Safe Paper Processing in a Clean Environment
Flexibly and reliably automating modern suction systems with Simatic S7-200

State of the Art Simplicity
Simatic S7-200 in the packaging industry

Behind the Scenes of a Smash Hit Musical
Simatic S7-200 instrumental in developing the stage set lifting technology for Mamma Mia!

Environmentally Friendly Antibacterial agent
LOGO! controls desinfektion system for water supply systems

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Welcome to the exciting world of Siemens Micro Automation. GO! International invites you to be inspired by the amazing variety of applications made possible by LOGO! logic modules and the micro controller family of Simatic S7-200. Used in millions of applications throughout the world, our logic modules and micro controllers assist you in improving your machines and your automation solutions. Visionary companies and people have come up with the most astonishing application ideas for LOGO! and Simatic S7-200. To maintain a competitive edge, they use newest technologies to develop applications that offer critical added value in terms of options, convenience and technical refinement – applications that are simple and intelligent in one. The topics in this issue range from an access control system to a hoist and an ice machine, and a podium control on a musical stage. There is a fascinating diversity of solutions in literally every field – industrial and otherwise – involving micro automation in everything from a simple bagel production to playing a part in the famous musical "Mamma Mia." And these ideas breed new ideas among our customers who realize the many opportunities that minimum automation for maximum effects offers – whether in individual yet ingenious solutions, as a cost effective machine control, or as building automation solutions.

With this 2006 GO! International issue, we invite you to take a trip around the world and to learn about some of our most interesting customer applications – a few highlights from the large spectrum of micro automation solutions. Be inspired and maybe your applications will be highlighted in one of our next issues.
When processing paper, for example, for document or envelope production, large quantities of paper shreds and dust are generated. A controlled operation and high level of processing productivity can only be ensured with the help of appropriate suction and filter systems. It is important that the components can be flexibly controlled and regulated to accommodate the various levels of scrap paper, dust and circulating air which are accumulated. At the Commerzbank in Frankfurt, Germany, clean air at one of the most modern computer centers in Europe is ensured through the suction systems of Hunkeler Systeme AG of Wikon, Switzerland.

When processing paper, for example, to print forms or at digital printing centers, large amounts of scrap paper and dust are generated which can result in failures or shutdowns of the highly productive paper processing machines. Therefore, the scrap must be continually removed from the workspaces of the machines. This is done with the appropriate suction equipment. Companies which process paper in large quantities, in particular banks or preprint form developers equip their production rooms with powerful suction systems. The paper shreds and dust are fed into separators and filters via pipes, where they are then separated from the vacuum air and compacted into connected containers using paper presses. The exhaust air is carefully filtered, and the clean air then returned to the working and production areas. As a result, the health risk for employees is reduced and a clean environment upheld.

The S7-200 PLC, which is equipped with a CPU 224, was expanded with 38 digital inputs and 24 digital outputs. In addition, the suction system was integrated into the building's primary automation system. The S7-200 PLC is also equipped with a Profibus. "The S7-200 is the only PLC we know of which, in terms of systems with a comparable price/performance ratio, can be optionally fitted with a Profibus," as Jwan Lüscher of the electrical project planning division at Hunkeler Systeme AG explains.
The modular design of the S7-200 is particularly beneficial for system designers of automated suction systems. It enables them to adapt the controller to suit the needs of each application, thereby automating the systems in a particularly economical manner.

"Moreover, Siemens controllers are internationally recognized," as Andreas Frey, head of electrical project planning at Hunkeler, emphasizes. It is increasingly becoming the most important decision-making criterion, as he continues. A few years back, the company began exporting its systems around the world.

Its present export share is around 40 percent, with the trend continuing upward. Reliability, user acceptance and global spare parts supply within a few hours must be ensured at all times. In particular, small companies without a global service maintenance and repair network of their own fully depend on the reliability of the control technology and the necessary spare parts supply. Moreover, it is important that the controllers with their simple, modular structure be accepted throughout the world by regional specialized staff, and that they can be easily repaired.

