrequently needed knowledge current with a relatively large amount of effort and expense for training and continuing education. Even with the large plant network we have here at BMS, that doesn't always make sense. Service partners whose core expertise lies precisely in this area are able to work more efficiently.

Ward Beullens: For that matter, these questions tend to have even greater impact on small companies and operations. From a rational economic perspective, you have to conclude that it doesn't make sense to keep such specialized expertise in-house.

And that's why you made a lifecycle service agreement with Siemens?

Klaas Kölln: The decision wasn't that simple. But you need to keep in mind that we have 30 Siemens control systems in use at our sites. This represents a substantial investment – the systems can't just be replaced when something breaks down. At the same time, we recognize the fact that Siemens offers comprehensive service – and we want to have our concerns about the serviceability of the control system taken into account already during the manufacturer's development process. So the decision to collaborate with Siemens seemed obvious in the end.

Ward Beullens: System development is particularly important to us. Maintenance aspects have to be integrated into product development. As a company, we do have a certain size and influence, so to some extent we also see it as our responsibility to create a greater awareness of service aspects within Siemens through our partnership.

Ward Beullens, Electrical Engineer

Ward Beullens has been working at Bayer since 1988, initially in operations management in the area of process automation. After eight years he moved to system technology, where his responsibilities included leading the systems group in Rio de Janeiro, Brazil, and working on major investment projects in China. Since 2008, he headed the System Technology at Bayer MaterialScience (BMS) in Leverkusen, Germany.

Klaas Kölln: Service is not something minor that you just take care of as you go along. Both parties need to commit to this type of collaboration. You have long contract periods and need to work together well during the full term. And when push comes to shove, you just need someone who can quickly and reliably find and eliminate the cause of the problem and fix it. In some cases, you have to involve someone from development.

And how exactly do you collaborate?

Klaas Kölln: First of all, we have a general framework agreement that defines the various service packages with prices and services. Based on this framework, the contracts for each plant are negotiated individually. The contract term extends over several years. Once a year, we also have a joint status meeting where we take a look at what measures are pending in the planning period and how we can implement them. The prior year is also evaluated in order to monitor the contract in a way that is transparent for both sides.

Doesn't this long contract term entail a certain risk?

Ward Beullens: First and foremost, the long contract term provides stability – we have a reliable, predictable cost situation that we can account for more easily in our operating costs calculations. For me, as head of System Technology, this means above all that it is easier to support production. Service becomes an inherent part of the plant lifecycle. Of course, ultimately we want to save money as well. In order to share risks, we want to transfer a larger part of the service responsibility to the system supplier, and get the supplier involved in the entire service chain, from system design and installation to configuration and maintenance. We operate large, continuous processes, and the control system just has to be up and running. For that we need clear workflows for service processes – spare parts, responsibilities, contacts – so that in the worst-case scenario, everything will run smoothly. The service contract is also a good basis for this clear workflow.

Klaas Kölln, Physicist

Following his studies, Klaas Kölln initially began his career in 2005 at Bayer MaterialScience (BMS) in project execution for process control technology in projects in Dormagen, Germany, and Shanghai, China. Since 2009, he has been working in Ward Beullens's group. In addition to project work, he has focused primarily on lifecycle services and enhanced service models.

And does this approach work in practice?

Klaas Kölln: In 2009, we initiated a pilot project. This project was very successful, allowing us to now further roll out the service partnership with Siemens. We could feel that we had a true spirit of collaboration right from the start, even though not everything worked out perfectly immediately, which is to be expected in a pilot project. After all, the people on the teams need a certain amount of time to commit and get used to the new form of collaboration. And on the operating level, there are of course a few improvements that still need to be made in order to ensure that a control system specialist is always on staff in the service department, for example. That's a knowledge building and organizational process not just for Siemens. We also learned a great deal during this project and had to rethink several aspects – about the need to have clear areas of responsibility, for example, which can be crucial. And we see that with a contract like this, the relationship at the service interface is more reliable and stable.

And how will things proceed after the pilot project?

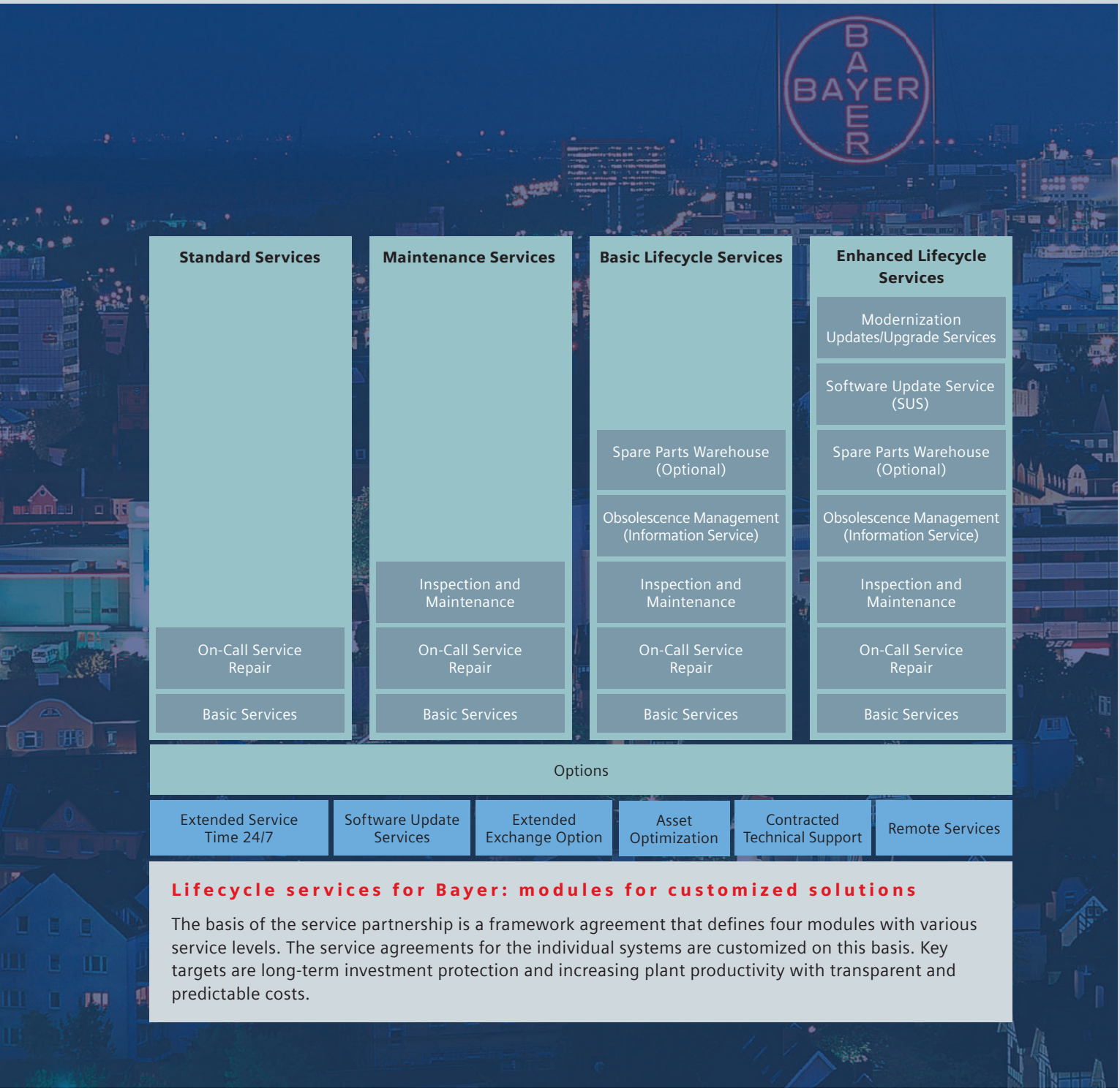
Ward Beullens: A service contract for another plant has already been concluded, and we are now evaluating further plants step by step. We are initially focusing on large operations. At the same time, we are also discussing advanced models, particularly because products and applications for control systems are closely interrelated. That's why it's an interesting approach to outsource service in the area of engineering and system support, including aspects such as user and rights management, industrial security, diagnostics, and modifications in engineering. The control system supplier is a logical partner for this – because who knows the system better than the supplier? In Europe concepts like this are quite new, but in the United States they are much more evolved, as the market there has always been more service driven.

Klaas Kölln: Lifecycle service, as we currently define it, is largely reactive – it includes service for the products that Siemens supplies and later maintains for us. But we need to ask whether we need to keep doing things this way.

Speaking of operator models: Are you worried about losing critical knowledge and becoming too dependent on a partner?

Klaas Kölln: We clearly will not outsource all service activities. We'll continue to provide in-house support for our own plants and systems – after all, we need to be able to assess suppliers and systems. However, even today we need the support of system suppliers when a certain level of in-depth expertise is required. And there are many systems integrators for Simatic PCS 7, so we always have several possible partners.

Ward Beullens: We will keep our freedom of choice. One option would be to have Siemens approve a system that a system integrator implemented and then include the plant in the lifecycle contract with Siemens.



Lifecycle services for Bayer: modules for customized solutions

The basis of the service partnership is a framework agreement that defines four modules with various service levels. The service agreements for the individual systems are customized on this basis. Key targets are long-term investment protection and increasing plant productivity with transparent and predictable costs.

It sounds like the coming years will see some interesting projects.

