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Digital Enterprise – on the way to Industrie 4.0

Industry is reinventing itself

How companies significantly improve their productivity through digitalization

Smart schedule for labeling

Higher productivity in manufacturing individual labels by using Preactor

Container handling set for growth

Port logistics modernized with Integrated Drive Systems

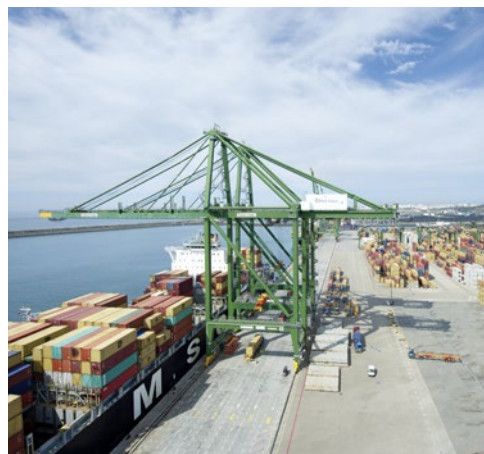
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Editorial

Dear readers,



Siemens AG / E. Walter

Digitalization has become the key growth driver in industry. Significant gains in efficiency can be achieved only if manufacturing companies use software to digitally support and closely align their processes along the entire product and production lifecycle.

The industrial enterprise of the future exists twice – in the real physical world and in the digital world. Physically, it is the provider of the products and services needed worldwide by the market – that is, the customers. Digitally, it is the best possible representation of the real company and its products and processes. Each product and each process in the value chain can result in a continuously improving real physical product and process.

What sounds simple is a Herculean task in practice. First, it is not sufficient to digitalize and optimize all the processes independently of one another and then link them together. Only deep integration with joint data models can create the seamless integration that delivers the greatest productivity benefits and that characterizes a so-called Digital Enterprise. In achieving this integration, it is not only the company's own internal functions that must be taken into account but also the entire supply chain.

Pursuing this goal poses new collaboration challenges for the different product, process, and software development disciplines. We must and will overcome these challenges, as doing so enables us to offer a solution that is entirely new, exciting, and truly unique not only for our customers but also for Siemens: the Digital Enterprise Software Suite. In this issue, we will introduce some aspects of this offer.

Anton S. Huber
Chief Executive Officer of Siemens AG
Digital Factory Division



In the digitalized factory of the future,
real and virtual production merge into
one overall process

Digitalization in manufacturing

Industry is reinventing itself

More affordable products, smaller batch sizes, shorter development times, more innovative features – these are the requirements with which customers confront manufacturers of industrial products and consumer goods around the globe. What still sounded like an almost impossible task just ten years ago is increasingly becoming feasible: the digitalization of industry is catapulting manufacturing enterprises to a significantly higher level of productivity.

More than a century ago, Henry Ford started an industrial revolution. In 1913, the car manufacturer started up his first assembly lines, thus creating the basis for today's mass production. Since then, thanks to cutting-edge automation technologies, engineers and scientists have perfected the principle so completely that millions or even billions of products can be manufactured at low prices and with consistently high quality.

However, both customers' expectations and technical capabilities have increased – and so have the demands on manufacturers: Today, customers can tell the manufacturer directly via the Internet what exactly they want to buy and when. The companies have to respond to this change – with substantially shorter times to market, significantly greater flexibility, and individualized mass production.

These lofty goals cannot be achieved through further optimization of factory automation alone. Rather, an integrated approach is needed that addresses the entire value chain and includes the complex network of suppliers. Manufacturing companies have now reached the point where they have to automate their entire workflow in order to remain competitive in the long term.



With the assembly line production of his Model T, Henry Ford revolutionized industrial manufacturing. The digitalization of industry will result in a similar productivity boost

Data islands turn into continents

Many companies and research facilities have realized this and are working furiously on new technologies for the production facilities of the future. This approach to production relies above all on the digitalization of all processes. It opens up completely new possibilities for companies to develop and manufacture products and solutions quickly and efficiently, thus creating a crucial competitive advantage.

Currently, most digital information in industry is spread out in data silos over various systems, like islands in the sea: information on the product design is managed in design engineering programs; the manufacturing execution system (MES) controls production, the efficiency of which is determined by automation systems; and enterprise resource planning (ERP) solutions know all about the commercial aspects of the business.

In the digital factory of the future, these data islands will merge into one continent – horizontally over the product lifecycle, from design to service, and vertically from the factory (shopfloor) to the management level (top floor). Then everyone involved, from the product designer to the factory and plant planner to the marketing manager and the service technician, will have access to identical data. This also applies when sharing with col-

40%

of the 3-D product data worldwide are already being generated with Siemens PLM Software.

leagues in other locations, when communicating with external specialists and suppliers, and increasingly even when communicating with competitors.

PLM software offers the solution

The basis for this merging of data is solutions for product lifecycle management (PLM) such as the NX software suite from Siemens for product development and manufacturing and Teamcenter, the PLM system used most worldwide. The NX simulation solutions combine, for example, analysis models with interdisciplinary simulation and integrated data management. Plus, Teamcenter stores all data on a product in one central location, thus preventing media discontinuities and inconsistencies.

PLM software and the increasing digitalization of industry allow for increased productivity due to the connection between the real and the virtual worlds. For example, simulations play an ever-greater role during product development because with their help, innumerable variants can be simulated easily and at low cost, and the use of expensive, real prototypes can be largely avoided.

However, simulation technology is also becoming more important for the planning and virtual commissioning of manufacturing plants. With the Siemens Tecnomatix software, for example, companies can simulate entire factories and calculate the future throughput rate of a planned production line already during product development.

The process industry will also benefit from this development. Its plants are especially complex and need to work effectively and reliably for decades. Downtimes lead to significantly higher costs than in the manufacturing industry, which is why it is all the more important that they run perfectly from the start. This is also one of the reasons why up to 80 percent of the subsequent overall costs are defined at the beginning of the plant engineering phase. Here, too, simulations can dramatically lower costs and increase productivity – already at very early stages. Siemens offers numerous software tools for all phases of product development and production processes for the process industry. This includes, for example, the Comos software, which stores all plant information in one central database and, with the Comos Walkinside module, even makes virtual tours through factories that do not yet exist possible.

33 billion objects online

The next big leap regarding digitalization is the Internet of Things. Thanks to falling prices for storage capacity and computing power, increasingly powerful broadband Internet connections, and ubiquitous mobile phone networks, as well as a practically unlimited number of IP addresses, more and more objects will have a digital identity and an Internet connection. The IT consulting firm Gartner estimates that by 2020, about 33 billion objects will be networked in the Internet of Things.

Many of these objects will move through the factories of the future as preproducts or workpieces. Systems known as cyber-physical systems (CPS) are also a central component of the Industrie 4.0 vision. With the Internet of Things, a ubiquitous networking of persons, things, and machines is at the core of the vision of Industrie 4.0. In a virtual marketplace, products, modes of transport, and tools are intended to negotiate among themselves which production elements are best suited to perform the next production step. This way, the virtual world seamlessly connects with the objects of the real world.

For this to work, the CPS must have digital memory that exchanges information with its surroundings during the manufacturing process. "All information



Digitalization will prevail everywhere

Industrie 4.0 and the Internet of Things will substantially increase productivity, efficiency, and transparency, says Bettina Tratz-Ryan, Research Vice President of the IT consulting firm Gartner, in an interview.

What significant new business models will result from the digitalization of industry?

Innovative manufacturing technologies and information technologies will be much more closely networked and be able to exchange data and experiences. The merging of the digital world and the real world will result in new value chains and new partnerships that often go beyond industrial sectors. These new business models will lead to versatile and customer-specific products that can be set up on a platform and customized.

What role does the implementation of the vision of the Internet of Things or Industrie 4.0 play in this process?

The Internet of Things and Industrie 4.0 will be instrumental in guiding this implementation. The Internet of Things will strongly affect factors such as productivity, efficiency, and transparency.

What industry do you expect to experience the biggest changes due to digitalization?

The efficiency growth in industrial production is huge. However, the energy industry, telecommunications companies, and financial services companies, for example, will also benefit from the spread of digital media as well as interactively controlled things and machines.

What are the greatest challenges that industrial enterprises must meet in order for the digital transformation to succeed?

This transformation requires a culture change. Also necessary is a common strategy for business and IT governance – otherwise, every new technology or value chain turns into a disruptive element.

Digitalization is usually about the manufacture of products. Is digitalization less relevant for the process industry?

There are different degrees of vertical integration and added-value models in the process industry, some of which extend to the customer's facility. This results in very specific efficiency models for innovation, preproduction costs, provision of resources, and production itself. However, digitalization will prevail everywhere because without exception, information and real-time analyses result in greater transparency.

Which countries or regions are taking the lead when it comes to the digitalization of industry?

Industrie 4.0 is a phenomenon centered in Germany. Yet innovations in connection with digitalization increasingly come from countries such as the United States, China, Japan, and Israel.

about the product and the necessary processing steps is stored in the memory of the CPS," says Wolfgang Wahlster, head of the German Research Center for Artificial Intelligence (Deutsches Forschungszentrum für Künstliche Intelligenz). "This is why they can tell the machines what the next step in the process is."

Halving cycle times, reducing costs

This dialogue between product and machine will make the manufacturing processes of the future more flexible and resilient. "In the future, the production of customized products will be possible

at the price of mass production – then all variants of a product family can be manufactured on the same line, for example," says Henning Kagermann, president of the National Academy of Science and Engineering (Deutsche Akademie für Technikwissenschaften, Acatech).

The objects networked in the Internet of Things will produce a sought-after commodity themselves in the future: data. Sensors in machines, wind power stations, and cars continuously deliver information about their status and their surroundings. Between 2010 and today, worldwide data volumes have already increased

71%

of the industrial enterprises in Germany consider software to be the innovation driver for their businesses.

sevenfold. By 2020, they are expected to increase again by a factor of four.

To be able to interpret these huge data volumes in a sensible manner, analysts must understand them first. In addition to IT know-how, this requires a sound knowledge of machines and plants as well as of the measuring technology used. This is why

and marine motors, to steel mills and paper mills. Every month, more than 10 terabytes of data are processed through the company's own common remote service platform. This data volume is likely to increase tenfold by 2020. The data from the control systems of thousands of buildings, trains, and production facilities can be used, for example, to derive recommendations for the operators on how to lower energy costs.

The economic potential of Industrie 4.0 is high. For example, the IT industry association Bitkom and the Fraunhofer IAO (Institut für Arbeitswirtschaft und Organisation) estimate that the value added through new technologies could increase by more than €267 billion in Germany by the year 2025. The business consultants Strategy& and PwC forecast that in Germany the automotive industry, mechanical engineering and plant engineering, the process industry, the electrical and electronics industry, and the information and communications industry will generate additional turnover of just under €31 billion per year in the coming years, thanks to Industrie 4.0.

Global competition

The competition to realize the vision of the Internet of Things for the factory of the future is taking place worldwide. No internationally important industrial enterprise can afford to neglect this trend any longer. "The industrial Internet will change the basic concepts of competition. Companies have to let go of focusing on individual products or services and think in a more integral manner," says Pierre Nanterme, CEO of the business consultancy Accenture.

What is considered certain is that it will not be individual companies or nations that will win the contest for the digital technologies of the future of industry. However, it is just as certain that those companies and national economies that deal with and implement the emerging opportunities quickly and thoroughly will benefit the most from digitalization – just like Henry Ford and the automobile industry, which raised the productivity of all industries to a new level with mass production based on the division of labor.



Siemens AG

In the future, identical product and production data will increasingly be available to all involved, thanks to digitalization

in the future it will become ever more important to turn big data into smart data.