Hunkeler Systeme AG of Wikon, Switzerland specializes in the development, design and realization of paper disposal systems. The company currently employs a staff of 45. The paper processing division, which has been in existence for several decades, develops and manufactures comprehensive paper supply and processing systems. The production range comprises winders and unwinders as well as folding, cutting and stacking machines which operate in connection with highly productive copying machines and printers. The parent company in Wikon also produces customized systems for cutting, folding and assembling special advertising materials and direct mailings. The paper processing company designs, develops and implements systems in close cooperation with customers operating in the printing, wholesale, banks and insurance industries. The recently established disposal division forms an integral part of Hunkeler Systeme AG. Its product range includes standard equipment such as baling and briquette presses, press containers and choppers as well as customer-specific systems for the graphical packaging industry and digital print centers at banks, insurance groups and service companies.

High-performance transport fans, equipped with knives, shred the endless strips of paper and feed them into the separator.

Specialists in paper disposal systems

Jwan Lüscher of the electrical project planning division at Hunkeler Systeme AG
Andreas Frey, head of electrical project planning
Kurt Käser, manager

Thanks to the optimal separation and compacting of the paper, logistics costs are kept to a minimum.
In the early 1970s, Ernest and Ralph Matthews, two brothers in Decatur, Alabama, created an innovative method to increase the quality and packaging speed of small packets of sugar based on a continuous motion, rotary filling technology, now known as the Ropak Packaging System. Today, as a world leading OEM in flexible packaging technology, The Ropak Manufacturing Company continues to use their experience and innovation to deliver intuitive designs with unrivaled performance, reliability, and support.

Their most recent development is the StikPak, a hybrid packaging machine that uniquely lowers packaging material costs and offers the flexibility of wet or dry packaging. Originally developed in Europe, the StikPak design was acquired and is currently manufactured exclusively by Ropak in the U.S. market. Ropak continues to enhance the StikPak design and offers it in a variety of configurations. Alongside innovation, Ropak uses proven technology concepts not simply to “keep pace” with emerging trends, but also to proactively enhance their equipment to the benefit of their customers. Ropak relies on relationships with suppliers like Siemens and Edison Automation – the local Siemens Technology Center (STC) – to provide them with the products and solutions required for their market. Recently, Ropak partnered with Siemens and Edison Automation to upgrade the Ropak IV, one of their flagship packaging models recognized worldwide for its speed, simplicity and serviceability. The Ropak IV is a dual-line machine that offers high-speed form, fill and seal production of small pouches of free-flowing product with output speeds of 1,000 to 4,500 units per minute. The vision of the Ropak engineering team was to implement a cost effective solution that would enhance the proven

State of the Art
Simplicity
Ropak IV system by incorporating state-of-the-art controls to improve reliability, safety, and motion control.

A Flexible, Open Platform

The team selected the Siemens S7-200 Micro PLC as the system control platform for its open communications, powerful performance, optimum modularity and overall low cost of ownership. The S7-200 PLC program is designed to communicate directly to the MM440 variable frequency drive from Siemens, which provides precise speed regulation for the rotary feed wheel using USS protocol with no additional hardware in either the drive or in the PLC. This approach provided a reduction in wiring, a cost savings on hardware by removing analog output cards from the PLC, and simplified programming by using the USS protocol. The use of serial communication to the variable frequency drive enhanced the accuracy and speed of the machine.

A Powerful, Efficient Communications Network

Ropak’s focus on increasing customer productivity extends beyond the machine level. Critical information exchange enabled by powerful and efficient communication networks plays a key role in their development strategy. Today, with a share of over 80%, Ethernet is now the no. 1 LAN network in the world, and has opened opportunities for companies like Ropak, Siemens, and Edison to provide enterprise-wide solutions that deliver measurable bottom-line results. An Ethernet module on the Simatic S7-200 PLC ensures that the Ropak IV can transfer data back and forth directly from the machine to any OPC compatible package, including Microsoft® Excel, SQL, Lotus Notes® and World Wide Web (www) applications. This approach provides flexible communication options and elevates system availability, putting critical information in the hands of people who operate, analyze, maintain, and service the enterprise – all through one communication port.