Klaas Kölln: Certainly. I am quite excited to see how the collaboration will work out on a large technical scale. We need to take the project from the pilot stage and turn it into a daily routine that both sides enjoy. It's also important for the contract to be well defined. And the people on the front lines need to work with each other as partners on a team, talk frequently, and align their expectations and requirements. The calls for a close partnership, because a contract like this requires a spirit of trust.

Ward Beullens: That's the point – following not only the letter of the agreement, but the spirit of the contract as well. That applies to both sides.

Mr. Beullens and Mr. Kölln, thank you for speaking with us. ■

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■ Service for industry

Looking at the Big Picture

Industry customers increasingly ask for customer- and sector-specific service offerings, whether maintenance management, plant monitoring, or supplying spare parts, says Dirk Hoke, CEO of the new Customer Services Division, which combines the worldwide service activities of the Siemens Industry Sector.

Since October 1, 2011, the Customer Services Division is responsible for worldwide service for the Industry Sector. Why did Siemens concentrate these activities into one unit?
Dirk Hoke: The pressure on industry is growing. Competition is increasingly focusing on price, and climate and environmental protection requirements are becoming stricter. Innovations in plant technology alone are no longer enough. Our customers need intelligent service with added value that is specifically geared to their industry and needs. That's why we concentrated all our service activities and competencies so that we can now offer service for industry from a single source.

Why is service so important – and what would you mark as key aspects of service?
Dirk Hoke: Good service makes an important contribution to optimizing lifecycle costs of machines and systems, to increasing their efficiency, and to better utilizing energy. Through integrated planning, implementation, operation, maintenance, and modernization, technological innovations can be more quickly implemented. Key aspects are predictive and preventive service and service speed, as downtime can quickly cost our customers millions. But modern service also depends on building comprehensive expertise from existing product, industry, and market knowledge, and converting this expertise into improved service offerings. That's exactly what we made a priority. Our service employees have comprehensive industry expertise and work worldwide to provide support to customers. As part of a worldwide network of experts, we work together with our customers to develop a tailored service package that also includes complete service execution if desired.

What does that mean for customers in the process industry in particular?
Dirk Hoke: We support customers in the process industry with services covering all aspects of commissioning and maintenance, and in the optimization of their machines and plants. Since we deal with very complex and critical processes in this industry, service has to ensure maximum plant safety, as plant failures and faults may have grave consequences. Our service package thus also includes risk assessment or verification of safety-critical systems as well as modernization solutions. That's how we help prevent process-related faults – in dosing for food production, for example.

Have you already implemented such strategies?
Dirk Hoke: Certainly. At Rosen Eiskrem GmbH in Nuremberg, Germany, for example, we modernized the existing process control system and replaced the control system of the ice cream mixing plant. This improved both process and quality control. The mod-

Dirk Hoke

Dirk Hoke holds a degree in mechanical engineering. He began his career at Siemens in the rail electrification business. He served as CEO of Siemens Morocco and the Siemens Cluster Africa, which includes more than 50 countries. Since October 1, 2011, he has been CEO of the Siemens Customer Services Division, which combines all service activities of the Siemens Industry Sector.

Photos: Tilmann Weishart

ernization also reduced the amount of manual work and the production costs as well. Another example is an energy consulting service we provided to increase plant efficiency. At the Belgian fruit juice manufacturer Tropicana, we performed an energy audit to optimize energy use, improve the control system of the conveyor belts, and adjust the construction plans of the planned plant expansion. And the Tropicana employees were also given recommendations for operating the production plant in the manner that made the most sense from an economic and ecological standpoint. Over a period of four years, the energy efficiency of the plant increased each year by 5.5 percent.

How important is partnership in the Customer Services Division?

Dirk Hoke: Very important. What distinguishes us and makes us into real partners is our ability to look at the big picture, which allows us to optimize the entire value chain of our customers. Through the new form of collaboration within the Industry Sector, we can further expand our service expertise and thus offer services to our customers from a single source. ■

Customer services

Siemens supports its customers throughout the entire product lifecycle with a comprehensive services portfolio:

- Consulting and engineering services
- Spare parts management and commissioning
- Comprehensive technical training offerings
- Technical support
- Online support
- Retrofit and repair services
- Dedicated services for increasing energy efficiency and environmental performance, as well as for plant monitoring and management

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■ Project execution

Full-Scope Project Services

Excellence in project execution requires not only certain skills but also a comprehensive set of processes and workflows that help ensure and document the project results. The AGC project in Klin, Russia, is a perfect example of how Siemens manages large-scale international projects.

Project management excellence is one of the key factors in fast, efficient project execution. Consequently, Siemens has established a detailed set of guidelines and processes to support Siemens project teams all over the world and to ensure project execution quality. This PM@Siemens process methodology comprises project phases, process steps, milestones, and quality gates. Established in 2001, PM@Siemens has become a global tool for Siemens in achieving project execution excellence through the utilization of best practices and global skills. PM@Siemens covers the entire project lifecycle, from sales to final acceptance and on to lifecycle services for operating systems. The methodology focuses on maintaining and building personnel skills and specifies a sequence of process steps with defined inputs and outputs, working content, and the requirements for reaching and passing project milestones. Over the last 10 years, many customers have benefitted greatly from PM@Siemens, especially in international projects.

Excellence in glass projects: AGC Glass Europe in Russia

AGC Glass Europe, the leader in flat glass for construction, automotive, and solar applications, has a glass production facility in the city of Klin, near Moscow. In 2007, AGC decided to build a second production line, with the world's largest glass production capacity of 1,000 tons a day, to serve the growing demand for construction glass, both float glass and processed glass (coated and decorative glass).

To achieve more energy-efficient production with high quality, AGC looked for a strong partner to deliver a complete electrical and automation solution. Besides the design and engineering of a complete solution, the challenge was to manage the various interfaces between the packages in an international project environment under a tight schedule. Key success factors included single-point responsibility, definition of common project standards, reduction of engineering effort and risks on the customer side, and use of a single supplier for all systems in order to minimize bids and reduce procurement costs.

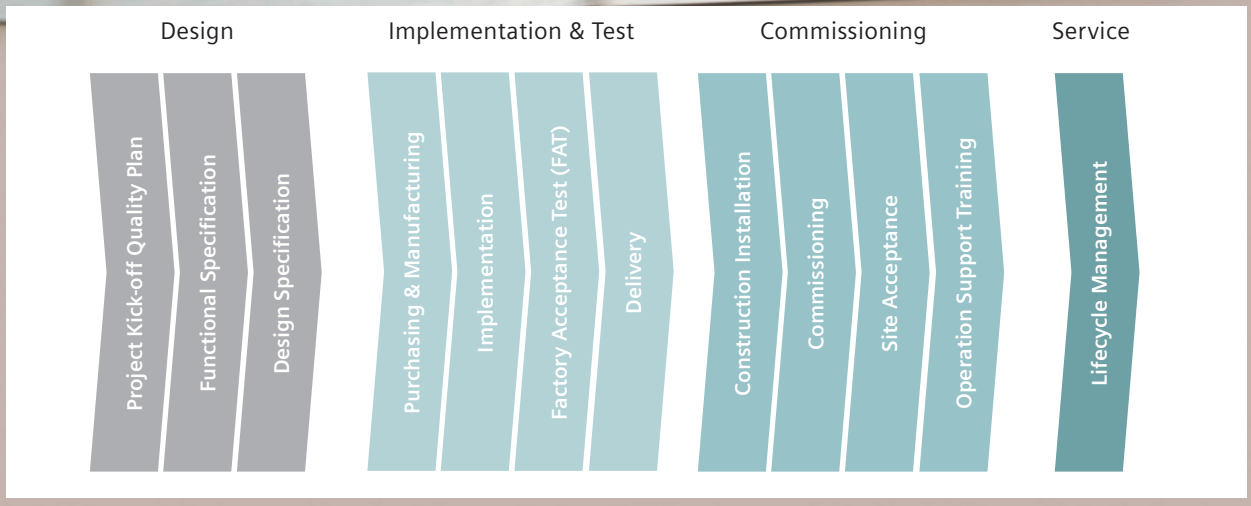
To fulfill these requirements, Siemens set up an international project team that was experienced in the glass industry. The team included experienced subvendors and construction contractors familiar with the codes and standards in Russia. The scope included medium-voltage (10 kV) and low-voltage (400 V) distribution with transformers; an uninterruptable power supply with backup diesel generators; motor control centers and variable-speed drives; a Simatic PCS 7 process control system; pressure, temperature, and flow instrumentation; process utilities automation systems based on Simatic S7 and Simatic WinCC; complete cabling; an intercom and camera system; and a comprehensive service package comprising project management, procurement, engineering, documentation, installation, construction, and commissioning.

Multiregional, multidisciplinary expertise

The core engineering, procurement, and project management team stayed at Siemens' Belgian office in Huisingen, near the AGC engineering department in Moustier, to guarantee fast and easy information exchange. The project team included engineers familiar with the electrical and automation requirements of the glass industry as well as a project management office with a quality manager, project assistants, a commercial manager, and an internationally experienced project manager from the Siemens Glass Competence Center in Karlsruhe, Germany.