The intelligent analysis of the data masses opens up completely new service models. The market for digital services should grow by around 15 percent annually in the future. For example, Siemens is operating remote maintenance centers on several continents that service more than 250,000 plants – from wind turbines and gas turbines, to trains

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Interview with Anton S. Huber on the Digital Enterprise

The CEO of the Siemens Digital Factory Division talks about the virtual representation of product development and production, virtual commissioning, and necessary new ways of collaboration.



Mr. Huber, Siemens sees the industrial enterprise of the future as a Digital Enterprise. What do you understand by this idea?

Because many activities in a company are now supported by software, the task is to seamlessly digitalize the companies' core processes and the overall product development process and to support it with software tools. In the future, no part of this value chain will be able to do without its digital copy. This includes the product concept, the engineering of both product and production, commissioning, and use, as well as new services offered in the context of or on the basis of the product. The main aspect of a Digital Enterprise is that it has seamlessly and digitally mapped and linked the value chain processes.

Is the Digital Enterprise then the digital copy of the company?

The digital representation of the value chain is just one aspect, but an important one. The Digital Enterprise emerges from the connection of the real company with its digital image. The intelligent collaboration of these two worlds, the digital and the physical, leads to the economical advantages that

are absolutely vital to maintain competitiveness and project profitability in global business.

What does Siemens offer its customers for them to swiftly develop their companies into Digital Enterprises?

It is absolutely clear that no company is able to modernize its entire software and IT structure over night. The most important factor is to start from the right point and to develop a long-term migration and innovation program that makes the necessary transformation attractive in terms of cost-effectiveness as well. As a first step, we recommend implementing a shared, company-wide data management platform. This is what we did in our own company too. For this purpose, Siemens offers its Teamcenter software, which is the global market leader when it comes to industrial data management platforms.

Amberg is often given as an example for Industrie 4.0. What does Industrie 4.0 have to do with the Digital Enterprise?

With Digital Enterprise, you can keep track of the entire value-added chain of a company. In the case of Industrie 4.0, this mainly applies to the field of production, focusing on the stand-alone organization of the production process.

As Amberg is a production facility, we take this site as an example to demonstrate the effects of digitalization on exactly this process of a company. The main focus here is on how the data of different processes are linked and not on the application of cyber-physical components and strategies, even if, in practice, we already have been using the "intelligent workpiece" (carrier) for many years.

In the context of its restructuring in 2014, Siemens created, among others, the Digital Factory Division. What does this division include?

In the Digital Factory (DF) Division, Siemens concentrates all the software, hardware, and automation know-how that is needed for a digital factory. Furthermore, it also includes software that is essential for the entire product development process of a company down to the suppliers.

From the market's point of view, DF addresses discrete production and the respective customers. The entire wealth of know-how and assets needed for the process industry were concentrated in Process Industries and Drives (PD), our associate division.





The Maserati Ghibli
on the assembly line

Digitalization in the automotive industry

Pioneers of the digital industry

Virtually no other industry is as advanced as the automotive industry when it comes to the digitalization of production processes. For example, almost all manufacturers worldwide rely on product lifecycle management (PLM) software from Siemens for the development of new models and the planning of new production facilities.

The Neptune statue in the center of Bologna is 3.35 m high and about 450 years old. Outside Italy, it is probably not very well known to many people, but car fans all over the world know the trident of Neptune, the god of the sea, on the fountain in Piazza Nettuno. His implement has graced the logo of the legendary sports car company Maserati since 1926.

But despite dozens of victories in numerous car races, despite many design awards, high brand awareness, and an excellent image, the famous manufacturer of luxury cars occasionally lacked consistency and economic success in the past century.

This has changed fundamentally: between 2013 and 2014 alone, the Maserati turnover of Fiat Chrysler

Automobiles (FCA), the seventh largest car manufacturer in the world, increased by just under 70 percent to 2.8 billion euros.

The new Quattroporte and Ghibli models played a significant role in this growth. The current Ghibli model, which is priced in the upper midrange, was introduced to the market at the end of 2013 and has been a best seller since then. "We sold 36,000 cars all over the world in 2014; about 65 percent of them were Ghiblis," says Mike Biscoe, head of marketing communications at Maserati. "And we keep growing. We are planning to sell a total of 75,000 cars in 2018."

Customized large-scale production

Maserati buyers expect quality, diversity, and individuality from a sports car manufacturing company with a long tradition. Soulless mass production without any variants would harm the brand. This represents an enormous challenge for the car manufacturer. Although Maserati customizes the Ghibli sedan like a craft producer would, the production costs must not exceed those of industrial-scale production to be able to remain competitive in the long term.

Achieving efficient, flexible, customized, cost-effective, and high-quality production – this is the challenge all manufacturers of luxury cars are faced with. On top of that, they need to introduce new models to the market at shorter and shorter intervals and control an ever more complex network of suppliers due to increasingly lean production. These challenges can be overcome only if car manufacturers continuously digitalize all functions throughout all levels of their processes.

This approach involves the use of a "digital twin," which can be generated with the Siemens PLM Software. This twin played a key role during the development of Maserati's Ghibli: with the digital copy, the company was able to generate a virtual copy in parallel to the physical development of the car – 100 percent true to the original, down to the last screw. During the development stage, the data of both the real and the virtual models were used simultaneously to optimize processes. As a result, costs and time for the development stage could be drastically reduced.

Take the wind tunnel, for example, which is used to optimize car bodies in aerodynamic terms – an

80%

of all cars produced worldwide are manufactured using Siemens PLM Software.

essential physical process to this day. Wind tunnel tests are elaborate and expensive, though. Using the digital twin, measured data from only a few real tests can be used for quick and inexpensive virtual further developments. Making constant new, slight adjustments to the digital twin, developers can find new ways to further optimize the form and components of a car.

Acoustics is another example. A special feature of luxury cars is their very own, unmistakable sound – the motor sound in particular. "The sound is extremely important for a car manufacturer such as Maserati, as customers associate the sound with the brand," explains Marco Maggi, Siemens sales manager in Italy. To optimize the sound inside the car, developers placed a dummy equipped with microphones in the prototype, recorded the sounds, and used this data for further virtual tests.

The digital twin can also drastically reduce the cost for test-drives. Within the context of what is referred to as reverse engineering, prototypes or even already produced series vehicles are sent onto the street or test course, and data are collected. This allows test-drives to be repeated as often as needed on the screen under modified conditions,

**Plant automation
increases productivity**



Oliver Tamagnini

and new cars can be optimized virtually. "Siemens software helps us minimize the number of expensive prototypes," says Maserati manager Gian Luca Antinori.

Greater production capacity, more model variety

By now about 90 percent of all car manufacturers worldwide are benefiting from the advantages of the Siemens PLM Software Suite. One example is the Chinese car manufacturer South East (Fujian) Motor (SEM). The company was founded in 1995 as a joint venture of the China Motor Corporation, the Fujian Motor Industry Group, and the Japanese manufacturer Mitsubishi Motors. By 2018, it aims to increase its production capacity from currently around 150,000 vehicles to up to 500,000 cars and vans and extend its range of models. Three new sedans are already available on the market, and two sport-utility vehicles are set to join them in the near future. SEM also wants to develop more fuel-efficient vehicles.

To reach its ambitious goals, SEM relies on the Siemens Teamcenter PLM software. "It provides a complete platform and integrated solution that covers the entire product lifecycle – from product planning and design, to quality management and production management, to downstream services," says SEM manager Li Yongbin.

Digitalization opportunities

The level of international competitiveness of car manufacturers will increasingly depend on the hardware and software they are using. Already today, the control devices, sensors, and software of a premium model represent more than 30% of the total value. Almost all vehicle innovations are already based on software – for instance, adaptive cruise control, automatic emergency call, or driver assistance systems.

In 2016, 8 of 10 new cars will have internet access, the consulting firm Oliver Wyman predicts. According to estimates of the IT consulting firm Gartner, every fifth car will be online in 2020. That would be about 250 million cars worldwide. They produce and receive huge amounts of data and will play a significant role in the development of the Internet of Things.

In 2020, components, software, and services around the cross-linked car will have a volume of 170 billion euros – six times more than today. This shows that digitalization also generates great market opportunities for suppliers.

90%

of the 15 most important car manufacturers worldwide are using Siemens PLM Software.

In addition, Teamcenter can be closely integrated into other software systems – whether enterprise resource planning systems, encryption software, or supply chain management systems. With the help of Siemens PLM Software, SEM was able to drastically minimize its time to market, reduce its development costs by up to 40 percent, and bring the error ratio in the engineering design down to only 1 percent.

Car industry all over the globe counts on PLM

The possible applications of PLM Software by Siemens are extremely versatile. For example, the car manufacturer Daimler also trusts in the software for the global development of cars: Daimler has been integrating the work of more than 20 development centers and its most important suppliers in one single product platform since the summer of 2012.

Nissan is one step ahead already: the Japanese car manufacturer managed to virtually halve the development cycle for its new cars from an average of 20 down to 10.5 months with the PLM Software I-deas, NX and Teamcenter – and all that with 80 percent less problems customers and dealers are reporting after sales have started.

Competitor Toyota Motor Corporation has been increasingly using Teamcenter for more than two years to manage information on car safety and to standardize processes throughout different departments.

"What if?" – this essential question often cannot be answered via tests in real production processes



Customized large-scale production at Maserati

at economically justifiable costs. VW in Wolfsburg receives the answer to questions such as “What happened if we used eight instead of four robots on one particular station” on the computer with the help of the PLM software Tecnomatix.

70,000 possible model variants

Maserati also has already taken the first steps in this direction. One goal of Industrie 4.0 is to meet a wide variety of customer requirements – to the point of cost-effective production with a batch size of one. The Ghibli is currently already available in 27 versions, 13 colors, and 205 configuration options. “This allows for 70,000 individual combinations,” says FCA information & communication technology manager Anna Adilardi.

The Ghibli is manufactured at the production facility in Grugliasco, near Turin. The latest version of the Quattroporte luxury sedan is produced here as well. “The challenge was to integrate two new assembly lines into an existing facility,” explains FCA manufacturing engineering and general assembly project manager Massimo Anfosso, who supervised the installation of the new production lines from the very beginning. To be able to introduce the new models to the market as quickly as possible, the production experts had to start working on the new lines while the new Maserati models were still in the design phase.

Maserati made use of the Siemens Tecnomatix PLM software for this parallel development of car and production facilities. “Our design engineers rapidly went through different modification scenarios of the new models over and over again. Accordingly,

we had to continuously adjust the production facilities,” Anfosso says. “The Tecnomatix tools helped us analyze how the changes to the car design affected production, in order to adapt the facilities and production processes appropriately.”

Automation in production

As at other facilities of the Fiat Chrysler group, the CARs (Control Architecture Standard) automation system is used in Grugliasco. It is based on the Siemens TIA (Totally Integrated Automation) automation solution, including the Simatic IT manufacturing execution system. “The system allows for an integrated dataflow from receipt of the customer order to body shop to paint shop to final assembly,” says Adilardi, who is responsible for information and communication technology at the facility in Grugliasco.

However, the suppliers are also connected to the data stream. Adilardi explains, “Before production starts at Maserati, they receive exact information about which parts are required for the assembly of each and every customized car.” That way, Maserati is able to produce its new Ghibli model in high quantities, with great diversity, and with unsurpassed quality – just like a workshop in the best Italian tradition. ■

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Innovative technology allows individual designs to be printed on napkins

Napkin printing machine with Simotion and TIA Portal

Memories captured on pulp

A cutting, printing, and folding machine manufacturer from Monheim, a German town on the eastern bank of the river Rhine, has for the first time managed to integrate an ink-jet printer into a napkin printing machine. Siemens' integrated automation and drive technology, together with the TIA Portal engineering framework, contributed significantly to this success.

Some moments, like that view of the sea during last summer's holidays or that encounter with the herd of cows in the mountain pasture, are forgotten much too soon. But instead of keeping such snapshots just in a photo album or hanging them on the wall, it is now possible to print them on napkins. Printing quality at a good price/performance ratio, even for small print runs for invitation cards or photo books, for instance, has been a reality in digital printing for quite some time. Until now, however, napkins have been excluded from this progress. The absorbent paper did not seem to be suitable for printing with ink-jet printers.