Safety Integrated

Another emerging trend in today’s industrial environment is the increased focus on personal and operational safety, and with processing speeds of up to 4,500 units per minute, the Ropak IV needed to ensure safe, reliable operation. Not satisfied with simply “keeping pace” with industry trends, Ropak again raised the bar to face their industry specific challenges. Ropak needed a system that would withstand their customer’s unique production environments; have the flexibility to easily configure safety interlocks and increase serviceability; allow users fast access to diagnose and respond to E-Stop conditions; employ open standards; and provide flexible control options for their customer. Ropak collaborated with Siemens and Edison Automation and developed a solution based on ASIsafeTM, which is a networked I/O and safety system that provides complete safety control and monitoring over an AS-Interface network. By using the AS-Interface network, Ropak is able to implement standard I/O and report the status of all E-Stops on each machine without additional wiring. A simple ladder logic program that resides inside a safety monitor unit provides a portable safety program with the unique ability to incorporate any manufacturer’s PLC, without the need of any additional hardware. To stand up to the Ropak IV’s unique production environments where the production process generates vibration, powder and dust, Siemens coded magnetic switches were selected. These robust switches are paired magnets, and in order for the magnet to provide a signal back to the controller, it must “see” its match. This non-contact, positive, coded solution provided the right solution for Ropak’s concerns about reliability.

Visible Results

To optimize the performance of the Ropak IV, it is important that an operator have the ability to quickly and easily setup, run, and adjust the machine as well as diagnose and respond to its functions. Using Ethernet media and OPC protocols, the Siemens Simatic MP370 Multi-Panel HMI from Siemens provides a bright, graphic-rich machine interface that allows customers to control and monitor all critical machine functions, including: heater control, machine speed, registration adjustment, product counts, E-Stop conditions, maintenance data, and much more. The clean, efficient setup and troubleshooting menu design escorts the operator to a quick resolution, reducing front-end and backend downtime, and giving the operator the ability to make critical, high-level decisions. With the help of Siemens and Edison Automation, Ropak Manufacturing now offers customer’s the Ropak IV with an enhanced level of control, communications, monitoring, diagnostics, and human and operational safety. Totally Integrated AutomationTM – your vision, our technology, working together.
Leonard Automatics
VISION Redefines Industry Expectations

OEMs in many industries often turn to automation technology to improve control, increase functionality, and improve efficiency. Leonard Automatics, a family-owned business based in Denver, North Carolina, with several decades of experience in the Industrial Laundry equipment and Garment Manufacturing Industries is benefiting from embracing this philosophy. Leonard Automatics is applying Siemens Micro Automation technology to improve reliability, deliver innovative state-of-the-art controls, and respond to demanding customer needs.

Leonard stands out in their industry as having a very unique perspective of their customer’s vision. They can confidently say that they completely understand their customer’s needs, due to many years of dedicated experience of rebuilding existing laundry finishing equipment. This experience has exposed Leonard to both the strengths and weaknesses of existing equipment and has contributed to their commitment to make needed improvements. One such area of improvement was in one of the most critical areas of the process – finishing. Their objective was to create a machine that consistently reduced operator error, increased repeatability, and maximized their customer’s return on investment.

A Superior Concept
Leonard designed their VISION® Finishing Tunnel to incorporate the most innovative control technology. This technology features robust, reliable controls, remote diagnostics capabilities, and an intuitive user interface – which together improve the entire garment finishing process. For example, a typical industrial laundry processes approximately 20,000 pieces of laundry per day. The process consists of 5 to 8 washers capable of washing 400 pounds of laundry per load, 4 to 6 dryers with the same capacity and one laundry finishing tunnel where virtually every garment must pass through. The washers clean the laundry while the dryers remove extra moisture from pants, but do not actually completely dry the clothes; shirts and coats come directly from the washers into...
the Tunnel Finisher. It is the job of the finishing tunnel to remove the rest of the moisture while removing all wrinkles from the clothes – our grandparents would have called this “hand ironing” but, even in their heyday, they could not have imagined trying to hand iron 20,000 pieces of laundry per day. The finishing is accomplished by closely controlling the temperature, humidity, and the length of time that it takes the garment to be processed in the machine. The PLC is the central controller for many features of the machine such as temperature, dwell time, humidity, automatic cleaning of the lint screens, and overseeing the entire machine to insure error free operation. The Leonard engineering team created an exceptional control system concept for the VISION® Finishing Tunnel. However, they were experiencing some reliability and quality problems with their existing automation supplier's architecture. Jeff Frushtick, President of Leonard Automatics, turned to his Siemens Sales Engineer, Allen Goodson, for some expert automation assistance and a solution to his critical requirements of operation. With help from Siemens Micro Automation and Siemens Technology Center (STC) Control Corporation of America (CCA) application engineers, Allen and the team set out to construct a more powerful, reliable, and cost-effective solution.