Siemens also involved certified engineering partners for local installation, construction, and commissioning. All partners had to follow the design guidelines, meet the engineering and documentation standards, and fulfill the product performance guarantees defined by the core team to ensure project quality. Project meetings – at least every four weeks and on request – between core members of AGC and

Foto: D. Oberreis



To ensure the same execution quality everywhere and at all times, Siemens has defined PM@Siemens, a common project execution methodology comprising project phases, process steps, milestones, and quality gates. Each process step specifies the necessary input and output data and describes the working content and requirements to meet the milestones

Siemens kept all parties informed about the project status and resolved issues at an early stage to prevent any impact on the delivery schedule.

One of the keys to success was the project execution and delivery rules set up in a joint project quality plan (PQP). The PQP covered the entire hardware and engineering scope of supply, project organization, project milestones, engineering and documentation standards, and procurement and construction procedures as well as site management to ensure occupational health and safety, factory and site acceptance tests, and communication and approval procedures between Siemens and AGC. For example, document numbers generated by the project management office had to be used by all project members, including subvendors, to ensure complete traceability of all project communication.

As Russia has special standards for electrical equipment, all components and systems had to include a GOST certificate in their shipping documentation.

Although Siemens components and systems are already certified, some third-party equipment required involvement by certification institutes. Siemens gathered all the certificates of the many components before shipment to the site.

For the working documentation, installation of the equipment and cable trays, cable laying, and commissioning of the components, Siemens used a local construction company and supervised its activities to guarantee correct implementation. Siemens delivered and installed all the components in only 12 months. The plant started production in May 2010 at full capacity and to the full satisfaction of the customer. ■

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D. Obertreis

■ Industrial IT security

Securing Systems, Creating Awareness

The security of automation systems in the process industry has recently been making headlines – and not always positive ones. Accordingly, industrial IT security has caught the attention of system users. How great is the danger, and what is the best protection strategy? The first article in our series on industrial IT security gives an outline of the required measures for an effective IT security concept.

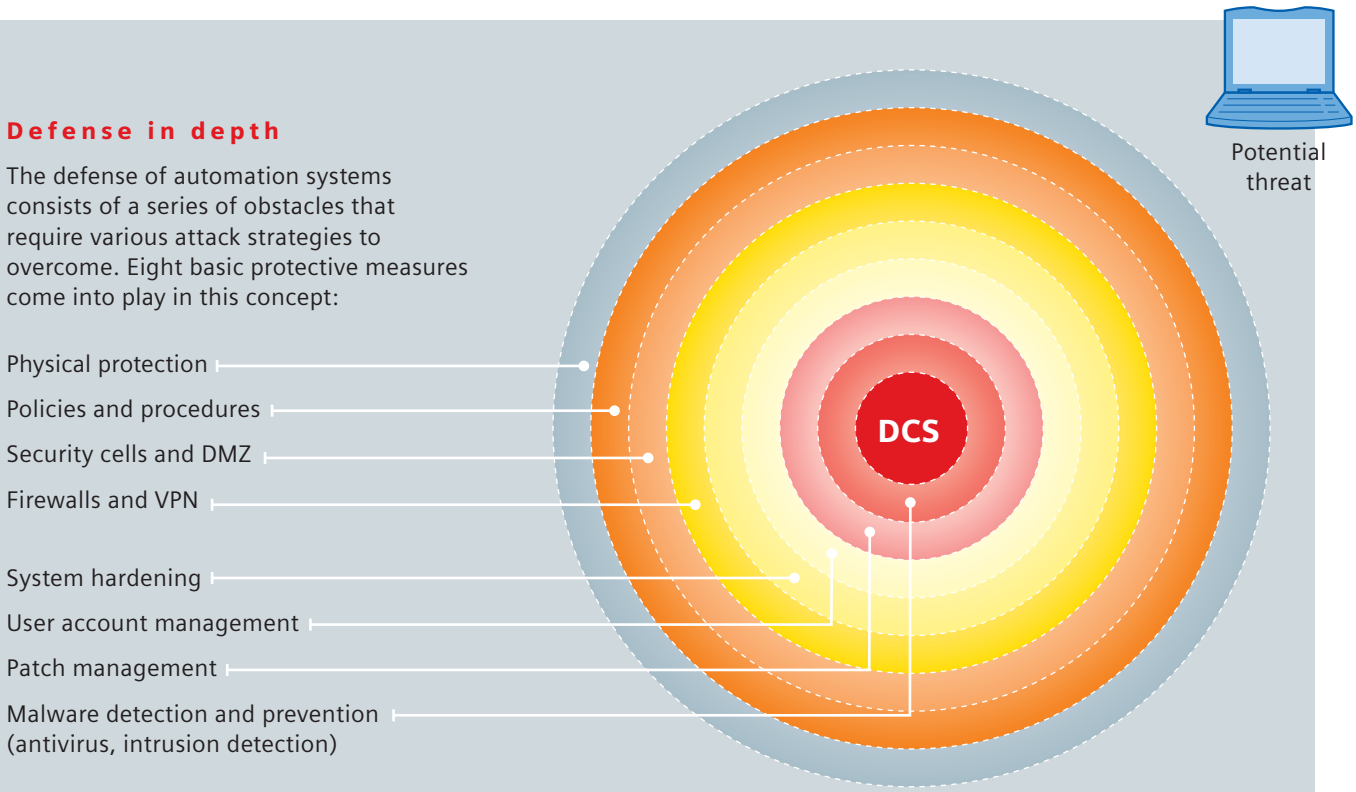
The security of automation systems was an important issue even before the recent spectacular hacking attacks. Manufacturers and users have always been aware of the risks that come with the increasing networking and openness of technology. However, the issue is often forgotten in day-to-day business. IT security comprises more measures than just setting up a firewall. Equally important are user awareness and a deep and wide security concept to defend against different methods of attack and threat scenarios.

Defense in depth

The model for this approach is the "defense in depth" concept, which is actually a military term. In the world of IT, defense in depth refers to a security strategy comprising several measures that set up a series of obstacles to attackers and that can be hacked only with a great amount of time and intellectual effort. These range from consistent access protection and targeted management processes to strict password management. And, naturally, they include all known technical measures that contribute to protecting a system from the outside and inside, for example, from human error and unauthorized access. The first line of defense has more to do with physical protection than with industrial IT security. How is access to the plant monitored, and is there access control? Are server rooms locked? Are network connections secured? Who must and who may have access to the systems? These basic questions should be part of every security concept. Equally important are clear guidelines and instructions for employees so that risks in the daily handling of the systems, such as introducing Trojans into systems via USB sticks, are eliminated.

Defense in depth

The defense of automation systems consists of a series of obstacles that require various attack strategies to overcome. Eight basic protective measures come into play in this concept:



The next two security layers are part of the basic automation system architecture. Its central feature is segmentation into isolated security cells that maintain their functionality even when communication with other network areas temporarily fails. In addition, all communication with the outside world must take place via a DMZ (perimeter network) preventing direct access to the system. The protection of the cells is monitored by firewalls. Communication between the individual cells should take place via secure connections by means of virtual private network (VPN) tunnels.

Hardened systems and continuous updating

Since every interface, at least theoretically, constitutes a possible point of attack, system designers should always ask which ports and drives are really necessary. System hardening removes all unnecessary software components and deactivates all unused ports, drives, and interfaces to eliminate possible points of attack and close potentially dangerous channels of communication. Strict user account management additionally ensures that every user is granted only the rights that he or she really needs to do his or her job. And, of course, the passwords must be secure and the accounts up to date. User accounts must therefore be checked regularly. Security patches and system updates must also be copied regularly.

The tightest security net is a host intrusion detection system. This either detects malware by blacklisting or allows only communication with approved programs (whitelisting).

Services for more security

To support users of Simatic automation systems in their choice and implementation of suitable security measures, Siemens offers extensive consulting and services in addition to the actual security solution. These services range from the evaluation of plant security and the design of appropriate solutions to system care. The training of process plant staff is also included. In addition to securing the system, those who work with the system must also be aware of their responsibility – because not every attack comes from outside and not every attack is intentional. ■

IT security note

Suitable protective measures (including IT security, e.g., network segmentation) must be taken to ensure secure operation of the plant. Further information on industrial security can be found at www.siemens.com/industrialsecurity.

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■ Process visualization

Easy Handling for Complex Plants

With HMI+, Siemens has developed an operator concept for process plants that transparently visualizes the ongoing processes and actively supports process control.

Four or more monitors, a wide range of devices and software products, and a confusing display of measured values – that's the typical working environment of an operator in the control room of a chemical production plant. Even in automated, high-tech production processes, human operators have an essential role. They are responsible for the entire operative process control and

Achim Zeller / Wacker Chemie AG

sellingpix / Fotolia

HMI+: a system for proactive process control

Siemens offers consulting services for customers to support them in selecting suitable solutions and analyzing control stations and operating concepts, as well as during the concept, design specification, and implementation of the HMI solution.

HMI+ optimizes process control for industrial production processes in many areas:

- Reduced HMI complexity
- Safe operator change
- Guiding attention through a color scheme
- Improved situation awareness
- Predictive process management
- Reproducibility of operation by design
- Safe and efficient operation

make sure that production runs as it should, that product quality is stable even when process conditions are not, and that production availability is as high as possible. At the same time, competitive and cost pressure restraints are omnipresent, demanding not only highly efficient processes and maximum plant availability but also forcing plant operators to streamline their operational structures by centralizing tasks and controlling entire production clusters from one central control room.