First-class printing quality

With the world's first digital napkin printing machine for advertising, high-quality custom napkins in small print runs will soon become a reality. The new machine prints napkins according to the customer's specifications over the full area, in photo

quality, and, of course, using food-safe inks. The DigiPlus 430S, a machine designed and developed by SDF in Monheim, rolls, prints, and cuts in only one pass. A Canon Océ ink-jet printer has been integrated into the machine.

The machine conveys the paper, which is coated by spraying on liquid and then dried before the actual printing process, over large rolls. The coating prepares the surface by making it denser and smoother to prevent the ink from running without compromising the napkin's absorptive capacity. After printing, the napkins obtain their characteristic embossing on the margin and are cut, folded, and transferred to a packaging machine in stacks of 10 to 150 pieces.

Complex configuration of the leading axis

"Unlike with flexographic printing machines, a foreign system is integrated into the machine with the printer," explains Günther Kluge, electrical design manager at SDF. "The printer constitutes the leading axis that all the other axes need to follow with angular synchronism and maximum precision. This inevitably introduces disturbance values into the system that must be filtered out in order to maintain the exact same repeating pattern."

The Simotion D445-2 motion control system is the centerpiece of the drive technology. The Simotion functionality is directly integrated into the control unit of the Sinamics S120 drive system. This makes the overall system, consisting of control and drive, con-

siderably more compact and particularly fast reacting. The printer's high speed places extremely high demands on speed synchronization and the angular accuracy of the axis unit. Even minute deviations would result in the images being positioned off the exact center of the napkin or the embossed margin shifting – and either would be noticed immediately. "With this machine, we were able to learn about the new qualities of Simotion and considerably extend our experience with this system," states Kluge.

Integrated automation

Using the Simatic S7-1500 and project planning in TIA Portal were also new for SDF. "TIA Portal and the Simatic S7-1500 became interesting for us when the engineering system for Simotion was integrated with Scout Version 4.4," says Kluge.

A higher-level fail-safe Simatic S7-1500F controller is responsible for the safety functions and processes distributed signals. "The fact that safety functions are integrated into the control system saves time and effort both in wiring and project planning, as the same programming language is used for standard and safety functions," explains Kluge. The display on the CPU was very helpful during commissioning, as it could be used to read out the statuses of all the connected Profinet bus members, specifically, the inputs and outputs of the distributed ET 200SP. A few small switch boxes within the machine are enough for these compact I/O devices. According to Kluge, the Simatic KP8F Key Panels with fail-safe inputs are particularly useful, because all emergency-stop switches are wired

over them. The freely configurable buttons clearly indicate the machine status with five freely selectable colors.

The machine can be controlled and monitored via a high-resolution Simatic TP1500 Comfort Panel. "The control interfaces must be largely self-explanatory," says Kluge. "This reduces personnel expenses and increases competitiveness for our customers." He adds that the storage capacity and the reader integrated into the Simatic Comfort Panel help satisfy these customer requirements.

Integration increases efficiency

Project planning in TIA Portal impressed Kluge, especially the symbolic programming. "If the motor or load change, the limit values can also be changed without us having to rewrite the modules," he says. "Once the standards have been generated, their long-term usability makes us independent from inevitable mechanical changes, thus protecting our investments and, in the end, those of our customers." According to the electrical design manager, the integration of automation and drive technology significantly increases transparency and engineering efficiency. ■

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Siemens AGW Geyer

"TIA Portal and Simatic S7-1500 became interesting for us when Scout was integrated into the engineering framework as well – at exactly the right time, from our point of view."

Günther Kluge, Electrical Design Manager, SDF

Sentron PAC for measuring current and availability

Two birds with one stone

The tool manufacturer Fraisa measures the power consumption of its complex machine tools and uses these data not just once but twice: for increasing energy efficiency and to determine the availability and productivity of the machines. Sentron PAC ampere meters deliver the data, and a Simatic S7-1500 controller collects them.

The Swiss family business Fraisa made a name for itself 80 years ago with the production of milling tools for the clock- and watchmaking industry, thus laying the foundation for the Fraisa Group. Today, 520 employees in six countries manufacture tools for the metalworking industry that are valued for their high precision and efficiency. The Willich factory near Düsseldorf in Germany functions as the company's service center. Here, customer-specific special orders are realized in small batches and tools are reconditioned upon customers' requests. In 24 grinding centers, 33,000 tools are reconditioned per month – six days a week and around the clock, in unmanned operation at night.

Energy efficiency has long been a top priority at Fraisa. Waste heat is used for heating, and the company is preparing to achieve certification in accordance with the EN 5001 energy efficiency standard. Previously, Olaf Bonten, authorized officer and head of production, was able to answer questions about the productivity of his grinding centers only in a relatively vague manner. The reason was that the

many product versions call for frequent adjustments, and employees must interrupt the process again and again to verify and document the small tolerances in the micrometer range.

Identifying optimization potential

"What is new is that we measure the power consumption of our machines not only as a basis for increasing energy efficiency," Bonten says, "but also to determine key performance indicators of our plants." For the implementation of this system, Fraisa commissioned Engels Elektrotechnik, based in Tönisvorst, Germany. The Siemens Solution Partner had already implemented a monitoring system for leaks in oil lines with Simatic S7-1200 at Fraisa. Now, Engels Elektrotechnik was to visualize the power consumption of the individual machines in order to determine how much current was being consumed during the run-up phase, during productive operation, and during the adjustment processes.

"This way we can measure the availability of the CNC tool grinders and the utilization of the entire line, as well as initiate measures to increase the capacity. The visualization system with its database lets us define current limits and evaluate deviations above and below those limits. Productive operation is being simulated during the warm-up phase, which can last up to 30 minutes. During this phase, the machines require only slightly less power than during productive operation. Nevertheless, the warm-up phase is considered to be part of unproductive operation. That is why it is so important for us to be able to set and adjust the limits for the operational states on our own. The ratio of the various operational states to each other supplies us with objective data regarding the availability and productivity of a machine and helps us identify optimization potential," Bonten explains.

engels-elektrotechnik.de

For more than 60 years, **Engels Elektrotechnik GmbH, Tönisvorst, Germany** has been offering individual solutions for industry and process automation – from planning, to the development of hardware and software, to commissioning and service. As a Siemens Solution Partner Automation Drives, the company is able to always customize the perfect solution for its customers.

Solution
Partner

Automation
Drives

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Fast and straightforward implementation

Frank Opteroodt of Engels Elektrotechnik equipped each of the 24 subdistribution boards with a Sentron PAC 3200 ampere meter. A Simatic S7-1500 (CPU 1513) serves as data collector and administrator, and a Simatic IPC427D panel PC provides the visualization. The required SQL database is part of WinCC Professional Runtime. Simatic S7-1500 was chosen because it provides sufficient free capacity for extensions and because it can be used as a Modbus master without additional investments due to its Modbus interface. This last aspect was especially important to Opteroodt: "Building automation almost always plays a role as well when it comes to the collection of energy data. Since Modbus is predominantly being used here, we have consistently relied on Modbus from the start. The current project also showed that it sometimes makes more sense to look not at the power consumption but at a certain phase (e.g., L1). Here, too, Simatic S7-1500 with its integrated Modbus interface has an advantage."

TIA Portal makes all the difference

As a Siemens Solution Partner, Opteroodt has known TIA Portal, the new integrated engineering framework for Simatic Controller and visualization with WinCC, since its market launch. "The option to transfer variables directly from Step 7 into WinCC resulted in significant time savings, given the large number of variables that needed to be connected. We especially appreciate the new Calculate Box function that is integrated into Step 7. We program mainly in FBD. The fact that we can also perform more complex calculations with it without having to switch to a high-level language further increases the engineering efficiency," he explains.

Previously, Opteroodt used WinCC flexible as a visualization system. What he values most in WinCC Professional is the significantly higher number of tags and the option to also process mass data in the SQL database. Opteroodt obviously enjoyed configuring the trends and the traffic light display with large, clearly visible buttons for the different operational states. "I was able to optimally arrange the windows on my 27-inch monitor. The time and calendar functions integrated into WinCC Professional stand out due to their great ease of use and allow for exact evaluations." ■

Olaf Bonten (left)
of Fraisa and Frank
Opteroodt are
pleased with
the result



Fraisa uses Sentron
PAC devices –
a total of 24 – for
measuring the
power consumption



In the Willich
factory, Fraisa
regrinds precision
tools



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All-wheel acoustic dynamometers equipped with Siemens components

Acoustic dynamometers make people listen

For more than 15 years, Akustikzentrum Lenting (AZL) has been a partner to the automotive industry, serving all its acoustic and vibrational testing needs. From the drive technology to the controllers, the new all-wheel acoustic dynamometer is equipped with Siemens components exclusively.



Greater driving comfort – ensured by the ultramodern dynamometer from AZL equipped with Siemens components

For most car buyers – sports car fans aside – a quiet and smooth driving experience is an expected characteristic of a new car.

This inconspicuousness not only translates into greater driving comfort, it also represents quality in manufacture. This requirement poses a challenge for automobile manufacturers. Fortunately, specialized companies such as Akustikzentrum Lenting (AZL) provide the necessary expertise, the technical equipment, and effective processes to detect unwanted noise and vibration and their causes already during the development of new vehicle models.

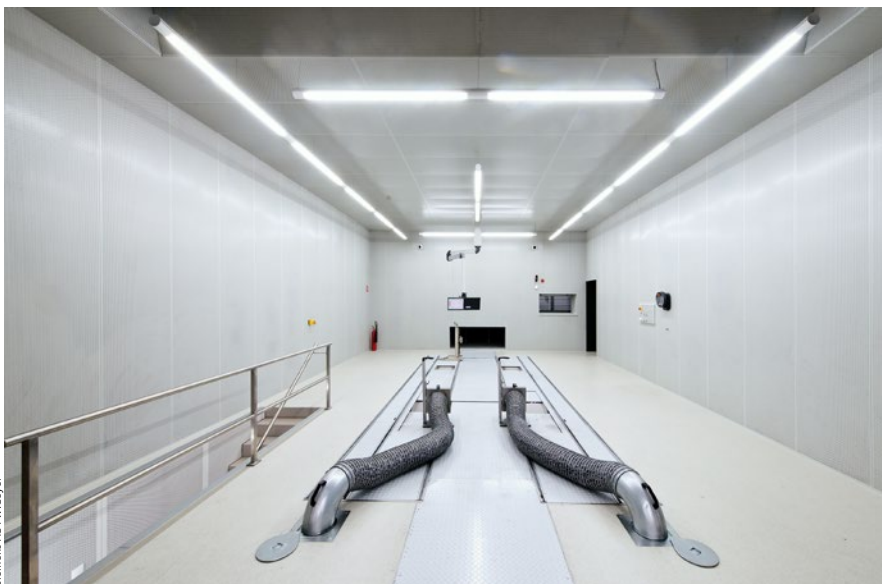
In addition to well-grounded technical consultation and acoustic dynamometer rentals, the comprehensive services offered by AZL include building dynamometers for use at the customer's location. "For equipment manufacturers that want to modernize their dynamometers, space is a particularly

big issue," says AZL managing director Michael Zehner. "With our compact design, we offer them an additional crucial advantage."

Compact test technology for special requirements

AZL recently began using a new, ultramodern dynamometer. One of the most compact all-wheel acoustic dynamometers in the world, it was developed in close cooperation with Siemens. Zehner explains: "We chose Siemens for the automation, the low-voltage switchgear, the drive technology, the user interface, and the controllers because we have had good experiences with the company from the start and because for our customers it is also important to have high-quality products built in, for which there will still be spare parts available even in 10 years, if necessary." The compact design of the new dynamometer was made possible through the four Simotics T-1FW3 water-cooled

The compact dynamometer with torque motors from the Simotics T-1FW3 series, seen from below



The acoustic dynamometer at Akustikzentrum Lenting



torque motors that are mounted directly on the drums as individual direct drives. The four permanent-magnet synchronous motors form one complete system, which, according to Zehner, "is unique and ensures extremely high control quality due to the rigid connection." The control quality is a critical factor, because acoustic tests in the automotive sector are especially demanding in this regard.