Control and Flexibility
The Leonard Automatics VISION® Finishing Tunnel is controlled by a Siemens Simatic S7-226 PLC with 16 Kbytes of program space, 10 Kbytes of data storage space, and very fast, efficient program execution. The S7-226 provides a generous amount of processing power and the flexibility to facilitate future expansion of the control system. The S7-226 controller enables Leonard to program the machine to its optimal settings, then allows the customer the flexibility to custom configure the machine with additional settings providing them with the ability to process garments with much lower labor costs, which maximizes the customer’s return on investment. Another major advancement is the ability to control the process temperature by sensing the temperature of the garments during the process. Previously, indirect sensing based upon air temperature was used, then garments were carefully inspected and machine parameters were adjusted manually which was time consuming and prone to error.

Critical Information Exchange
To respond to Leonard's demanding customer communication requirements, the CP243-1IT module was used. This IT module contains an embedded web server which provides an easy to use remote interface through any standard web browser. The module has 8MB of internal storage with options such as realtime data acquisition permitting the transfer of critical information directly to Microsoft® Excel™ for analysis. The embedded web server of the CP243-1IT provides an easy to use remote interface to the machine using any web browser. The remote diagnostics capability of this control architecture gives Leonard remote connectivity into the VISION® Tunnel Finisher, which initiates a proactive approach to ensuring the highest level of machine uptime for their customers.

An Intuitive Interface
Because the industrial laundry industry suffers from high employee turnover, it is likely that undertrained personnel will be operating the system. The TP270 Simatic Touch Panel provides Leonard the clean, clear graphics needed to easily setup, run and operate the machine. Even inexperienced users can intuitively make high level decisions based on simple language and graphical representations provided by the TP270 Touch Panel screens. The clear display and easy-to-use interface reduces the operator learning curve, accelerating productivity, translating into savings for Leonard's customers.

Achieving the Customers’ VISION
The Leonard Automatics VISION® Tunnel Finisher does more than just improve industrial laundry control – it has actually redefined industry expectations. Until recently, innovative features such as sensing actual garment temperature and realtime data acquisition were unheard of in the industry. The culmination of these innovations are a direct result of Leonard’s customer-centric philosophy, unique collaboration with end users, and eager responsiveness to elevate their customer’s return on investment. Siemens provided Leonard Automatics with the strong foundation of products and technologies they required to continue to flourish and improve their competitive position in their industry. Utilizing this powerful, stable architecture has given Leonard Automatics the ability to focus on their core competencies without concerns of support or reliability.
The woodworking and cabinet manufacturing industry has seen many changes throughout the decades in technology as it applies to process control and automation. Most applications started with strictly mechanical control and evolved to relay logic, combined with mechanical architecture. However, as time progressed more companies building woodworking equipment utilized the benefits that proprietary printed circuit-board technology offered. But as technology improved, most simplistic solutions no longer required elaborate printed circuit designs with the advent of products such as the logic module LOGO! offers.

With its intuitiveness regarding programming, functionality and the minimized level of support required, companies are recognizing the need for such devices to pave the way for improved technology in their processes. One such company, Castle, Inc., located in Petaluma, Calif., recognized the benefits of LOGO! for one of its machines, the Edge Bander, model EB-2.

Time for a change
When the Siemens distributor/systems integration firm, E & M, located in Healdsburg, Calif., first introduced LOGO! as an alternative means for controlling the Edge Bander it was clear everything the circuit board design offered, LOGO! was able to accomplish and much more. As described by Max Durney, Founder of Castle, Inc., “The need for an elegant solution for the edgebander was extremely high.” He added, “The inconsistency and unreliable nature of the existing technology was a real stumbling block for the product and it was clear that a change needed to occur due to the demand for the product and for the level of support required by the old control system.” At that time E & M was tasked with the challenge of essentially converting the existing program over to the LOGO! device.