BASF is a typical example of an international chemical company facing global competition. Because of the size of its production sites, however, the company has optimum conditions for centralizing process control and therefore optimizing the cost situation – a task for which the "Opal 21" project was launched at the company's sites in Antwerp, Belgium, and Ludwigshafen, Germany. Siemens, a longstanding partner in the field of process automation that was familiar with the existing system environment, was one of the providers recruited to assist with this project.

The Siemens team immediately recognized that this task was typical of many process plants. Due to the higher process information volume and the heterogeneous system environment, the complexity of the operator's working environment has increased in recent years. Operators are increasingly challenged with keeping an eye on process conditions, which can lead to a situation in which corrections to the process are made only when the system detects a critical state and triggers an alarm. Siemens therefore saw the task at BASF as a pilot project and developed a completely new HMI concept that can be applied to many different processes and control tasks.

This concept is based on the rules and recommendations cited in VDI/VDE 3699 "Process Control with Monitors" and other directives; these recommendations are integrated into the HMI+ concept and transferred into the context of user-centered process visualization. The concept combines familiar elements and structures of control units, such as operator interfaces and their operating procedures, the design of control rooms and measuring stations, and organizational measures, in a complete package. It is called Human Machine Interface Plus (HMI+) and offers a number of noteworthy features.

Developed by operators for operators

The new HMI concept was consciously developed from an operator's point of view, taking into consideration the great expertise and wealth of experience that constitute a valuable resource for every company. Innovative technologies based on Simatic PCS 7 support its implementation. The basic HMI+ requirements were largely determined from a task analysis. One of the key features is the consistent and uniform visualization of all processes by process-related overviews. Operators are presented with all the important parameters regardless of the specific device supporting them in their decision making.

HMI+ relies on so-called hybrid displays – a combination of digital and analog displays – that give operators a clear picture of the key process variables. This approach is supported by embedded trends, enabling critical developments to be detected and operators to be alerted in time so that they can intervene promptly and get the plant back into automatic operation in a calm and controlled fashion. This results in proactive plant control, which makes the whole process safer and easier to handle. Downtimes should therefore be virtually eliminated. Controversial but essential are pipework schemes in gray scales. Other static representations, such as equipment layouts, normal operating states, and so on, also use unobtrusive colors. Irregular situations are marked with highly visible colors, for example, for alarms and their priorities, so operators can make corrections in time to avoid responses by protective devices. Process graphics are created as dynamic images of piping and instrumentation (P&I) diagrams. The complexity of process graphics is significantly reduced by specific displays for startup and shutdown, normal mode, load changes, and diagnostics so that operators are supported in their perception of what is needs to be done at any given moment.

System experience

As Siemens sees great potential for its HMI+ concept – in new plants as well as in existing plants and migration projects – the company has expanded the capabilities of the Simatic PCS 7 process control system to make it an integral part of a multifunctional operator workstation through features such as user libraries that are adapted to the HMI+ requirements. In addition to the system solution, close collaboration with the operators on-site is a key element because they are the ones who are familiar with the actual working routines and the actions that have to be taken in certain situations. Siemens has designed a dedicated HMI service concept for this, which ensures that existing operating expertise is not only kept in the operators' heads but also integrated into the operating concept, retaining operational experience in case staff members are transferred or leave the operator team or if plant control is centralized, ensuring that the processes continue to run smoothly. In this way, companies such as BASF can handle their complex processes easily and safely ■

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With its many new functions, Simatic PCS 7 Version 8 contributes to greater performance and efficiency for the entire lifecycle of a plant

Siemens AG

■ Simatic PCS 7 V8

Higher Performance for the Entire Lifecycle

Version 8 of the Simatic PCS 7 process control system offers a number of new functions, underlining once more the advantages of an efficient and future-proof central coordination point that reliably performs the many different tasks required during the entire lifecycle of a modern plant.

The new features range from an improved data exchange and simpler engineering workflow with additional communication, redundancy, and high-availability functions to new controllers and extended software tool functionality. The individual improvements meet important market requirements for powerful, future-proof, and expandable systems.

Integrated engineering

One focus is on the extended system-supported data exchange between the Comos plant engineering software and the PCS 7 engineering system. In addition to the simpler engineering workflow, the user also benefits from higher engineering quality and simpler change documentation. The Advanced Engineering System (AdvES) options package for Simatic PCS 7 Engineering links the tools of basic and detail planning, such as EPlan, ELCAD, and SmartPlant, with those of PCS 7 Engineering (CFC, HW Config, Technological Hierarchy). AdvES processes data for use in the PCS 7 ES. The package recognizes measuring point types after a single assignment and automatically generates the corresponding measuring point instances. Data can be imported into AdvES from measuring point lists and signal lists and transferred to the PCS 7 ES.

Dr. Stefan Bamberger, head of process automation product management at Siemens, explains the advantages: "We have always been promoting integrated engineering as part of the Digital Enterprise. With V8, we have taken another important step in improving the communication between Comos and PCS 7. We have tackled various aspects of mass data engineering – such as symbol tables, hardware configuration, measuring point types – to relieve the load on and speed up the engineering process. With the bidirectional data exchange between PCS 7 and Comos, we also achieve consistent data in the system, which enables low-effort but always still up-to-date plant documentation throughout the entire lifecycle of the plant."

Create reports easily, archive data centrally

In the new version of PCS 7, process data from multiple projects can be archived centrally in real time with the integrated, scalable Process Historian long-term archiving system. To optimize production and asset management, users can now access the archive data and reports quickly. They can create and change reports easily with the standard Microsoft Reporting Services tool. Simatic PCS 7 V8 is available for Windows 7 (64-bit and 32-bit) as well as for Windows XP. Since PCS 7 still supports the existing operating systems, it is possible to upgrade to the latest version without changing the hardware. With Windows 7, users can now also use the latest PC technologies such as multicore processors and benefit from better long-term support, including improvements in system security.

However, the aspect of lifecycle optimization is also pursued in the new Process Historian functionality, as Dr. Bamberger points out: "The success of the Process Historian and Information Server depends very ▶

All photos: Siemens AG

Simatic PCS 7 V8: main new features

- **Integrated engineering:**
  Better data exchange between the Comos plant management software and the PCS 7 engineering tools and an easier engineering workflow, resulting in higher engineering quality and easier documentation of changes
- **Windows 7 support:**
  Ability to use the latest PC technologies in process automation
- **Process Historian and Information Server:**
  Better access to plant data for asset and performance management
- **Extensions in communication, availability, and scalability:**
  More possibilities with Profibus and Profinet communication; high-performance Simatic S7-400H controller with greater I/O quantity framework; setup of highly available, redundant ring structures; and system-redundant connection of I/O devices
- **Efficient software tools:**
  More efficient integration and management of process devices and more efficient application engineering through the use of libraries
- **Integration of automation and switchgear:**
  Integration of medium-voltage switchgear into PCS 7 via Simatic PCS 7 PowerControl

- much on two things: first, on how well the archive system is integrated into the control system so that it can be addressed without expensive additional configuration, and second, on how flexibly the reporting system can be adapted to the specific plant requirements. We have achieved both with the Process Historian. In addition to direct configuration in the PCS 7 ES environment, Microsoft Reporting Services provide access to the whole MS system environment, allowing users to extract the data and prepare them in reports – even in Web-based environments. In addition, the appropriate reporting tools allow creating and adapting individual reports without restraints and without special system knowledge."

In V8, users can use a Process Historian and Information Server that is totally integrated into PCS 7 for reporting on production processes and plant performance. This enables the numerous pieces of information provided by the control system to be included in informative reports for the improvement of processes.

Improved communication, availability, and scalability

PCS 7 has also been improved with regard to Profibus and Profinet communication as well as high availability and redundancy, and improved control systems technology. The new high-availability controllers of the Simatic S7-400H series have a greater I/O quantity framework and an integrated 2-port switch Profinet interface. This enables setting up highly available, redundant ring structures and connecting I/O devices system-redundantly.

Although communication via Profinet has been established in the manufacturing industry for a long

time, until now this was not the case in the process industry. Dr. Bamberger explains: "Profinet has already been used successfully in manufacturing automation for some time and has proven itself a million times over. We are now introducing Profinet – as a consistent further development of Profibus DP – with Simatic PCS 7 for process automation. Why so late? Important functions relevant for the process automation industries, such as redundancy, have only recently been standardized so that we can now meet the basic requirements of our customers uniformly." The extensions of Simatic PCS 7 V8 are completed by a new automation device: AS mEC RTX, which is equipped with central I/O modules and optimized for small applications and use in the OEM environment.

Efficient tools for the process and operating levels

In Version 8, the functionality of the software tools has also been improved. New export/import functions were added to the Simatic PDM process device manager, the tool for the operation, setting, maintenance, and diagnostics of field devices. The user benefits from extended plant documentation, integrated statistics, easier operation, and more convenient device exchange. The PCS 7 TeleControl add-on now enables the setup of hierarchical system configurations, and the Route Control add-on enables graphic offline path search.

The Advanced Process Library (APL) now contains standard components for the integration of motor management, starters such as Simocode, and compact drives such as Sinamics and Micromaster. With APL, Simatic PCS 7 supports users with a standard library that covers all standard applications with its innovative concept, comprehensive functionality, and great flexibility. Dr. Bamberger adds: "We have also set up an Industry Library with V8, which provides mechanisms such as the integration of package units with S7-300 and uniform configuration of local operating panels with WinCC flexible in the look and feel of the APL. By integrating our own library, we are able to respond more flexibly to specific requirements and to implement these features in a prompt and targeted manner."