For example, the operation of the rollers must be absolutely synchronous. The rollers are equipped with various coverings or small obstacles to simulate different road surface conditions. Just as important is the ability to precisely control the rollers separately, in order to also detect noises and vibrations of the car in curves.

Realistic conditions wanted

The engine starts. A powerful car, midsize luxury class. Automatic transmission. Within seconds, freeway travel speed has been reached. How will

bumps be experienced in the vehicle at 130 kph? And at 190 kph? Zehner and his team are collecting important data and insights in these seconds. "When we attach what is referred to as beater strips to the rollers to simulate bumps, they have to touch the left and the right wheel at precisely the same time," Zehner explains. "Otherwise, the effect is not reproducible and sounds different each time." The important thing here is that the Sinamics drives adjust the roller movement to the nearest millimeter – even at high speeds.

The heart of the control technology is a drive-based Simotion D435-2 DP/PN with an integrated control unit that communicates with the power unit of the Sinamics S120 via the Drive-Cliq drive bus. The regenerative multi-axis topology of the Sinamics S120 allows the direct drives to exchange energy already in the intermediate circuit. This means that the total connected load can be dimensioned lower than when using separate frequency converters. If needed, the highly dynamic control unit of the



Test situation inside the vehicle to be tested, with a Simatic Mobile Panel

Siemens AG / W. Geyer

Sinamics converter switches between motor operation and generator operation with absolutely no shock or delay. Because of the motion control technology and control functions integrated directly into the drive, the overall system reacts especially quickly. Simotion controls the four axes and the various operation modes. The auxiliary equipment and the safety program run via the ET 200S distributed I/O system.

The communication of the individual modules takes place via Profinet with the Profisafe profile for fail-safe activation of the integrated safety function of the multi-axis converter. The dynamometer is operated from the control room via a Simatic IPC427C microbox PC. Of course, the test-driver can also influence the dynamometer, because many functions and parameters can be controlled directly from inside the vehicle via the 277F IWLAN Simatic Mobile Panel. And the panel has an emergency stop button for maximum safety.

The unique dynamometer goes into production

The prototype of the all-wheel acoustic dynamometer from AZL has been successfully and reliably proving its worth in vehicle development from the first day. An installation of almost exactly the same design has been delivered to a customer in the automotive industry, and the unique drive and automation concept of the dynamometer has found further buyers as well. Thanks to the modular structure of the dynamometer projects, Zehner and his team at AZL are able to meet very differing customer requirements. ■

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Port logistics modernized with Integrated Drive Systems

Container handling set for growth

The port of Sines in Portugal is the most important port on the Atlantic coast of the Iberian Peninsula. The port operator, PSA Sines, has invested correspondingly in the development of the port's infrastructure. With Integrated Drive Systems, freight transport is more efficient and consumes less energy.

Due to their convenient geo-strategic locations, Portuguese ports are the gates to Europe and the world. Such is the case of the deepwater port of Sines, which dedicates an area of more than 2,000 ha to industry and logistics, has a container handling capacity of approximately 1 million TEUs (twenty-foot equivalent units, or standard containers), and thus is the largest port for

general freight and containers on the Iberian Peninsula. Container shipments are booming in Sines: its growth rate of 32 percent last year was the second-largest in Europe, exceeded only by Gdansk.

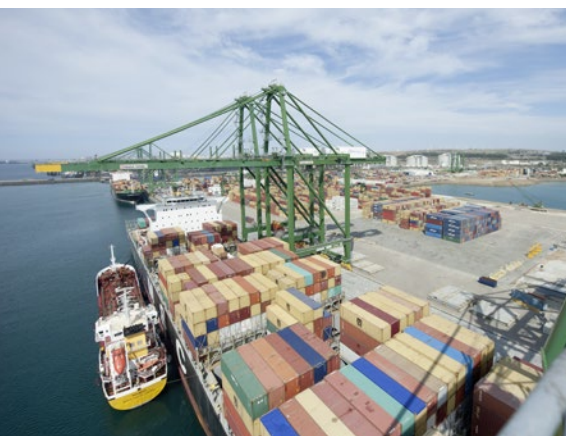
Gradual modernization with IDS

Port operator PSA Sines commissioned Siemens to modernize the automation, drive, and monitoring technology as well as the management systems of the current ship-to-shore (STS) cranes at Terminal XXI. The modernization is being carried out in several stages of expansion. In the first stage, the container cranes STS 1 and STS 2 were equipped with rugged AC motors, Masterdrive converters, and Simatic S7-400 controllers with the Simocrane CMS monitoring software. During the second stage, PSA purchased three new cranes equipped with Integrated Drive Systems (IDS), which combine Simotics motors, Sinamics S120 converters, and fail-safe Simatic S7-300F PLC. Simocrane monitors and controls

these cranes as well. In the third stage, which will be completed in 2015, three more cranes have been equipped with IDS, and the Simocrane system has been supplemented with further technology modules. The systems prevent the cranes from swaying, position the containers in semiautomatic mode, and perform remote monitoring.

Energy-saving and efficient

The customer required the modernization to result in safer and more efficient cargo handling with lower energy consumption. In order to achieve this, the project team tailored many of the parameters of the automation and drive technology as well as the monitoring systems to the customer's specific needs. Thus, motors and converters were configured in such a way that they can perform at full power when used together without overloading the individual components. By using regenerative Sinamics S120 converters, PSA Sines has also been able to reduce its carbon dioxide (CO₂) emis-



An essential feature for the port of Sines is the high growth rate of container shipments

Photo: Focal



Piano Focal

Ports are an important factor in the economic growth of Portugal

sions – by a total of 6,211,800 kg, or 10,353,000 kWh, since implementation of the improvements. The company estimates that with the three new cranes that are currently under construction, a yearly amount of 1,242,360 kg of CO₂, or 2,070,600 kWh, will be saved.

Short response times

What PSA Sines also greatly appreciates about the project is the excellent service provided by Siemens, because if there are any problems, a technician can be on-site quickly. The maintenance agreement includes preventive inspections at regular intervals as well as all necessary repair work on the Siemens systems in the STS and the rubber-tired gantry cranes. ■

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Retrofit for Integrated Drive Systems

Upgrade at the Dead Sea

When we refer to Integrated Drive Systems, we are not only talking about the hardware, with perfect interaction among the drive components and their integration into the automation environment; we are also referring to the broad range of services offered for the entire product lifecycle of a plant. Services for Integrated Drive Systems offer perfectly matched services for all drivetrain components, while integrated services such as permanent condition monitoring, planned maintenance measures, and optimized spare parts management increase the plant availability.

Retrofit for Integrated Drive Systems offers another way to increase the availability and energy efficiency of machines and plants. Siemens provides comprehensive retrofit options with the perfect solution for every requirement. Thus, a retrofit that involves duplicating the original motor 1:1 is a good option when drivetrains have been in service for a very long time. In many cases, it is possible to replace the component with a standard product from Siemens' extensive product range. From a technical point of view, upgrading to the latest technology is the ideal solution because migrating to variable modern speed drives, AC motors, and gearless drives sustainably lowers operating costs.

The managers of an Israeli potash conveying plant chose to retrofit

the drive system. The plan was to retrofit both brushless synchronous motors with frequency converters. The project team chose Sinamics S120 because these converters could be easily adapted to the motors that were already in use. Another advantage: the new con-



Mikhail Markovskiy - Fotolia

A modern potash transport system replaces the time-consuming transport by road

verters could be installed, and to some extent tested, during operation. This minimized costly plant standstills and the time-consuming transport of potash by road. Thus, the customer was highly satisfied with the result, not only from the technical but also from the logistical point of view. ■

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New Simotics reluctance motors

Dynamic energy efficiency

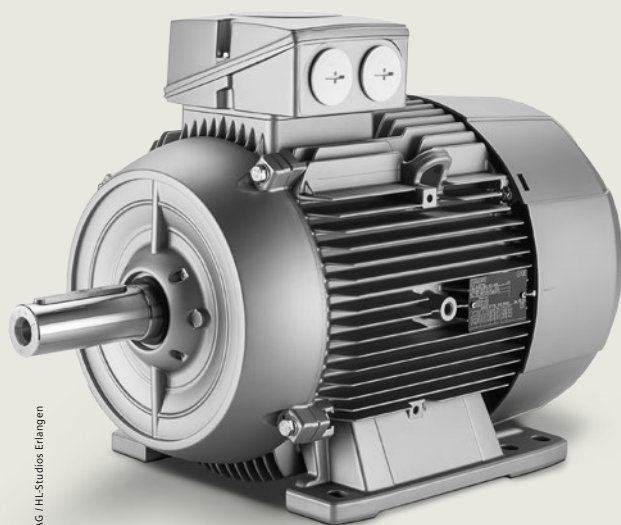
A new “old” drive principle adds momentum to the world of drives. The reluctance motor is experiencing a comeback as an energy-efficient and economical alternative to asynchronous and permanent-magnet synchronous motors. It is a motor in which efficiency and dynamics are no longer mutually exclusive. One convincing example is the new Simotics reluctance motor from Siemens.

The reluctance motor is not really new. It was first introduced in 1923 and then slowly sank into oblivion. There were many reasons for this, for example, the high cost of the special lamination. Since then, however, the problems have been solved and the synchronous reluctance motor is awakening from its deep slumber.

The secret is, among other things, that it needs no expensive or complex materials. The rotor of the reluctance motor has sheets made of iron that are magnetized during operation via the obligatory frequency converter.

The movement principle is similar to that of a permanent-magnet synchronous motor – only without the cost-intensive permanent magnets.

Comparable to the permanent-magnet synchronous motor in terms of performance and efficiency, the Simotics reluctance motor redeveloped by Siemens is far superior to the standard asynchronous motor when it comes to energy efficiency. Because it has the same dimensions as a standard asynchronous motor, it can be installed in many applications in place of an asynchronous motor without the need to change anything on the machine – making for a simple, low-effort switch to greater energy efficiency, because the new Simotics reluctance motor naturally surpasses the energy-efficiency values of a comparable IE4 Super Premium standard asynchronous motor. Due to the special design, the Simotics reluctance motor is particularly energy efficient in the partial load range.



Siemens AG / HL-Studio Erlangen

Simotics reluctance motor

Simotics reluctance motors are mechanically based on the 1LE1 energy-saving motors with a nominal speed of $1,500 \text{ min}^{-1}$. The first models are available for the range between 5.5 kW and 30 kW; the series will be expanded in the future to include the range between 0.55 kW and 200 kW. For the perfect design of the drives, Siemens supplies a number of support tools that save a great deal of time during planning, design, and commissioning.

Pa(i)r excellence

The matching Sinamics G120 inverter enables efficient and easy operation of the entire drive system, comprised of a Simotics reluctance motor and the Sinamics inverter. All the electrical data of the motor are already stored in the control unit of the inverter and are automatically entered into the inverter after the motor code is entered. The necessary manual entries are therefore limited to data such as cable resistance or inertia of the drive system.

Through the use of a Sinamics G120, the new reluctance motor achieves optimal functionality. The reluctance and asynchronous motors are in principle built the same way; however, although the reluctance motor generates higher motor currents than the asynchronous motor due to the somewhat lower power factor, if the motor is optimally controlled with a Sinamics G120 the energy efficiency is greater than in the asynchronous motor. In addition, the combination allows for simplified engineering and operating processes, due to the fact that the new Simotics reluctance motors can be overloaded by up to 20 percent of their nominal load even for longer periods. This offers significant advantages, especially in case of changing motion sequences.