Development underway
Marv Guggemos of E & M introduced Bill Hints, also of E&M, to the project; he began to familiarize himself with the Edge Bander’s technology and understand the requirements regarding the processes and performance. The need to gain perspective of the mechanical and control issues including the low-value pressure sensing and precise glue temperature was crucial to match the electrical aspects and marry the two to complete a suitable solution. As Max Durney indicated, “The additional benefit of utilizing the Siemens LOGO! Controls was that it required no modification of the primary mechanics of the machine. This translated into an even faster time to market for the product. The original proprietary printed circuit board, along with the mechanical design took approximately two and half years to complete. Bill quickly went to work developing the program and in a matter of weeks, virtually one-tenth of the time for the original design, was able to provide a first draft of the program using the LOGO! Soft Comfort software programming in function block format”.

Application
The Edge Bander machine is designed for the application of edging for cabinets and countertops. It is compact, yet full sized, providing small shops with the advantage of hot melt glue at an affordable price. Pictured here, it works with all wood and PVC tape. Providing glue switch-over in minutes, its primary market target is the 5-10 person manned shop that specializes in custom woodworking. Amongst the breadth of products that Castle Engineering offers to the market, the Edge Bander is considered a higher profile, higher volume product hence the emphasis to improve its existing control technology as well.

Service and Support
As indicated by Max Durney, the level of attention regarding service and support by E & M and the Siemens team has been unparalleled. Technical proficiency and self sufficient guidance has made this project all the more successful. The recognition of Siemens and E & M as a TIA, (Totally Integrated Automation) provider has had a dramatic impact regarding his existing business model and time to market his products to the industry. Other projects are also underway to retrofit existing technology using Siemens components.
Power tools are two a penny. But however different they are, the one thing they all have in common is what the users expect from them. High quality, long life, reliability. And therefore power screwdrivers, compass saws, slash shears and co. have to prove their capabilities and resistance to stress in various tests before they find their way into industry or DIY departments. Simatic S7-200 proves an unbribable inspector in the continuous testing system of the elwi elektronik Geräte- und Anlagenbau company.

Well-known manufacturers of power tools subject their products to various stress situations during the product development phase to test and optimize the useful life and reliability under different operating conditions. Such continuous tests also accompany production after series introduction to detect weak points and batch faults in good time and prove the consistent lifetime quality.

The elwi elektronik Geräte- und Anlagenbau company in Boxdorf near Dresden offers the industry an appropriate continuous testing system. In Germany, companies such as AEG, Black & Decker and Bosch use this development to test their products.

An integral part of the continuous testing system is the Simatic S7-200 controller. The advantages in favor of the micro-PLC, apart from the optimum price/performance ratio and easy programmability, are the global presence of Siemens and thus the guarantee of reliable customer support. Because the company’s customers are scattered all over the globe – e.g. Hungary, China, Brazil. In addition, everyone at elwi elektronik agrees as far as the availability of the products is concerned: “When we place an electronic order with Siemens today, we can be sure of getting the parts the day after tomorrow.” Unfortunately that cannot always be taken for granted of others!

An overview of the continuous testing system

The power tools can currently be tested on 16 test benches of the continuous testing system. Every one of these test benches is equipped with a compact, high-performance CPU 224 of the Simatic S7-200 and is connected to a host test computer via Profibus DP. Test programs can be created and tests can be started there.

The test computer is in turn connected to a central database server which takes care of the entire data storage. Since different work groups such as Development, Production, Quality Control etc. use this test system, a user management has been implemented. It is possible to monitor ongoing tests from every workstation PC, create new test programs and evaluate data of completed tests.

Samples under strict electronic control

The test program can be freely programmed to represent the life cycle of the sample as realistically as possible. The test run may contain as many different stress scenarios as you like. In addition you program when and which measured data are to be monitored with limit values. The test programs are reloaded dynamically into the Simatic S7-200 controller, the PLC program interprets the loaded code and controls the sample and the load devices accordingly. Various parameters such as current, voltage, temperature etc. are monitored and regulated on the sample.