With two new clients, the operating personnel now also have secure access to the control system via Web technologies. In addition to the thin clients that were already released for Version 7.1, V8 now also contains a full-fledged operating system for process HMI via the Web. The Simatic PCS 7 OS web client can be used as a normal operating station on the LAN and is especially suitable for projects with a distributed structure (e.g., in the field of water and wastewater) or applications with sporadic access to process information.

Energy management up to the medium-voltage level

For the currently hot topic of energy management, V8 also supports the user with a new add-on. Simatic PCS 7 PowerControl integrates medium-voltage switchgear into the Simatic PCS 7 process automation environment. Plant operators therefore now need only one system for controlling process systems and switchgear and can eliminate additional gateways. This reduces costs in daily operation because personnel can be deployed more efficiently and the maintenance costs are lower.

On the whole, the new version contributes to greater performance and efficiency for the entire lifecycle of a control system. The changes are based on questions that Siemens has transferred to the development process from the company's daily collaboration with its process customers, says Dr. Bamberger: "We have focused on central functionalities that distinguish a control system that is geared to the future. PCS 7 has been improved in many details; we have listened very carefully to what our customers want." ■

» We have listened very carefully to what our customers want. «

Dr. Stefan Bamberger,
Head of Process Automation
Product Management, Siemens

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■ Optimized Packaging Line

No More Black Boxes

The integrated Optimized Packaging Line (OPL) standardization concept offers well-grounded diagnosis of status messages and system errors in all parts of a modern filling and packaging line without requiring additional engineering.

A modern packaging line in the food and beverage industry is generally made up of a combination of machines, equipment assembly, and components from various vendors, which are connected together over a network. Until now, the network generally transmitted status messages for the components, but unfortunately they were limited and based on the manufacturer's specifications. Typical messages were "machine off," "out of caps," or "system error." That's precisely the problem: finding out why a machine had stopped meant using the manufacturer's specific tools to get inside the machine – and they're all different. And line integration meant investing a lot of time and money in a custom solution offered by a systems integrator.

Standardization improves availability

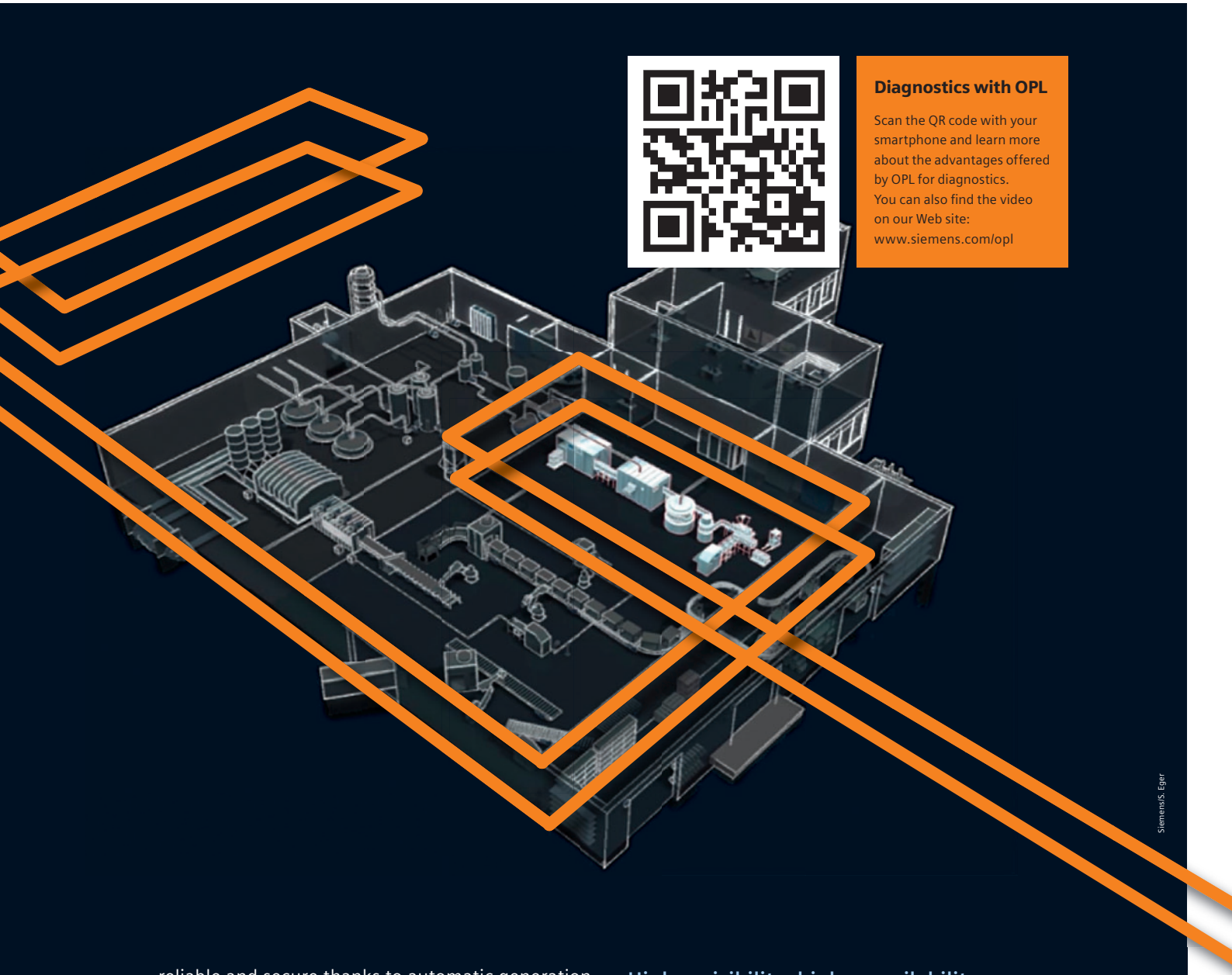
Consequently, such machines used to be black boxes that provided little insight into their process data – and were an obstacle to both quick and targeted troubleshooting and implementing preventive maintenance concepts, which rely on the easy accessibility of diagnostic information. The Optimized Packaging Line (OPL) comprehensive standardization concept provides this data access for line- or plantwide diagnostics by simplifying and standardizing the line architecture. OPL standardizes all technical system components such as networks, controls, and peripheral devices as well as the associated software on the Totally Integrated Automation spectrum of products.

This consistent standardization offers many practical advantages. OPL automatically generates an entire "message package" for multiple languages all at once – such as the 39 messages for system diagnosis of an entire machine topology, which takes two minutes or less. Line integration is particularly

Optimized Packaging Line (OPL)

The comprehensive standardization concept for filling and packaging lines in the food and beverage industry utilizes the proven hardware and software portfolio of Totally Integrated Automation. OPL relies on open architectures based on OMAC (Open Modular Architecture Controls) and the Profinet User Group standard, while reducing the variety of hardware and software components. OPL also includes software components, sample applications, and best-practice solutions that are easy to parameterize for simple engineering of the line, independent of manufacturers. OPL supports efficient line operation through the following:

- Industry-specific solutions for line visualization and diagnostics
- Energy-efficient components and intelligent power management for potential savings of up to 35 percent of the total energy costs of a line
- A future-oriented automation architecture for efficient tracking and tracing or digital engineering



Siemens/S. Eger

Diagnostics with OPL

Scan the QR code with your smartphone and learn more about the advantages offered by OPL for diagnostics.
You can also find the video on our Web site:
www.siemens.com/opl

reliable and secure thanks to automatic generation, which significantly reduces the effort needed for an integration test. Consistent use of standard components that are specified within the framework of OPL also makes it simple to store the actual location of each individual component in the system.

Advanced diagnostic capability also pays off over the entire lifecycle of a plant, thanks to increased availability and lower maintenance costs. If a system error occurs or a status message is sent anywhere in the system, the responsible person can precisely locate the fault and its cause, with no more than a mouse click enabling fast and targeted troubleshooting.

The OPL condition-monitoring concept evaluates status data for all system components continuously and automatically, simplifying the assessment of the current condition of a component. As a result, the maintenance system can alert the plant operator before a motor fails, for example – and the motor can be replaced during planned downtime.

Higher visibility, higher availability

OPL offers in-depth details and precision for diagnostics that until now were costly to achieve. OPL greatly facilitates troubleshooting, speeds up repairs, and supports the smooth acquisition of equipment by the operator. There are no more black boxes in packaging lines, and plant operators can benefit from the full capacity of their equipment, faster and more reliably. ■

IT security note

Suitable protective measures (including IT security, e.g., network segmentation) must be taken to ensure secure operation of the plant. Further information on industrial security can be found at www.siemens.com/industrialsecurity.

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■ Plant asset management

Targeted Maintenance for Greater Productivity

Designing, operating, and maintaining process plants involves huge volumes of data that have to be created, maintained, and updated. The Comos software solution offers holistic data management for the entire plant lifecycle.