Long service life and simple maintenance

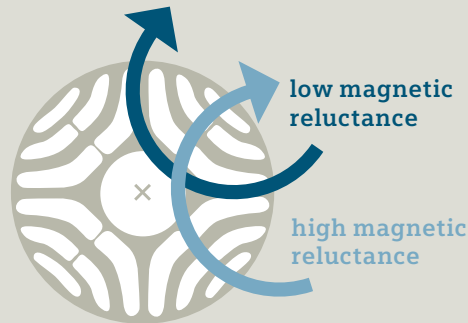
Due to the current flow in the rotor, asynchronous motors become considerably warmer than reluctance motors. The new reluctance motor also has advantages when it comes to service and maintenance: replacing the rotor is just as easy as in asynchronous motors, because unlike in permanent-magnet synchronous motors, the rotor is not continuously magnetized. It is therefore very easy to separate the rotor and the stator.

Conclusion: With their special advantages, Simotics reluctance motors are perfectly suited for lifecycle-cost-optimized applications. In intermittent operation, the advantages of short run-up times due to the low moment of inertia are especially clear. Thanks to their high efficiency level in conjunction with an optimal control system, it is possible to realize additional energy savings. ■

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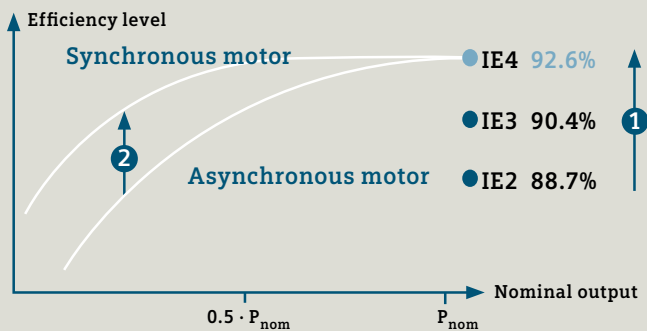
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Operating principle of the reluctance motor



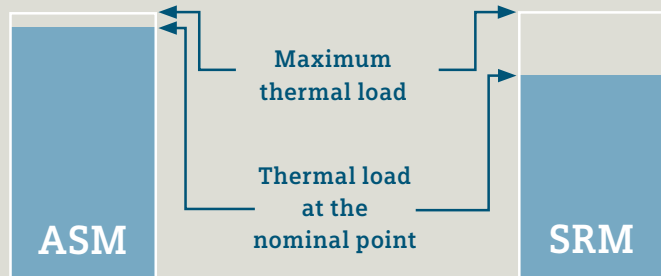
Reluctance motors operate according to the principle of magnetic reluctance, the magnetic equivalent to electrical resistance. The rotor consisting of air and iron has the least possible magnetic reluctance in one direction and the highest possible reluctance in the direction perpendicular to that. Because the system always moves toward the lowest magnetic reluctance, rotational movement results.

Technical advantages – energy efficiency



- 1 Realization of energy-efficiency classes higher than IE3 requires great effort for standard asynchronous motors.
- 2 Synchronous motors (permanent-magnet or reluctance) have a higher efficiency level in the partial load range than standard asynchronous motors.

Technical advantages – increase in performance



Large reserves with synchronous reluctance motors

- Permanent overload is possible, as the motors are not running at full thermal capacity at the nominal point.
- Technical background: compared to the asynchronous motor (ASM), the losses in the synchronous reluctance motor (SRM) are shifted to the stator, where they can be dissipated more easily. There are inherently almost no losses in the rotor.

Lab coater for high-precision printing

Coating specialist

It is impossible to imagine everyday life in the future without printed data storage, whether as intelligent labels on foodstuffs, pharmaceuticals, and many other consumables; in the logistics sector; or even for application on textiles. Thinfilm Electronics ASA is a market leader in the expansive field of printed data storage. Kroenert GmbH, an expert manufacturer of coating and laminating machinery based in Hamburg, Germany, developed a customized coating station for the Norwegian company for the production of printed data storage. For this application, Kroenert's LabCo lab coater has been specially adapted to the customer's needs.

Printed data storage for a wide variety of applications usually has a storage capacity of 20 bits. To produce the base material, a polymer carrier film is coated multiple times in a register. Because utmost precision, both mechanical and electronic, is required in this process, the LabCo has been equipped with various additional modules in collaboration with Siemens Solution Partner Lebbing engineering & consulting GmbH. For example, the register control was integrated into the motion control system with the TRC3000 Simotion register control technology module. An intelligent wedge mark sensor now measures the registers of the printed web with a three-channel light sensor and

lebbing.com

Lebbing engineering & consulting GmbH, with headquarters in Bocholt, Germany, has been a certified Siemens Solution Partner since 2003. In addition to its core competencies in drive and automation technologies, the team has extensive experience in the application of converting technologies. Motion control systems based on mechatronic drive designs improve the machines' performance while at the same time reducing engineering costs.

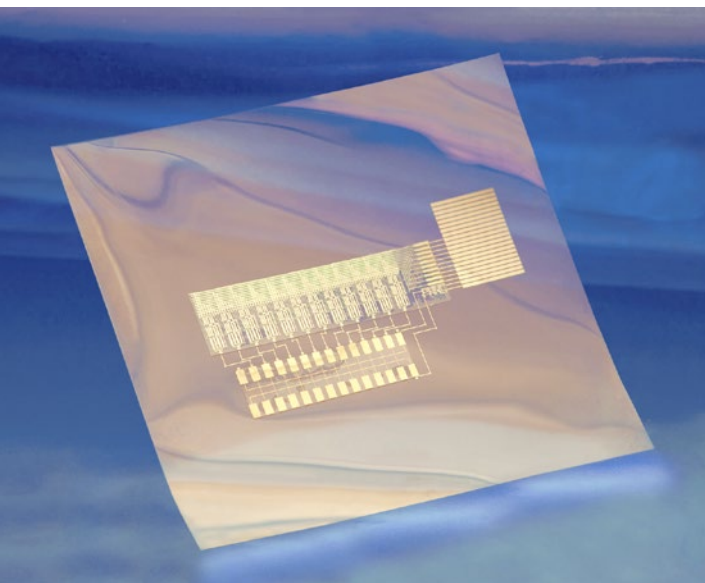
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transfers the values directly to the control system via Profinet IO IRT, which guarantees accuracy of under 50 µm along the longitudinal register. A Simatic IPC 277D panel, used for visualization, records and archives all the register values in real time in Siemens WinCC flexible through add-ons.

"We achieve the necessary mechanical precision by using low-backlash gears and direct drives and a specially adjusted edge control system," explains Guido Lebbing, managing director of Lebbing GmbH. The guide rolls have a very smooth surface and are precisely aligned, ensuring stable web tension and a perfect web run. Frank Schäfer, clean technologies sales manager at Kroenert, adds, "Systems like this allow us to use our expert knowledge and industry know-how to tailor the machine exactly to our customer's needs."



Printed array with addressable, nonvolatile storage and transistor logic

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The fast-rotating screw conveyors in food processors are a source of danger for operating personnel



Siemens AG

**Sirius safety relays
in food processors**

Dangerous screw

Whether they be meat products, dairy products, or confectioneries, the Microcut machine from Stephan Machinery swallows them all and finely cuts them to a pulp. This poses quite a danger to the operator, who feeds the machine manually. For the fast-rotating screw conveyors to really cut only what they actually should, the machine must switch off quickly in dangerous situations. The machine manufacturer from Hameln, Germany, opted for Sirius 3SK1 safety relays. With their narrow width of 22.5 mm, these modules can be integrated into compact switch cabinets directly on the machine. In addition, the advanced version of the basic device can be extended by up to five additional input and output extension modules via device connectors. The devices are certified for international use in accordance with IEC 62061 to SIL 3 and ISO 13849-1 to PL e.

Another advantage of the 3SK1 is that it can be set for both mechanical and electronic sensors; for this reason, there are four DIP switches on the front panel of the device that can be used to easily parameterize the devices. Thanks to the cascading input on the 3SK1, Stephan Machinery saves itself an additional device. Usually, the emergency-stop button and the transponder read head of Microcut machines are used to monitor the cutting tool opening and lead to the Sirius 3SK1 basic module by way of two channels. If there is an additional

folding grate on the filling hopper, it is monitored by a second transponder read head, which can now be monitored on the cascading input of the Sirius 3SK1.

"There are many special requests for our standard machines, which we respond to with individual design variations," states Stefan Zirpel, who is responsible for electronic engineering in the automation department of Stephan Machinery. The project manager also experiences significantly easier commissioning with the online configurator. After a few parameters have been entered, the tool selects the suitable devices plus accessories and summarizes everything in one detailed order list.

By using the Sirius 3SK1 safety relays in its Microcut machines, the manufacturer has ushered in a new era. "We are saving space and reducing costs, as we require fewer devices, and, above all, we can configure systems much more flexibly thanks to the modular expandability," Zirpel concludes. ■

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Energy data management at a plant for medical products

Well charged – with reduced energy consumption

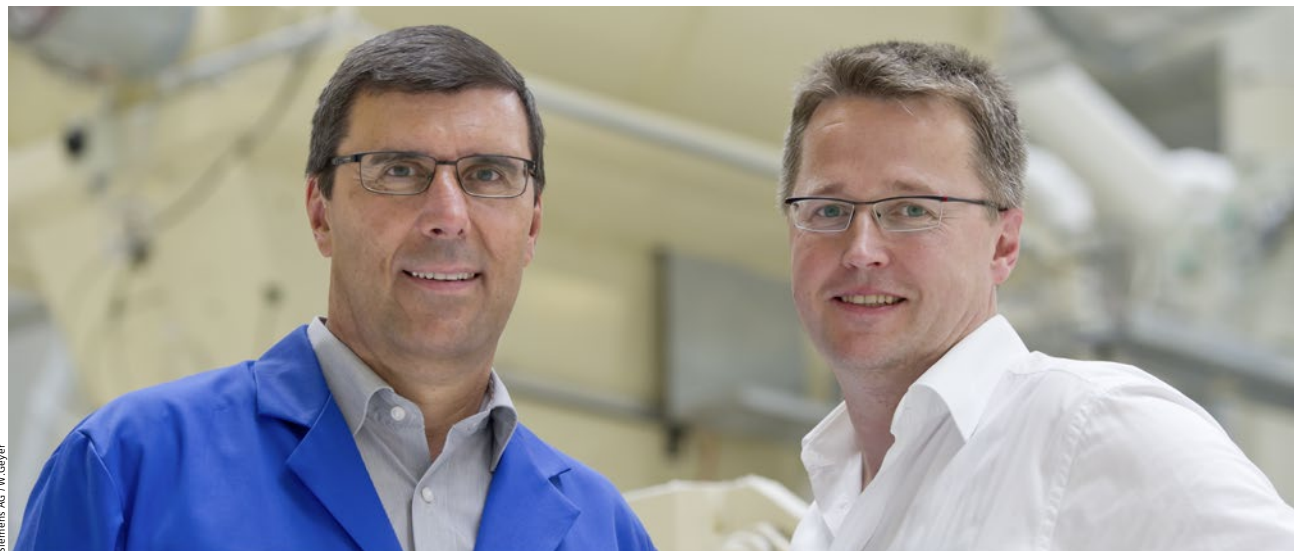
By installing an energy data management system, the HARTMANN GRUPPE has discovered substantial savings potential on the production line. Just by varying the charging times of the forklifts, the company was able to reduce the peak load at the charging stations and in the recycling area by 10 percent.

Whether following a scraped knee or broken bone or as a high-blood-pressure patient, most of us have had contact with the products with the blue oval label at some point in our lives. The product portfolio of the HARTMANN GRUPPE, a leading European supplier of medical and hygiene products, includes everything from wound dressings to customized and operation-specific surgery sets. Absorbent incontinence products are the business segment generating the largest sales volumes. These products are developed and produced at the technological competence center in Herbrechtingen, Germany, located not far from Hartmann's headquarters in Heidenheim an der Brenz. The company decided to implement an innovative energy data management system here – and has already been able to reduce the previous connected load by 10 percent.