The tests run for a maximum of 1000 hours. If a parameterized limit value is exceeded beforehand, the test stops and the measured data of the failure time are saved with high resolution. In this way you can determine later which malfunction caused the sample to fail. During the test, all measured data are recorded, processed and passed on to the database server. A tendency of how the measured values change due to wear is then evident for the entire runtime. The report compiled at the end of the test includes all the events that have occurred, a list of the measured values over the whole runtime and all the relevant data for common test logs.
Crystal Clear Advantages

The Glastechnik Holger Kramp GmbH is not only a leading supplier of Italian glass processing machines in Germany, Austria and Switzerland. With water treatment plants for the glass and stone industry out of their own development and production the company makes a useful and environmentally friendly addition to its own range of products. Own innovative solution strategies and technical know-how from Siemens are the key to success!

Water means life and it is important to use this natural resource sparingly! About 70% of the world’s water consumption is accounted for by agriculture, industry uses about 20% and 10% flows into private households. In Europe more than half of the water consumption goes into industry. Water laws for industry among other things aim at preventing uncontrolled water consumption. In order to be able to react quickly to changes in laws and customer needs, the Glastechnik Holger Kramp GmbH in Stockelsdorf near Lübeck relies not only on its own innovative ideas and concepts but also on a flexible and efficient technology made by Siemens.

LOGO! with the extension modules DM 8 230R and DM 16 230R, Siemens protective and switching devices for low voltage and the controllers Simatic S7-200 with TD 200 or S7-300 for more complex tasks are used. Micromaster frequency converters regulate the running and volume of the water pump exactly. The optimum supply with 24 V DC is provided by LOGO!Power.

Complex tasks?...
In the manufacturer of flat glass sawing, drilling and grinding take place using diamond tipped tools and constant addition of water and coolant among other things. The treatment of the contaminated water is the job of the Clean water treatment plants from the Kramp company. They are integrated in the existing water circuit and offer a cleaning capacity of 12,000 to 24,000 l/h.

To achieve an optimum cleaning result at as low a cost as possible, numerous factors have to be coordinated. These are the degree of contamination of the process water, the flow velocity of the water and the clean water consumption of the connected machines, pH and conductivity value, temperature and coolant-lubricant percentage as well as the exact dosing of flocculators and the subsequent reaction. For this it is necessary to enter and control all measuring variables and processes in the right order. If, for example, the pH value does not meet the specifications, water is drained automatically by flow measurement and replaced by the same amount of fresh.
water. Coolant-lubricant must be fed in at the same time. „Only the concept as a whole in connection with state-of-the-art control technology enables a very high efficiency of the plant“ Michael Kramp, authorized signatory of the company, sums it up.

... Siemens offers the solution!

LOGO! with its digital and analog inputs, many functions such as timing and priority circuit, counters for the operating hour metering and control possibilities in the combination with the LOGO! Power power supply has once more proven to be a reliable partner and is therefore preferred by the company. More complex automation jobs are performed with the controllers Simatic S7-200 and S7-300.

The implemented 24 V power supply unit LOGO! Power supplies other components in addition to the logic module such as solenoid valves and floating switches, electronic dosing pumps for the flocculator and sensors for pH and conductivity value determination. Depending on the degree of automation different output powers of the power supply are required. „LOGO!Power 24 V/2.5 A was previously used in the plants, but now we can rely on the new variant with 4 A output current for greater power requirements“, says Michael Kramp enthusiastically, who is impressed above all by the extremely compact design of the youngest member of the LOGO!Power family.

One step ahead worldwide

The plants from Glastechnik Holger Kramp GmbH are exported worldwide beyond the German borders. The high availability of all implemented automation components from Siemens was and is crucially important.

In addition the Siemens products are also equipped for international use. Example LOGO!Power: With its wide range input and internationally recognized standard certifications it can be used on almost all power supply networks in the world without any problems. Additional equipment variants with output voltages of 5 V, 12 V and 15 V for a wide range of possible applications round off the product range.