The operation of industrial plants is characterized by increasing competitive pressure. For this reason, operators today define two main objectives for the purpose of continuously improving plant productivity. The first objective is to improve overall equipment effectiveness (OEE) by increasing plant availability, optimizing operational sequences, and utilizing forward-looking cost planning. The second objective is to reduce the total cost of ownership (TCO). The quality and costs of maintenance work play a central role in both objectives. To achieve more efficient maintenance, plant operators are increasingly outsourcing tasks and services to specialized and therefore lower-cost providers. Moreover, new maintenance approaches such as total productive maintenance (TPM) are becoming more prevalent. Plant owners choose different concepts depending on the specific requirements of their plants or individual plant areas. These range from reactive maintenance approaches where repairs are made when problems occurs to proactive approaches involving preventive and predictive maintenance.

Implementing such novel concepts, however, requires efficient data and information management, which, in turn, has to be based on comprehensive documentation of every single component in the automation system, complete with all technical data and operating parameters. The information contained in this documentation must always be readily available and up to date.

christian42 - fotolia

Keeping clear track of things: crucial especially in complex process plants

Holistic data management supports efficient maintenance

Growing complexity

But cost-effectiveness is only one of the pressing challenges in the process industry. Since many plants have a considerable impact on the environment and consume large amounts of resources, they have to meet strict requirements for sustainability, emission control, and resource efficiency, and comply with the ever stricter regulations that require that this compliance be monitored, documented, and certified. However, in the future fewer people will be available who have the required level of skills, while at the same time the volume of data that has to be managed and the complexity of industrial plants in operation will increase considerably. Plant owners are therefore already working on optimizing their data and information management through the use of appropriate software applications and managing data complexity.

These developments also imply that it is critical to document all plant components in detail and to record their interactions already during plant design. This results in a large number of documents in various forms that will accompany the plant throughout its lifecycle. Such complete and structured plant documentation must be constantly updated to provide a detailed and accurate representation of the process plant. Unfortunately, this is exactly where requirements and reality start to diverge. For instance, very often plant documentation is paper-based and does not reflect the as-built state of the plant because modifications are documented insufficiently or not at all.

Holistic platform concept

Modern IT solutions such as the Comos software solution enable holistic and consistent data management that supplies the required information quickly and in a comprehensible form for tasks such as scheduling preventive maintenance or in the event of a plant malfunction, providing an immediate answer to the questions of the assigned service and maintenance personnel. The right information or data must be available at the right time in the right place and must also be prepared and used appropriately to support fast, targeted actions that will eliminate the fault efficiently or contribute to efficient preventive repair and maintenance.

Object-oriented solution

Comos is based on an open system architecture that links data sheets, lists, and other documents directly to the corresponding objects. This allows easy navigation between the various document types and the individual objects. All components of the plant are perfectly coordinated, accelerating and simplifying project work considerably. The responsible personnel can access the necessary data quickly as needed, and filter or process it using queries. This provides a quick, clear overview and enables staff to take targeted measures to ensure more productive plant operation. ■

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For on-site maintenance, mobile devices will provide the required information

Comos: efficient data management for increased productivity

Modern production plants supply huge volumes of data and are characterized by extreme complexity. The failure of a single device can cripple the entire production process and even threaten the very existence of the company. Efficient data management with Comos enables plant operators to implement innovative maintenance concepts.

■ Coca-Cola Beverages Vietnam Limited, Vietnam

Upgraded Drink Happiness

Coca-Cola is meeting growing production demand with the recent migration from S5 to S7 controller technology in one of its Vietnam facilities.

Coca-Cola Beverages Vietnam Limited (CCBVL), a business unit of the South African bottler Coca-Cola Sabco since 2004, produces its own vitamin-packed energy drink along with other familiar brands such as Coke, Fanta, Sprite, and Schweppes Soda and Tonic for consumers in the region. CCBVL has production plants in Hanoi, Da Nang, and Ho Chi Minh City with more than 1,200 employees and operates can, glass bottle, and PET production lines with a combined annual output of more than of 18 million cases of soft drink products.

Process capacity challenge

"Since 2009 our growth has been very fast," says Nguyen Thi Ngoc Diem, country supply chain manager at Coca-Cola Vietnam. "In fact, with 35 percent annual sales growth, it has been a struggle for the factories to meet the demand." Diem's role includes responsibility for manufacturing and logistics at all three Coca-Cola facilities in Vietnam. Diem identifies the major issue: "Capacity. Even with a high efficiency level of 70 percent, it is difficult to have sufficient output. And so the challenge for manufacturing is to constantly look for ways to maximize production." In both the Hanoi and Ho Chi Minh City plants there were specific issues with the RGB (returnable glass bottle) lines: the production rate specified by the respective suppliers could not be reached. Another issue cited by Tran Huu Thoi, who is responsible for plant asset management at the Ho Chi Minh City facility, was maintenance of the S5

PLC, the control system supplied along with the mechanical equipment by the RGB line manufacturer. Although innovative at the time, the S5 is now outdated technology. "After this PLC reached its end of life, it became increasingly difficult to source spare parts such as I/O cards. So there were frequent line stoppages whenever we experienced problems related to the control system," Thoi explains.

Updated control solution sought

Recognizing the issue with the aged equipment, Coca-Cola decided to upgrade the control systems on the RGB lines in Hanoi and Ho Chi Minh City. CCBVL eventually opted to go with the advanced technology of the S7 PLC, due to the professional approach observed during the bid stage and the after-sales technical support and service that would be available from Siemens Vietnam. Both Diem and Thoi highlight the smooth migration process, the good collaboration between the teams, and the professional approach on the part of Siemens Vietnam. At the Ho Chi Minh City plant, the implementation involved upgrading the controllers in four areas: bottle washing, beverage filling, the product case conveyor, and product labeling.

Migration rewards

"We have achieved an RGB line production rate increase of 20 percent," says Diem. With S7 enabling synchronization between the various line modules, smoother production flow is the result. And naturally, the newer system has higher reliability, resulting in more predictable production. Out on the plant floor, Thoi is happy to see the end of those days of downtime for unplanned maintenance and the difficulties of dealing with an older control system. A side benefit of the upgrade is that the extracted S5 PLC components are now a ready source of spares for another line in the plant that still uses S5 controllers.

Optimized Packaging Line realization

This modern controls upgrade puts CCBVL in a position to move to the next evolutionary stage: implementation of an Optimized Packaging Line (OPL) concept. This concept integrates an entire packaging line on a common automation and communications standard. Profinet provides the backbone by enabling horizontal linking of the various machine controllers and vertical integration to a SCADA package for supervisory control of the entire packaging line. And OMAC-based standardized software structures reduce the amount of application software required. Machines can be quickly and simply connected to one another, line bottlenecks can be rapidly identified, and there is far less engineering complexity. The result is lower lifecycle costs, less downtime, and improved quality. "In Ho Chi Minh City, we can now produce 28,000 bottles per hour as compared to the previous 24,000, since the new system went live in April 2010. Similarly, in Hanoi, we have been able to go from 30,000 to 35,500 bottles per hour," says Diem. ■

Migration details

- Full hardware and software replacement of two filling and packaging lines
- Variable-frequency drive and sensor replacement
- Future management information system (MIS) and enterprise resource planning (ERP) system connectivity
- Step 7 programming language training
- OPL hardware specification for PLCs, HMIs, and networks

All photos: Coca-Cola Beverages Vietnam Limited

After the migration, operations benefit from improved usability and higher information availability. The Optimized Packaging Line concept integrates the entire packaging line on a common automation and communications standard

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■ St. Marys Cement Group, Canada

Rising above the Dust

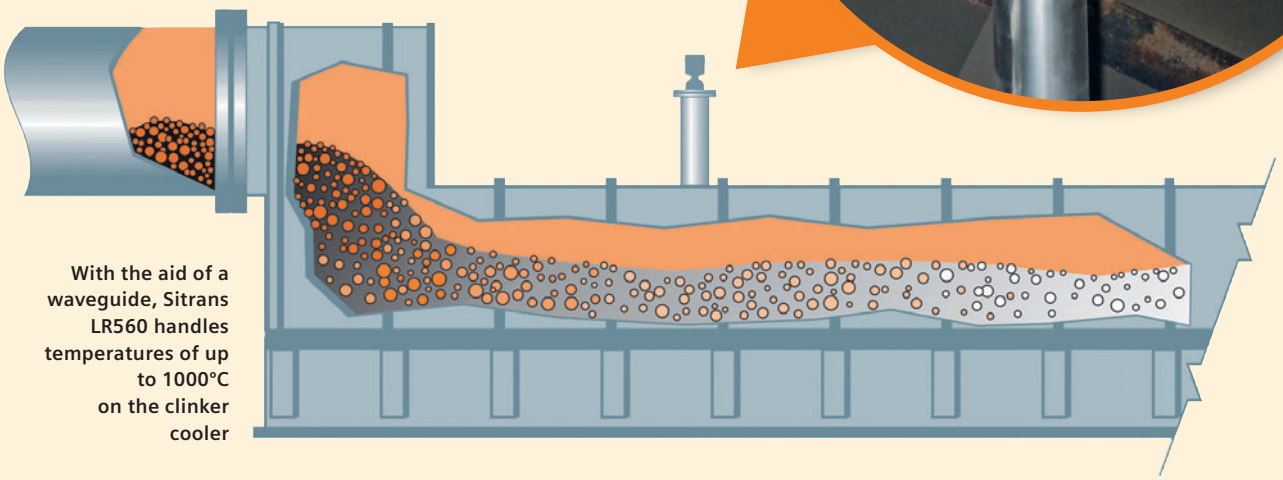
Siemens radar technology easily overcomes level-measurement challenges in a cement plant's hot, dusty environment.