Transparency is a prerequisite

"The responsible use of resources is important to us, which is why we have paid close attention to achieving the highest energy efficiency possible in our production facilities from the very beginning," explains Christian Koch, technical director in Herbrechtingen. Added to that was the fact that energy costs have risen significantly in recent years due to taxes and fiscal charges. The company therefore decided to install a system to record the energy data in order to identify peak loads and detect possible savings in the production area. "The result surprised us," Koch says. "For example, there was a regular peak load occurring at the end of each shift that we were unable to explain at first. Using additional meters, we were able to identify the charging stations for the forklifts as the consumers, since the last thing the employees do at the end of their

Christian Koch (left) and Michael Mak of HARTMANN have had only a positive experience with the energy data management system



shifts is connect the forklifts to the charging stations." The remedy was obvious: the forklifts could be charged one after another instead of simultaneously. However, the failings of the existing system quickly became apparent in this process, because it did not support the required load-shedding control system.

Proven energy management

Koch and Michael Mak, who is responsible for energy management in the company, decided to switch to WinCC powerrate energy data management, an option for the existing Simatic WinCC process visualization system. This not only enables controlled load shedding but also facilitates configuration. "Since WinCC powerrate is integrated into the familiar Simatic software environment, our company electronics engineers had no difficulties with the configuration from the start," Mak explains. "This is important, since energy management is a continuous optimization process that only works if the employees embrace it."

In addition to the charging stations, recycling turned out to be an area that could be turned off as needed without affecting production. Air-conditioning systems in various areas of the building were also identified for possible load shedding.

Power consumption is recorded at all relevant junction boxes via Sentron PAC ampere meters. Every charger is equipped with an ampere meter. The devices that are to be turned off are all connected

to the corresponding Simatic controls the same way through an ET 200M distributed I/O system. Identical energy management switch boxes make the overview easier. Load shedding is based on current 15-minute trends. A prioritization system determines where a load can be shed, if required. The strategy takes into account the size of the expected peak load within a 15-minute interval, the load of the equipment that can be shed and its priorities, and its minimum on and off times. For technological reasons, the switching characteristics can also be set to "rolling," that is, equipment is changed in the priority list on a rolling basis.

Sustainability pays off

The benefits consist not only of a reduction of the peak load by 10 percent. Koch says, "Since we now know the development of our consumption over time very well, we have a significantly better basis for negotiations with our suppliers in the future. We hope to save even more as a result." In addition, recording energy flows and evaluating them is a prerequisite for certification according to ISO 50001, which attests to a facility's efficient energy management. The factory in Herbrechtingen is already certified. The HARTMANN factory in Brück in Brandenburg, where WinCC powerrate is also used to record energy data, has achieved a reduction in the Renewable Energy Sources Act levy due to the certification.

Mak serves as a consultant to other factories preparing for certification. His experience: "There is savings potential everywhere. Nevertheless, the experience from one production environment is difficult to transfer to a different one. The highest possible transparency is a prerequisite. In order to tap the identified potential quickly and efficiently, it is advisable to use energy data management that is integrated into the automation system. We have found that WinCC powerrate works very well in this regard." ■

"Since WinCC powerrate is integrated into the familiar Simatic software environment, our company electronics engineers had no difficulties with the configuration from the start."

**Michael Mak, Energy Consultant,
PAUL HARTMANN AG, Herbrechtingen**

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Integrated Drive Systems in largest fluidized bed incineration plant

Power guzzlers under control

Pumps, fans, and compressors are known to be the biggest power guzzlers in the manufacturing industry. The drivetrain responsible for this consumption is typically comprised of several components such as a converter, motor, coupling, and transmission.

In Siemens Integrated Drive Systems (IDS), all these components are perfectly matched to each other. Because here, too, the sum of the maximum possible energy savings of the individual components is usually significantly lower than the

The task then was to increase the capacity of the air condensers by 20 percent, while at the same time maximizing the energy efficiency. The project team replaced the drives of six of the air-condenser fans with Integrated Drive Systems from Siemens. From the Sinamics frequency converter to the Simotics AC motor to the Simogear helical gear unit, everything was delivered from one source. The drivetrain needed to be installed during the regular three-day plant maintenance session. The run-up took place without any problems and within the specified time slot.

“With IDS, we now need only one supplier for the entire drivetrain.”

Geert Pluckers, Head of Projects and Modifications, Sleco



Geert Pluckers

maximum possible energy savings of a perfectly coordinated total system. That is exactly what the new EN 50598 standard, valid everywhere in the EU since December of last year, takes into account: it is not the power loss of the individual components that is relevant for the classification, but rather the power loss of the entire drive system.

The Belgian company Sleco is operating a plant for incinerating sludge and nonhazardous industrial waste in fluidized bed furnaces. This process generates steam, which drives a turbine for electricity generation. In recent years, Sleco has increased the capacity of the incineration plant so much that the air condensers were no longer able to work efficiently.

Speed measurements showed that the capacity of the fans had increased by 23 percent – more than the target 20 percent. “Since the project was more profitable than expected, the investments will be amortized already after two years,” says Geert Pluckers, head of projects and modifications at Sleco. “And we now have only one supplier for the entire drivetrain and thus also only one contact point ready to support us in case of a problem.” ■

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IO-Link in an aluminum granulation plant

Small talk in the smallest space

With IO-Link, it is possible to easily develop flexible automation solutions that optimally accommodate the tight spaces in many production facilities. Equipment provider Fleischmann GmbH experienced this while using IO-Link in an aluminum granulation plant at Lake Constance that produces aluminum pellets with a diameter of about 3 mm for the steel industry. The entire automation system for the plant is now located in nine cabinets with a width of 1.2 m each – just under 30 percent less than with conventional solutions.

In this plant, aluminum scrap is conveyed into a furnace via a feed system and weighing equipment. The liquid aluminum is then poured onto a cooled turntable with a screen. After just half a turn, the liquid transforms into solid pellets that are transported to bunkers via a conveyor system. As required, they then make their way to the customer by truck.

To save valuable space, the experts at Fleischmann opted for Sirius 3RA6 compact starters. As the shutdown and monitoring equipment is already integrated into the motor feeders, much of the cabling that would otherwise be required has been eliminated. The connection to the controller via IO-Link also makes installation and commissioning

easier. Communication via a Simatic IPC427C microbox PC with a real-time-enabled and fail-safe Simatic WinAC RTX F soft PLC turned out to be the best solution for this application, as it will allow an enclosure installed at a later stage to be quickly and flexibly integrated into the plant control system with the safety bus solution via Profisafe.

There are also various IO-Link-enabled Sirius 3RT2 contactors in the plant, providing increased safety for the burner control. The burners that keep the aluminum hot are also equipped with additional 3RS15 temperature-monitoring relays. Up to four intelligent monitoring relays can be connected to one plug-in IO-Link master of the ET 200S. All cyclical reporting and diagnostic data are transmitted to the control system by means of a point-to-point connection via the IO-Link master. The machine operator also has the option to perform machine diagnostics directly via the touchpanel using WLAN as well as to report failures to maintenance personnel via e-mail and text message.

However, it is not only the hardware that is integrated but the engineering as well. With the TIA Portal engineering framework, it is possible to configure and implement control engineering, switching technology, drive technology, safety engineering, and visualization all on one platform. Markus Berner, managing director at Fleischmann, sums it up: "We used TIA Portal as well as IO-Link communication and the IPC controller for the first time in the Lake Constance project, and our experience with these systems could not have been better."

The liquid aluminum, which is poured onto a cooled turntable with a screen, turns into solid pellets after half a turn



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Industrial Network Validation enabled Saint Gobain Gyproc to detect faults and thus increase network performance

Troubleshooting industrial networks with Asset Analytics

Tracking problems

Siemens eliminated faults in the Profibus networks at an Indian site of the French construction material manufacturer Saint Gobain Gyproc using the Industrial Networks Validation and Analytics analysis service. The team of experts improved the performance and reliability of the industrial network at the same time.

The industrial network is the backbone of every automation system. Ever-increasing amounts of data are sent in faster and faster cycles between controls and bus devices. To enable ambitious production targets to be met, the network must be available and reliable. Well-thought-out project planning, set-up, and commissioning are crucial, particularly when the network components are from different suppliers.

Critical planning phase

Most problems occurring during operation originate in the planning phase. Saint Gobain Gyproc India Ltd., a global leader in the manufacture of lightweight drywall and gypsum plasterboard, experienced this firsthand. At a site near the southern Indian city of Bangalore, the company was using a production system that had been installed by several suppliers. After installation, the network did not work perfectly and the Profibus networks failed time and again. The company even reduced the network speed in some areas to eliminate the faults but was still unable to achieve trouble-free network operation.

Analysis services for Profibus networks

Network experts from Siemens, implementing the validation service for Profibus networks, checked all the network and component parameters. Industrial Network Validation and Analytics was used to improve the network's operational reliability. The network architecture consisted of seven different networks with 140 slave devices. To ensure a complete examination of all possible fault locations, validation was performed according to strict guide-

lines – from the detailed inspection of all control parameters and the measuring and archiving of fieldbus key performance indicators (KPIs) to the installation of additional hardware and software to monitor and maintain these KPIs.

The analysis revealed some serious problems. In addition to deviations from standards and guidelines, the signal level did not reach the recommended minimum level in some areas. "Thanks to Industrial Network Validation from Siemens, we were able to detect faults and optimize the overall performance and reliability of our Profibus network," explains Harsh V, general manager of Saint Gobain Gyproc India Ltd.

Convincing result

Since the validation, the signal level of the entire network at the site has increased by up to 100 percent. The analysis results enabled the signal profile and the network performance to be enhanced as well. Integrating the validation during the planning phase provides for higher network availability and reliability, faster commissioning, and a smoother start to production. Production downtimes due to network failures should now be a thing of the past for Saint Gobain Gyproc. ■

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Scalance switch with NFC tag for mobile troubleshooting in industrial networks

Mobile diagnostics

On-site troubleshooting directly on the machine is particularly important in industrial networks. Mobile terminal devices in combination with near field communication (NFC) open up interesting new possibilities here. One example is rapid network diagnostics via smartphone on NFC-capable Industrial Ethernet switches from Siemens.

Whether tablets or smartphones, mobile computers are omnipresent and used daily by many people. A rather less-known fact is that they can also help ensure the continued operation of industrial networks – through mobile network diagnostics. This is possible because the common networks used by mobile terminal devices are based on radio technologies such as 3G/4G or WLAN and allow for data rates that are only slightly lower than those of line-based networks.

In an industrial plant that is designed for maximum availability, a wide variety of modules need to ensure this

availability. The same also applies to industrial networks. The high level of availability is usually achieved via a redundant design and configuration. The result of such redundancies is that a single error – for instance, caused by a cable break – does not necessarily compromise the functionality of the entire system. Nevertheless, it is very important to detect the fault, as another failure can quickly change the situation.