But the products from Siemens were convincing on all levels. The regulation and control solutions with LOGO! and Simatic for instance are very flexible and offer a number of possibilities for adapting the plants to company conditions later. Technical extensions can be made easily and with little effort even after years. And ultimately the end users of the Siemens products benefit of course. Operation of the plants is easy and can be learned quickly even by technically unskilled personnel. The costs for disposal and cleaning are also reduced. The service lives of the tools are increased by about 35 % and the water consumption falls by about 70 %. Conclusion: Overheads are reduced.
The stage set for the musical Mamma Mia at the Cirkus in Stockholm, Sweden called for a moveable stage with a retractable bridge. To handle the task, Frea, the company responsible for building the stage set, contacted HT Lyftsystem, which specializes in custom lifting and handling solutions. Although artistic demands differ from conventional industrial applications, the two companies opted to use a Simatic S7-200 controller upon consultation with Siemens – a solution which turned out to be ideal for the task.

Mamma mia, what a circus! People rushing back and forth, cables all over the place and partially-finished set props – this sums up the situation in mid-January 2005, only three weeks prior to the opening night. To the untrained eye, it seemed as though the set construction experts would need another three months. But, of course, everything was ready on February 12, 2005, and the premiere of the Swedish production of Mamma Mia! was staged with everything in the right place.

Joining the Siemens team on the Cirkus stage at Djurgården in Stockholm was Göran Eriksson from HT Lyftsystem, a company which specializes in the development of technical lifting and movement solutions tailored to meet customer needs. Depending on the lifting or movement requirements, HT Lyftsystem utilizes lifting tables, trolleys, columns, rail systems as well as balancing and lifting cylinders. Normally, HT Lyftsystem develops adaptations for industrial use. Occasionally, however, it also receives orders of a more unusual kind, where the goal is not to improve the work flow or work environment, but rather to control the artistic effects.

Artistic requirements
A technological solution for a musical poses somewhat different challenges than an industrial solution. With an industrial application, there are certain predefined requirements. In the theater world, however, it becomes a question of artistic perspective. There is a basic idea as to how something should rotate or move, but specific requirements concerning the movements do not always exist. For one, there are no defined measurements. “Specifications” frequently take the form of a hand-drawn sketch providing an approximate idea of what is needed. As a result, HT Lyftsystem, in collaboration with Frea,
converted the special requirements for the Cirkus stage into CAD drawings. These were then used to cut out the sloping, asymmetrical sets and steps.

For the musical Mamma Mia!, various lifting and lowering effects were needed on stage, including a bridge which could be lowered to the level of the stage floor when not in use, and which could be raised during the performance.

Also, a theater stage needs to be able to change its appearance during the performance. At times during the Mamma Mia performance, for example, the stage is a beach, at other times, it is a hotel. Therefore, a retractable bridge with steps was built on the sloping stage floor. The bridge and steps are raised and lowered with the aid of several lifting tables controlled by a Siemens S7-200 controller. There are also two moveable, battery-operated towers on wheels located on the stage which are controlled by a LOGO! logic module.

Relying on LOGO! and S7-200

In the past, HT Lyftsystem has made frequent use of LOGO! logic modules, particularly for the impulse control of various lift and movement solutions. Some of HT Lyftsystem’s other customers include Ericsson, Kraft Foods and Astra Zeneca, whose typical production environments involve a great deal of routine lifting and handling tasks – tasks, however, with very specific requirements when it comes to solutions.

Another example in the world of theater involved a project for the Galenskaparna comedy group at their Casinofeber show. During the show, items such as a roulette table had to be raised onto the stage through controlled openings in the floor. LOGO! was used to control the speed and to coordinate the openings in the floor and the lift. The solution also included radio-controlled sections which move across the floor and lifting arms which move out over the audience.

Yet another exciting job was the launch of a new Scania truck model. Large screens around the walls concealed the stage, opening once the film presentation was over. The stage in turn was divided into three revolving sections, two for trucks, and one for an orchestra. In addition, the seating area was divided up so that, when the show was finished, the trucks could drive out between the seating sections. Just imagine! Eight ton trucks on a revolving stage! Frea built the stage, which required 15 tons of steel, and HT Lyftsystem provided the lifting solution. Once again, everything was controlled by LOGO!