St. Marys Cement Group is a subsidiary of Votorantim Cimentos, a cement manufacturer based in São Paulo, Brazil. Its Bowmanville plant near Toronto, Canada, produces around 1.8 million tons of clinker and 1.2 million tons of portland cement annually. In operation since the late 1960s, it is one of the most modern facilities in North America. In the past, the plant struggled to measure product material levels. A cement production facility can be brutal, with extreme dust, high temperatures, and mechanical wear and tear. Most level-measurement sensors are at the top of silos – some of which are 80 meters tall – so accessing the sensors can be difficult. In the past, maintenance was costly and consisted of cleaning or replacing sensors.

Overcoming the level-measurement challenge

In cement plants, contacting-type transmitters wear out quickly, and cables can break and fall into a vessel, resulting in expensive repairs and production stops. Ultrasonic sensors experience signal loss because of the dust. High temperatures limit the choice of sensors.

In early 2000, Siemens introduced 25 GHz radar technology with electromagnetic waves. Radar is unaffected by dust and temperatures and offers cost-effective technology that is simple to commission and usable everywhere. Today, 25 GHz radar is the standard level-measurement technology for cement producers. However, 78 GHz radar will likely replace 25 GHz technology, as it offers cost savings



With the aid of a waveguide, Sitrans LR560 handles temperatures of up to 1000°C on the clinker cooler

and even better performance. Siemens' 2-wire Sitrans LR560 FMCW (frequency-modulated continuous wave) radar transmitter is the first radar level transmitter operating at 78 GHz frequency. The higher-frequency waves (microwaves) can measure distances up to 100 meters and have a narrower beam.

A sensor to look through the haze

The homogenization silo is the most challenging to measure in the plant. In the spring of 2000 Siemens tested the very first Sitrans LR in North America on this silo. This 80-meter-high continuous flow (CF) silo is continuously filled with multiple air slides, making it extremely dusty: a light source lowered from the top is invisible beyond 5 meters. The CF silo feeds production directly. Monitoring its level is critical because it is used to mix raw material into a homogenous state and requires a minimum level to maintain uniform quality. The silo is constantly aerated, producing a fluidized surface, and is also constantly filled and emptied. Level readings are used to control the cement level, optimize quality, plan production quantities, and schedule shutdowns.

Obtaining reliable measurement was impossible in the past. Turbulence in the vessel broke plumb-bob cables, and ultrasonic sensors could only measure distances of 10 meters. The Sitrans radar technology proved to be the perfect solution, providing continuous, reliable silo measurements. Measuring sand in a silo challenges even 25 GHz radar transmitters, as the mounded sand reflects signals away from the transmitter. Here the 78 GHz LR560 shows its advantages. Its narrow beam does not see obstructions and its short wavelength provides reliable readings even on a steep angle of repose.

Clinker at St. Marys Cement is stored on-site in two silos or is conveyed to two dock silos. Although the clinker is very hot and dusty as it is loaded into the silos, four Sitrans LR radar transmitters reliably monitor the silo levels. Overfilling the clinker silo is a safety concern, and the radar transmitters ensure that this will never occur. The clinker exits the kiln at over 1000°C and must be air-cooled before it moves to the clinker silos. The bed depth of the clinker on its cooler grate affects the facility's production rate and the quality of its product. Bed depth used to be inferred by measuring hydraulic pressure on the grate drive and cooling air pressure. Radar devices now directly measure the clinker bed depth level, providing faster, more accurate readings.

Safer and more cost-effective level monitoring

The Sitrans LR560 has proved its value at St. Marys. Reliable inventory measurement allows efficient production planning. Reliable control of applications allows increased product quality. Maintaining clinker bed levels lowers operating costs and increases safety. Maintenance costs have been reduced or eliminated, and there is no risk of a cable breaking and falling into the process. The Sitrans LR560 is easy to install and commission. The graphical Quick Start Wizard allows operation in minutes, without any fine-tuning. Its reliability and low maintenance requirements increase safety, as daily trips to the top of the silos have been eliminated. ■

» The Sitrans LR560 radar unit has proven very reliable and robust in some of our toughest silo measurement applications. The 2-wire unit reduces installation costs with its smaller, lighter design, while providing valuable real-time silo measurements critical to our production needs. Consequently, we have specced this unit for upcoming projects where silo measurement is required. «

Kevin Hodgins, Electrical Supervisor, St. Marys Cement

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All photos: Holcim

The Chekka cement works supplies cement to both local markets and the Middle East region

■ Holcim, Lebanon

Cementing Relationships

Holcim upgrades the Simatic DCS in one of its Lebanese operations in record time by teaming up with Siemens Solutions Partner Esprocessing.

The most important construction material throughout the developed world is arguably cement. Cement is made essentially by crushing limestone and heating it together with clay and a bit of sand, iron, and ash, and then grinding it to a fine powder. In practice, the cement manufacturing process consists of many simultaneous and continuous operations employing some of the largest mov-

ing machinery used in manufacturing. The control system must be sophisticated and effective to manage these operations in real time, to ensure safe operation of the powerful equipment, and to deliver a high-quality product.

At Chekka in Lebanon, Holcim operates a manufacturing unit supplying cement to both local markets and the Middle East region. The facility is not new, and the operators were experiencing increased downtime due to technical failures. For example, there were problems with data communication with an external mobile plant that relied on the use of cables moving with the equipment. The Holcim management decided to solve these problems by replacing the original communication and control systems with new distributed control system (DCS) equipment.

Upgrading to the latest technology

Holcim appointed the Siemens Solution Partner Esprocessing, headquartered in Paris, to help the company replace its control system, then based on Siemens S5 technology and the Cemat 4.12 process control system, with a new system using the latest version of Cemat, which is based on Simatic PCS 7 Version 7. Esprocessing was selected because of the company's knowledge of Simatic DCSs, its experience in the cement industry, and a track record of successful projects in the Middle East, Africa, and the Indian subcontinent. The objectives set by Holcim were to install a new reliable, fast, and easy-to-use process control system that would minimize plant downtime, increase productivity, optimize energy use, and provide the plant operators with real-time process management data. Holcim required the new system to be installed during a planned kiln maintenance shutdown period of just 12 days.

Migration in two phases

In view of the very short time window available to complete the site upgrade, the team decided to implement the revamping in two phases. In the first phase, the crusher, stacker, and utility processes would be migrated to PCS 7. The remainder of the processes would continue under the existing DCS. In the second phase, the rest of the systems would be upgraded to Cemat and PCS 7. For the two-phase approach to work, the upgraded units operating under PCS 7 needed to communicate and work together via Industrial Ethernet with the units still running the older systems.

The crusher, stacker, and utility processes were migrated by installing two AS/400 automation systems with a Simatic S7-300 controller for unit control, two redundant servers, an engineering station, a single station, and an OS client, all operating under Cemat based on Simatic PCS 7. To minimize downtime and prevent wiring mistakes, new Simatic ET 200M I/O modules were installed using preconfigured card adaptation units to connect to the existing wiring looms.

Bildnachweis

Cemat based on Simatic PCS 7 in Chekka: the benefits

By upgrading the control system, Holcim was able to improve operations in several areas. Key benefits include the following:

- Maximum plant reliability
- Increased productivity
- Reduced power consumption
- Real-time management information

The communication issues with external mobile plants (stacker and reclaimer) were solved by replacing the old drum cable links with two new wireless networks. These link the S7-300 programmable logic controller (PLC) in each plant with the raw mill Simatic PLC. Esprocessing also added a server link from the raw meal conveyer belt analyzer back to PCS 7. This enables real-time regulation of the raw mix dosing system based on analysis of the raw meal output.

Smooth production restart

The Esprocessing engineers worked around the clock, and after just 24 hours the systems were up and running again using the new DCS. The engineers then moved on to the second phase, and within 36 hours the entire system was switched over to the new control system. After the 10 days of planned maintenance, Holcim started warming up the kiln and 30 hours later restarted production without any problems related to the new process control system. ■

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■ Greater Vernon Water, Canada

Keeping Funds Liquid

An integrated solution for automation and instrumentation saves money at a new water treatment plant, contributing to both smooth project implementation and improved operational performance.

Nestled in grassland hills and surrounded by three lakes, Vernon, British Columbia, is a major agricultural area, but it also has an expanding urban sector. Ranked the third best city in BC, this commercial hub and popular tourist area has water needs that are growing right along with the population.

To address these needs, the Greater Vernon Water utility decided to build a new water treatment plant. Completed in June 2006, the plant supplies 40 million liters (11 million gallons) of drinking water per day to 35,000 customers in the Greater Vernon area.

The plant takes water from Kalmalka Lake using four intake pumps. The water is passed through ultraviolet (UV) reactors and further disinfected with sodium hypochlorite. The finished water is discharged into the pressure grid of the city and a 14-million-liter (3.7-million-gallon) reservoir.

Streamlining communication and processes

In designing the plant, engineers strove to be cost-effective and efficient. Using one network for electrical, control, and instrumentation systems was key. Another requirement was to use the least number of suppliers without sacrificing quality, durability, or reliability. The project required level, flow, and pressure instrumentation.

By selecting one network for electrical, control, and instrumentation systems, engineers could focus on project design and long-term reliability. The Profibus network was chosen because only Profibus can handle instrumentation and electrical control on one network; it is proven technology, works well in multivendor applications, and allows all instruments to be configured over the bus.