A good team: smartphone and NFC tag

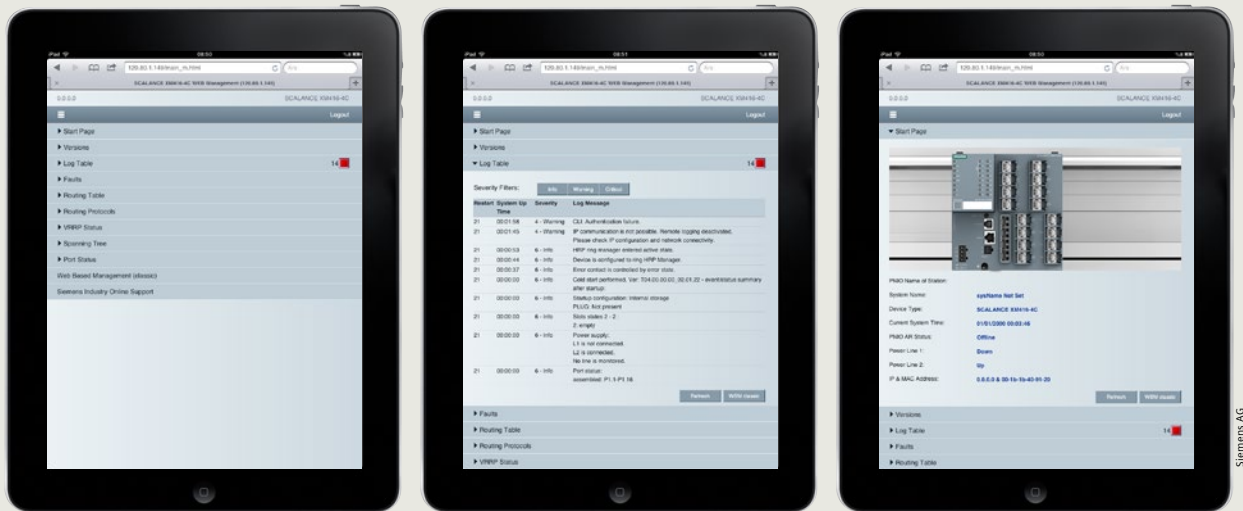
This is where the latest-generation smartphones or tablets come into play, as most of them feature NFC radio

chips. NFC involves communication over a distance of a few centimeters. Just like RFID, NFC technology requires reading devices on one side – for example, in smartphones – and transponders or tags on the other side. An NFC tag of this type is integrated into the Industrial Ethernet switches of the new Scalance XM-400 series from Siemens. The NFC tag contains information for accessing the web server of the switch. In contrast to QR codes, the content of the information can be changed dynamically.

The modular switches of the Scalance XM-400 product series are perfectly suited for use in production, as they are mechanically robust and do not require a fan. Either electrical or optical transmission media can be connected to their so-called combo-ports. Thanks to port extenders that can be connected to the switch, it is possible to provide as many as 24 ports with gigabit transmission rates in a Layer 2 switch. The switches can be upgraded during operation and without any tools.



A Scalance XM-400 basic device from Siemens with an integrated NFC solution for initiating mobile diagnostics



The mobile websites with diagnostic information for the Scalance XM-400 allow for efficient troubleshooting and thus increase system availability

On the firmware side, functions such as redundant ring topologies and spanning tree topologies, and even security functions such as access control lists and terminal device authentication, support the network's availability. Moreover, comprehensive Layer 3 functions can be activated in the same switch, and a replacement device with the previous configuration can be started immediately in case of failure. Whenever a management IP address is configured, it is also written onto the NFC tag when using the Scalance XM-400 switches.

Jump-starting with NFC

If a redundant path is activated, for example, after a cable break, the system keeps running but the monitoring system indicates an error. The network operator goes to the respective switch and holds his or her smartphone directly in front of it. A URL, for instance <http://192.168.1.1>, is sent to the smartphone or tablet via NFC, and the Internet browser automatically opens the login page of the mobile web interface of the network component. After entering the login data, the operator has access to clearly structured diagnostic information that is formatted to match both

the size and resolution of the display on the mobile terminal device.

NFC is not suited for permanent data transmission, as it is difficult to operate the terminal device and keep a transmission distance of about 3 cm at the same time. The set-up must therefore ensure that the smartphone or tablet can connect with the switch via WLAN or LTE (Long Term Evolution). In addition, NFC works with a transmission rate of only about 400 Kbits/s.

Diagnostics also via simple mobile terminal devices

Based on the by now widespread operating philosophy of mobile websites, the operator can easily find what he or she needs. If the screen resolution falls below a limit where even the adjusted display is not easily readable any longer, the individual display fields are rearranged so that information is clearly presented even on simple mobile devices. Of course, the mobile pages can also be selected manually without NFC support.

As soon as the diagnostics displays and logging notifications indicate that one of the current configurations needs to be changed, it is possible to switch to the classic WBM (web-based

management) view at any time. The user, logged in in the appropriate role, can continue to change the configuration directly. For this, there are more than 100 pages available in the classic WBM view for a wide variety of aspects.

Increase in system availability

In addition to the device features directly resulting in the higher availability of the network and therefore of the entire system, such as redundant voltage supply, fanless operation, and the use of special redundancy reports, the simple diagnostics as well as quickly implementable adjustment options reduce downtimes in case of an error. These options are complemented by the consistent integration of all network components into a monitoring system such as Sinema Server. In addition to the local storage, notifications can be sent to the central monitoring system, which makes the correlation of notifications from different sources much easier. ■

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Simatic RF600 RFID system in logistics

The supply chain works

In Germany, the statement "I'll just run over to Müller" refers less often to a visit to the neighbor than to a quick trip to the drugstore. There are currently more than 700 drugstores in the Müller Holding Ltd. & Co. KG chain in Europe. For virtually error-free delivery to these stores, the company relies on RFID technology from Siemens.

Müller's central warehouse in Ulm, Germany, and the connected external warehouses are operated by Drogerie Dienst Ulm GmbH, a subsidiary of Müller Holding. During the pre-Christmas season, the orders for up to 25,000 roll-on containers called dollies are picked and loaded here every day. However, even outside these seasonal peaks, the handling capacity has continuously increased as a result of the company's steady growth.

The problem here was that with an increase in merchandise movement, the number of incorrect deliveries to the stores had also risen. For Uwe Lindner, logistics project manager, it was therefore necessary to minimize incorrect deliveries despite an increasing handling capacity and to establish more efficient and more transparent processes in the intra-company logistics system. It was an ambitious project, focused from the start on implementing a customized RFID solution from Siemens. Mercatis Information Systems GmbH, headquartered in Ulm, was commissioned

to connect this solution to the existing warehouse management system called "Lisa."

The greatest challenge of this project was the highly frequented loading gates serving as interfaces between the warehouse and transportation. During the initial project phase, an RFID gate solution based on the Simatic RF600 UHF system was developed, implemented, and optimized on a total of 50 loading ramps/gates during ongoing loading and delivery operations. Technicians installed a Simatic RF670R reader with two pairs of RF640A RFID antennas for detection and direction control of the dollies at each loading gate.

The loading progress is displayed on an IPC477D, which allows the status of the current delivery to be seen at any time right on-site. The Simatic RF670R RFID readers communicate via TCP/IP-native and XML message with the industrial PCs that are connected to the warehouse management system via Industrial Ethernet. The approximately 190,000 dollies are clearly identified by their attached RF630L RFID transponders made of durable plastic. Damaged tags can be easily replaced at any time and registered in the warehouse management system.

The reading quality is continuously monitored. The engineering and commissioning software played a crucial role in the rapid implementation and optimization, as the software made it

possible to optimize the RFID system at one gate and then simply transfer the configuration to all the other gates. In the next step, the conveyor technology of the central warehouse and the new warehouse, Ulm-Nord, were also equipped with Siemens RFID technology. Now, Simatic RF630R readers, each with two external RF620A antennas, identify the dollies on the conveying line. The special advantages here are that the RF630R readers are optimally suited for use in metallic environments due to their special algorithms and high immunity to interference, and the capacity of the RF620A antennas can be gradually increased, ensuring quick and easy commissioning of the plant.

"The reading accuracy of the Siemens RFID system is more than 99 percent and thus has drastically reduced – really almost eliminated – incorrect deliveries compared to the previous process that was controlled only visually by employees," confirms Lindner. The automated documentation of all merchandise movements in the warehouse management system also makes traceability and identification of further optimization potential easier. The advantages of the Siemens RFID system have impressed the members of the project team and encouraged them to equip more areas with RFID. ■

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NX CAE in the aerospace and defense industry

Redemption through design

Design Automation Associates Inc. (DAA) provides mechanical engineering and analysis automation consulting services. The firm has customers in many different industries, including aerospace, automotive, consumer products, and shipbuilding, and protecting its reputation for reliability and cost-effectiveness is vital to its success.

DAA's reputation was put at risk during a recent project for CIGNYS, a Michigan-based precision manufacturing company. The project entailed a stress analysis of CIGNYS's new military mobilizer to determine if it could withstand the impact of a parachute landing. It encountered notable time and cost overruns due to needing to build analysis models for each simulation. CIGNYS gave DAA an opportunity to redeem itself on a similar project. Not taking any chances, DAA sought a solution that would make the preprocessing stage more efficient.

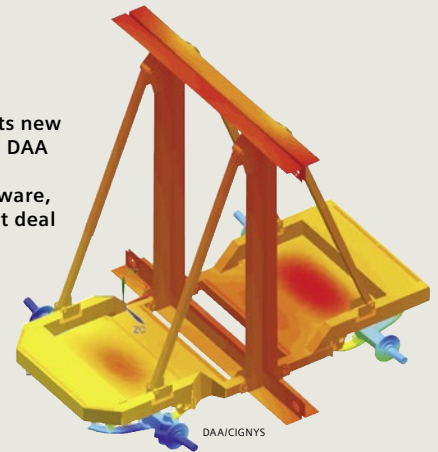
Simulation preprocessing is highly time-consuming. Creating the 100 or more mid-surfaces of the solid geometry to connect the mesh together alone took 12 hours. In total, with DAA's existing computer-aided engineering (CAE) tools, the entire preprocessing phase took 63 hours per iteration. This still did not include any design changes to evaluate how a geometry change might affect performance. To reduce the time and resources spent on each iteration, DAA decided to use NX CAE from Siemens PLM Software for both simulation preprocessing and the actual structural analysis. DAA was confident that NX would help after witnessing how its powerful geometry engine could improve the entire defeaturing, mid-surfacing, and connection phases. Siemens' Global Technical Access Center helped DAA's engineers quickly get up to speed on how to use the tool. This helped DAA to gain significant time savings from day one.

Using NX CAE, DAA was able to reduce preprocessing from 12 hours to just 1 hour. Rather than having to extend and trim the mid-surfaces, DAA's engineers used NX Nastran's embedded structural analysis solver to glue edges and surfaces together for all nodes within a specified tolerance. If they wanted to investigate how a feature change would impact performance, they simply made a change to the underlying geometry and used NX CAE to

update the finite element analysis (FEA) model with minimal intervention. This provided rapid design-analysis iterations that reduced the time spent on mid-surfacing by 92 percent.

The time saved on analysis modeling gave DAA more time to collaborate with CIGNYS's design team and make smarter engineering decisions. This led to a 30 percent faster project turnaround time. "The heart of any successful project is the reliability of up-front schedule and cost estimates. Anything that increases uncertainty and limits flexibility hurts both the project and the business performance of associated organizations. DAA made significant strides in reducing uncertainty and increasing flexibility using NX CAE," says John Lambert, DAA's president and CEO.

For simulation preprocessing of its new military mobilizer, DAA used NX CAE from Siemens PLM Software, thus saving a great deal of time



Along with significantly reducing analysis time on this project, NX CAE enables DAA to gain time savings for all future projects for CIGNYS and solidify the relationship, thanks to the processing power of Siemens' software. "DAA took real, tangible steps to demonstrate to CIGNYS that future projects will have lower costs and greatly decreased exposure to unreliable and unpredictable solver behavior," says Jeff Shelagowski, executive vice president of CIGNYS. "The capabilities provided using NX CAE directly addressed both issues in a substantive way." ■

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Comprehensive use of Teamcenter by a Chinese automaker

Going up a gear

In order to stay competitive, meeting customer demands while achieving the highest efficiency is a key challenge in the automotive industry. The Chinese automaker South East (Fujian) Motor also wanted to increase its production capacity and speed up the development of new brands. Teamcenter provided the platform on which to drive these improvements.