Cost savings with high quality

Using Simatic and Sitrans systems and Profibus for all level, pressure, and flow instrumentation kept wiring and installation costs low.

Sitrans Probe LU ultrasonic transmitters measure the level of sodium hypochlorite. The Sitrans Probe LU is easy to install and position, and offers a high signal-to-noise ratio and patented Sonic Intelligence signal processing for superior reliability. In this application, it was wired directly into the Profibus network for centralized commissioning and control. A built-in alphanumeric display is visible through the transparent lid for on-site confirmation of measurements.

Sitrans FUS1010 clamp-on ultrasonic flowmeters monitor the inflow rate of raw water into the plant. The flowmeters simply clamp onto the pipe's exterior. The transducers' "zeromatic" function helps the flowmeter perform more reliably with a stable zero point, and automatic adjustments can be performed without stopping the flow. The analog output is converted directly into the Profibus network, providing centralized monitoring and control.

A Sitrans F M MAG 5100W electromagnetic flowmeter with Sitrans F M MAG 6000 electronics measures water flow from the plant to the reservoir. It is accurate to +/-0.25 percent. Sensorprom allows the

A Sitrans F M MAG 5100W electromagnetic flowmeter with a Sitrans F M MAG 6000 transmitter measures the finished water

Photo: Siemens AG

» The Totally Integrated Automation solution is very good for us. It has reduced the project capital costs, increased operational safety and efficiency, and reduced the maintenance and running costs of the plant. «

Cole Tucker, Utilities Technician, The Corporation of the City of Vernon

accuracy of the meter to be verified without removing the meter. The Sitrans F M MAG 6000 can connect not only to industrial networks such as Profibus but also to networks such as Foundation Fieldbus, Modbus, DeviceNet, Canbus, and others.

Sitrans DSIII differential pressure transmitters monitor pump discharge pressure, grid pressure, brine tank levels, and the reservoir level. Sitrans DSIII has advanced diagnostics features and an accuracy of +/-0.075 percent.

Easy to install, easy to use

Choosing Siemens allowed Greater Vernon Water to deal with only one supplier for electrical, instrumentation, control, and Supervisory Control and Data Acquisition (SCADA) systems based on Simatic WinCC, Simatic programmable logic controllers (PLCs), motor control centers (MCCs), and smart drives. This allowed easy implementation of integrated plant operations and centralized control, which kept costs low.

The Profibus devices are also easy to troubleshoot with the Simatic PDM (process device manager) software. They can be adjusted, calibrated, and diagnosed from a central location, which saves time and improves operator safety.

In addition to providing instrumentation, Siemens was the only vendor able to connect the UV system HMI to the central SCADA system in the control room via Industrial Ethernet. This lets operators visualize and control UV operations from the control room instead of going to the UV reactors, saving time and reducing maintenance costs. ■

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The Eludril packaging line in the liquid dosage production unit

Pierre Fabre Médicament

■ Pierre Fabre Médicament, France

Sparkling Clean and Easy to Swallow

Impressed by Siemens' reputation, a French pharmaceutical laboratory chooses Simatic control technology to improve cleanliness, increase production efficiency, and win over hesitant operators.

Pierre Fabre Médicament Production is the second-largest independent pharmaceutical laboratory in France. The company produces a wide variety of medical products in its Gien (Loiret) factory, including tablets, sugarcoated pills, capsules, sachets, solutions and drinkable ampoules, creams, and ointments. The liquid-dosage production unit has a variety of tanks, mixers, pumps, and transfer valves. This equipment is cleaned with a cleaning-in-place (CIP) station that has a fresh purified water tank, a return purified water tank, an acid solution tank, and a sodium solution tank. Two cleaning lines contain disinfectant.

Modernization to safeguard compliance

In 2008, the plant faced a challenge. The control system was getting old. The plant needed a reliable, expandable control system to control the CIP and manufacturing processes and ensure that data pro-

cessing conformed to US Food and Drug Administration (FDA) requirements (21 CFR Part 11). Hakim Bennouna, instrumentation, automation, and process maintenance manager at Pierre Fabre Médicament Production, says he opted for a Simatic-based solution because of the availability, robustness, and stability of Siemens' automated systems.

Seamless control

The new control solution handles both the CIP and manufacturing processes. The CIP station has 7 recipes, and the manufacturing process has 65. These recipes are stored within the operator station and sent to the programmable logic controller (PLC) as needed. Operation begins with a rinse using return water. Several cleaning stages follow, with acid for stripping, sodium to neutralize the acid, disinfectant, and a final rinse with fresh water. Simatic S7-300 controllers open the fluid valves (hot and cold purified water, alcohol), and a Simatic S7-1200 controller powers pumps supplying the sodium and acid.

ing routines. "The real challenge was not only to ensure that operators adhered to the automated system, but also to familiarize them with operating an automated facility," says Bennouna. "A further challenge was commissioning. We had four months to develop the system and only two weeks to put it into service!"

Significant improvements

Operators adapted very quickly, following a four-hour training session. "Soon, certain operators will even be able to change manufacturing or cleaning recipe parameters themselves," says Gil Soustre, who is in charge of liquid-dosage-form production. The automated system makes it easier for operators to become multidisciplinary. An operator in charge of manufacturing might also oversee automatic cleaning processes. In addition, the plant's hardware configuration enables operators to use any mixer or send product through any piping system. Productivity has increased. "The time for routine cleaning

» The challenge was not only to ensure that operators adhered to the automated system, but also to familiarize them with operating an automated facility. «

Hakim Bennouna, SI/SA and Process Maintenance Manager, Pierre Fabre Médicament

The Siemens architecture includes a Simatic PCS 7 Box; a Profinet network for inter-controller communication; a Simatic S7-1212C controller, which controls acid, sodium, and disinfectant; a Simatic S7-300 controller with a 315-2 PN/DP CPU for the cold purified water loop; and a Simatic S7-300 controller with a 317-2 PN/DP CPU for the hot purified water loop, which supplies the fresh-water tank and the premix and mixing tanks. The system is completed with a Simatic S7-300 controller with a 315-2 PN/DP CPU for drawing alcohol. This architecture is complemented by a communication system that ensures correct management of all processes, from CIP to drug production.

Batch processes used to be managed manually via a nonautomated system in Fortran. Today, Simatic Batch within the Simatic PCS 7 Box controls production and CIP and automates recipe use. Operators have experienced a genuine revolution in their work-

used to be 80 minutes. It is now only 60 minutes," says Soustre. "The gain in productivity adds up to four hours per day." Traceability is also improved, thanks to the multiple recordings made of lead times, conductivity, and temperature. Cleaning quality is better than before. After passing through the cleaned equipment, rinse water has 0.3 to 2.80 µSiemens, which corresponds to chemically pure water. This proves all the stripping, detergent, and disinfectant agents have been eliminated. ■

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www.siemens.com/processnews

Graham Bros. Construction, Canada

Less Load During Load-Out

With a new Sitrans LR560 level measurement solution, Graham Bros. Construction now has reliable level measurement over the full range and operation of the asphalt load-out silo, and operators can continuously monitor the asphalt level from the comfort of the control room. ■

Read the full article online:
www.siemens.com/processnews

Operator Training Systems

No Train, No Gain

An operator training system (OTS) is to a plant operator what a flight simulator is to a pilot. It helps establish expertise and best practices among operators, enhancing process understanding and quality compliance, and can play an important role in achieving and maintaining optimum plant operation in the process industries. ■

Read the full article online:
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XinYu Steel, China

Balancing Efficiency

High-accuracy weighing of raw materials with belt scales improves the bottom line of XinYu Steel. Siemens MSI belt scales enable unified management and monitoring of energy and raw material flows and are connected to the network through the whole factory – features that have greatly improved the measurement and management level. ■

Read the full article online:
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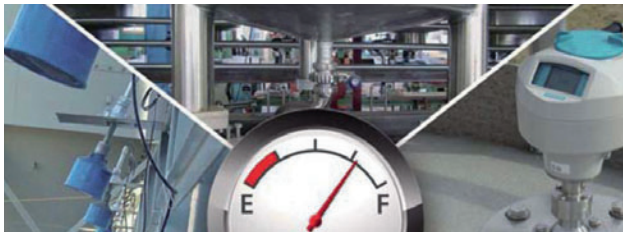

Level Measurement

Variety's the Key

The number of possible applications for level measurement is practically endless. A wide mixture of classic, modern, and sometimes somewhat unusual measurement principles plus application-specific know-how ensures that users can select the best solution for their particular tasks. ■

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info

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events

ACHEMA 2012

Guiding You through Change

ACHEMA is the world forum of the process industry and a trend-setting technology summit for chemical engineering, environmental protection technology, and biotechnology. This year, the industry's most important gathering will be taking place for the 30th time. From June 18 to 22, 2012, experts from leading companies in the process industry will be meeting in Frankfurt, Germany, to discuss innovations in processes and plants.

Currently, the process industry is going through major changes – new raw materials and new markets, but also new requirements, call for a rethinking in many areas. For this reason, the theme of the Siemens booth at ACHEMA will be change, and Siemens will be showcasing its capabilities as a trusted lifecycle management partner in dynamic times.

You will soon be able to find out more about the Siemens ACHEMA highlights on our new Web site.

Get more information online:
www.siemens.com/achema

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