With a wealth of industry expertise to draw on, the South East (Fujian) Motor Co. Ltd. (SEM) car manufacturing company already had a highly modern production process with rigorous quality testing. SEM is a joint venture between China Motor Corporation, Fujian Motor Industry Group, and Mitsubishi Motors, which specializes in passenger cars and technical consulting services. To achieve its goal of raising production from 150,000 cars a year to 500,000, it would need to upgrade its lifecycle planning and production processes.

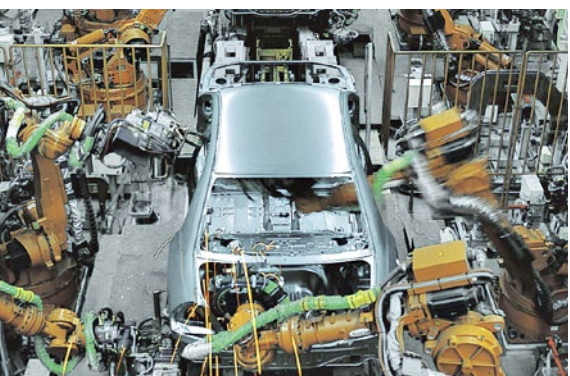
Along with increasing its output, SEM wanted to improve its design and development capabilities. Alongside the cars already developed under its own brand, including the V3 Lingyue, the V5 Lingzhi, and V6 Lingshi, SEM wanted to start manufacturing the DX7 and R7 sport utility vehicles and new

energy-efficient cars. This would require the implementation of an advanced product lifecycle management (PLM) platform to enhance the company's research and development data across multiple systems.

Complete integrated solution

The Teamcenter platform from Siemens provides a complete integrated PLM solution, covering product planning, industrial design, engineering design, quality management, production management, and product services. This made partnering with Siemens, for both its industry expertise and technology, an easy decision for SEM to make. Along with core product management, Teamcenter could also be deeply integrated with SEM's peripheral systems, such as its enterprise resource planning (ERP), computer-aided design (CAD), encryption, and supply chain management (SCM).

Teamcenter serves as an information platform for the entire lifecycle of the production process



South East (Fujian) Motor

Benefits of Teamcenter

- Direct savings and productivity improvements of over \$2 million
- Faster time to market for new vehicles
- Better decision making
- Efficiency of drawing release process (including design, engineering verification, and review) improved by 30%
- Efficiency of engineering release process in management fields (including engineering, development, and logistics) improved by 40%
- Over 99% design drawing accuracy
- Improved quality control



Teamcenter's lightweight JM data format would also make design reviews more effective.

To facilitate a smooth implementation, Siemens assisted SEM in defining the scope of Teamcenter's deployment and then configured the platform to suit the company's unique needs. "The experienced implementation professionals from Siemens PLM Software were able to quickly and accurately understand SEM's business characteristics and advantages and then build the most suitable platform solution for SEM by combining the best practices in the global market," explains Li Yongbin, SEM's consultant manager. "In addition, Teamcenter, with its strong customization and secondary development capabilities, has the flexibility to be configured to our R&D and other business practices, so as to meet our business requirements to the greatest extent."

Unified research and development

One of the key benefits of Teamcenter has been its provision of a unified R&D management platform. It gives SEM real-time, accurate, and traceable vehicle development information and a fully configured bill of materials (BOM) based on a standardized product structure, design process standards, and specifications. These tools have enabled the creation of more accurate digital mock-ups, reducing changes related to human errors and enhancing the quality of the entire design process.

Steps to implement continuous improvement

The Teamcenter implementation supports SEM's goal of attaining continuous informationalization and data-driven automation. SEM has attained great

benefits from these practices, including savings of more than \$2 million annually from reduced stock, labor costs, and manufacturing costs, as well as improved productivity. Significant improvements in R&D efficiency have created a 30 percent faster drawing release process, a 40 percent faster engineering release process, and over 99 percent design drawing accuracy. All these improvements have contributed to a vastly accelerated time to market for new vehicles.

Phase 1 focused on building a more efficient product R&D platform. Phase 2 will be the integration of Teamcenter's additional management capabilities for design, parts, and computer-aided engineering (CAE) for smoother product lifecycle management. Phase 2 will also enable 24-hour collaboration and the sharing of technical resources between global teams.

This will assist SEM in its ultimate goal of facilitating innovation through informationalization, and to use its data as a strategic resource that enhances competitiveness throughout the company. Leveraging the full power of Teamcenter will be a key part of this effort. "Siemens PLM Software is a world-leading provider of PLM solutions, whose far-reaching experience in the auto industry and great achievements in the digital manufacturing field are clear," says Li Yongbin. ■

The use of PLM software has enabled an increase in production

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Preactor in the textile industry

Smart schedule for labeling

The textile industry, one of the most dynamic industry sectors worldwide, has responded promptly to economic trends. The Brazilian textile manufacturer Haco also owes its success to its commitment to innovation. The company uses the Preactor scheduling software to achieve higher productivity in manufacturing individual labels.

Founded in 1928, Haco Etiquetas is a leading manufacturer of labels, tags, and other clothing identifiers. It creates labeling products tailored for multiple market segments and exports to over 30 countries from its six factories in Portugal and Brazil.

Scheduling as a major challenge

Haco had been using Preactor's advanced planning and scheduling (APS) software since 1999. When the system became outdated, the company decided to upgrade to the latest version of Preactor, which had recently been added to Siemens' Manufacturing Operations Management (MOM) portfolio. The main focus was improving scheduling for the weaving and finishing operations and the graphical manufacturing unit. Scheduling was a major challenge for Haco, as Gustavo Figueiredo, Haco's production scheduler, says: "Before this project, the optimization of resource usage was very dependent on the ability of the scheduler to balance customer requirements, set-ups, and delivery dates. It was almost impossible to do

manually, considering our volume of orders and the number of resources."

Faster delivery with Preactor

Over six months, Siemens implemented the upgrade in partnership with NEO, a Preactor reseller. NEO added new features and improvements to suit Haco's requirements, further refining the quality of the company's production scheduling. The solution runs completely integrated with Wintree, a specialist enterprise resource planning (ERP) system for the textile industry. Once implemented, the new version of Preactor had an immediate impact on Haco's scheduling. It automated and accelerated many tasks, including the creation of a scheduling analysis, using different scenarios, and the calculation of a feasible scheduling plan. Haco's scheduler was then able to make better decisions and needed to make only minor adjustments.

The Preactor solution was designed to generate several scenarios of production. This allows the company to make better decisions, considering



Haco manufactures a variety of individual labels in many shapes and colors – thanks to Preactor, they can be produced even more efficiently

level of service and maximum utilization of capacity. "Our market is very competitive and dynamic, and Preactor is a key factor in our business," Dulce Bruns, Haco's production scheduling manager, says. "With Preactor, our production achieved greater than 95 percent adherence of our released schedule and what were performed by the shop floor."

Additional benefits of the upgrade include reduced set-up time, improved production performance, and more accurate delivery estimates. "With the intelligent sequencing automatically generated based on the set-up time matrices, we save up to one hour per day on each machine, an increment of 5 percent on our productivity," Figueiredo says. "Thanks to Preactor, we can predict deliveries much faster and more accurately. We have planned continuous improvement of the current solution and its expansion to other facilities."

Further applications planned

Following the successful upgrade, Haco intends to roll out Siemens' Preactor APS across all of opera-



Haco's weaving factory in Blumenau, Santa Catarina, Brazil

tions. Commenting on the company's future plans, Luciano Mondini, Haco operations manager, says, "The goal is to connect all factories in a whole consolidated view, improving logistics processes and reducing production bottlenecks. Preactor enables us to clearly see the dynamic bottlenecks of our process and work objectively for better use of resources."

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IDS Roadshow tours Europe

Added value on board

“Extra Value Integrated” – this is the slogan of the IDS Roadshow that started at the end of November 2014. Since then, the truck has been visiting Siemens’ industrial customers in numerous European countries. With this mobile exhibition, Siemens demonstrates how the efficiency, reliability, and productivity of industrial applications can be increased with integrated drive solutions to achieve sustainable competitive advantage. The primary focus of the IDS Roadshow is the added value of Integrated Drive Systems for the customer. For this purpose, the truck is equipped with varied application-specific exhibits and live demos that illus-

trate the tangible benefits of optimally matched drive and automation components for various applications and industries.

Among other things, the mobile exhibition highlights the integration of the entire drivetrain into the Simatic PCS 7 process control system and into the TIA Portal engineering framework – for efficient engineering at its best. Deeper integration affects the product lifecycle and involves the complete integration of component data

into industrial software for planning, design, and commissioning. Here, the IDS truck shows how integrated software and comprehensive services not only ensure faster commissioning and higher reliability but also result in reduced maintenance costs.

INFO

For a list of dates and stops of the IDS roadshow, see siemens.com/ids-roadshow



The IDS Roadshow on its tour through Europe

Simatic S7-1500 training for experts

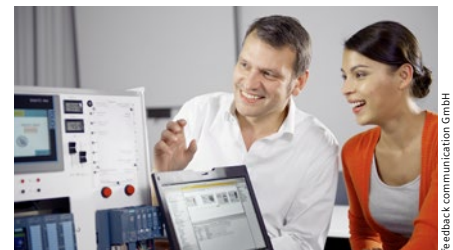
Certified competence

The interaction between the TIA Portal engineering framework and the Simatic S7-1500 control system is characterized by maximum efficiency and user-friendliness. The portfolio of Sitrain courses includes beginner, migration, and advanced training that enables participants to optimally use the new Siemens automation technology.

After Level 1 and 2 courses for service and programming, the corresponding Level 3 courses are now available as well. In the Level 3 service course, the participants receive new ideas for plant optimization and are thus able to shorten plant downtimes or prevent them entirely. The participants in the Level 3 programming course acquire detailed

knowledge on how to reduce configuration times and flexibly respond to the optimization requirements of a plant.

Sitrain has developed the Sitrain Certification Program to allow participants to provide evidence of the competencies they have acquired. For Germany, the contents and testing correspond to the guidelines for further education as defined and published by the German Electrical and Electronic Manufacturers' Association (Zentralverband Elektrotechnik- und Elektronikindustrie e.V., ZVEI). The certificate thus guarantees a standard of knowledge in automation technology that is valid internationally. Sitrain has also introduced this certification in other countries. In Germany, the participants can acquire the following certificates:



Participants can obtain competencies relating to Simatic S7-1500 and TIA Portal in three levels

- Siemens Certified Service Technician Level 1, based on the TIA Portal (exp. summer 2015)
- Siemens Certified Service Technician Level 2, based on the TIA Portal (exp. summer 2015)
- Siemens Certified Programmer, based on the TIA Portal

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Corruption perceptions index 2014

Setting a good example

Every year, the anticorruption organization Transparency International (TI) publishes its corruption perceptions index, which rates 175 countries. On a scale from 0 (high degree of perceived corruption) to 100 (no perceived corruption), Denmark ranks first, with 92 points; North Korea and Somalia are at the bottom, with 8 points each. According to TI, corruption weakens countries' economic growth. This is why those at the low end of the scale need to take radical anticorruption measures in

order to not endanger their economic development and thus the prosperity of their populations.

However, the countries at the top are called on in particular to fight global corruption. According to TI, they need to first make sure not to export corrupt practices into developing countries. Beyond that, they must lend their support to increasing integrity in finance and strengthen their efforts in the fight against the nontransparent management of finances. Top-ranked Denmark is already setting an exam-

ple against corruption with a public register that lists the beneficial owners of all companies registered in Denmark and makes it harder for corrupt persons to hide behind a registered company by using a false name. The anticorruption group is urging all European countries, the United States, and the G20 states to follow this example and implement such lists.

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Current information

Newsletter

With the Totally Integrated Automation newsletter you will be informed by e-mail about new hardware and software, services, application examples, and important dates and events relating to Totally Integrated Automation – electronically and always right up-to-date. You can find the TIA newsletter and further Siemens newsletters at siemens.com/industry-newsletter


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