The positive experiences made with LOGO! also played a decisive role in HT Lyftsystem’s decision to utilize a Simatic S7-200 controller for the Mamma Mia! project. Göran had faith in LOGO! It was both easy to use and functional. And if LOGO! had always worked well, he reasoned, why shouldn’t the S7-200 do the same? LOGO! itself, however, was not suitable for the project, because, in this case, the solution required more than digital outputs. Impulse control was not sufficient. Analog outputs were required for proportional control of the hydraulics of the lifting table on the stage. It should be pointed out, however, that a new version of LOGO! since then has been launched with analog outputs, meaning that LOGO! can now also be used for solutions such as the one required for the Mamma Mia! project.

Size is insignificant

With the help of the LOGO! and Simatic S7-200 technology, HT Lyftsystem has successfully developed a highly diverse range of lifting and movement solutions for an equally broad customer base. Despite its small size, the company has shown that it is able to perform on the big stage and, what is more, to do so in style.
As a company specializing in automated equipment for the bakery industry, ABI Ltd. has been making a name for itself as a progressive food processing equipment manufacturer since 1989. With the introduction of production logic solutions from Siemens, things really began to gel at ABI.

W

ith several successful installations around the world, ABI Ltd. owes much of its success to an almost mantra-like commitment to offering its customers solutions that are cost effective and user friendly. A few years ago, however, the high costs of point-to-point hardwiring forced ABI to seek out a more advanced level of communication technology. ABI owner Alex Kuperman found exactly what he was looking for in the LOGO!.

“For simpler applications where you don’t need a full-blown PLC, you can really save some costs and add simplicity to the programming and you don’t need a computer interface in order to program the LOGO!,” says Kuperman.

Modularity is the spice of life

When additional logic is required, ABI relies on the modular design of the Simatic S7-200 PLC series which dovetails nicely with ABI’s manufacturing philosophy of producing customized equipment that its customers can expand as needed. ABI produces bagel production line machines that are modularly constructed. This allows for gradual implementation of automatic features such as a production line scale enabling a large weight range of between 1.75 ounces and 6 ounces, “Quick Change” changeover options, automatic dough feeding and controlled pan oiling. The Step7-Micro/WIN software makes programming the S7-200 easy to learn through the use of powerful wizards that can simply handle more advanced tasks. Since Simatic S7-200 PLC can be easily expanded to meet exact requirements, ABI can build a machine that offers customers the capability of adding features as they become necessary and at their own pace.

Easy and practical

The Simatic TP070 touch panel has helped ABI further cement its position as a leader in the global bagel equipment industry. Easy to use, the TP070 operator interface terminal allows ABI customers to quickly adjust pattern variation, perform on-screen diagnostics, and take advantage of the dial-in remote troubleshooting capability. By displaying information in an easy-to-understand format, the operator can operate the equipment with a minimal amount of training – always an important consideration for ABI when designing equipment solutions. “As an OEM, we’re always focused on two things – cost competitiveness and ease of use. LOGO! and the Simatic S7-200 series meet those criteria perfectly.
Performing Under Icy Conditions

For a company that manufactures ice storage and distribution systems, you wouldn’t think water would be the root cause of a serious operational challenge. Unless it’s seawater. That’s coming into contact with the wiring in the relay and timer system used to control the ice making and delivery functions in the ice dispenser units you manufacture. Then, it is a problem. A big one.

When Sunwell was designing its next generation of Deepchill™ Variable-State ice preservation technology, they knew that their success would hinge on finding an innovative control solution that could operate in a demanding environment. Based on slurry ice—a cooling medium comprised of millions of ice micro-crystals suspended in a liquid brine solution—Variable-State ice technology allows Sunwell customers to create optimal cooling and preservation conditions to maximize their product quality and freshness.

A solution was needed that would allow for the continuous transformation of slurry ice through a range of ice-states under a number of challenging environmental factors including exposure to corrosion. Sunwell turned to Siemens for a state-of-the-art control solution that would not only meet its requirements but one that could be serviced and supported around the world.

With a large customer base of food preservation companies including commercial fishing outfits whose livelihoods depend on preserving their catch for extended periods of time while at sea, Sunwell had to find an automated process they could rely on. The S7-200 PLC solution was the perfect solution to provide the automatic control Sunwell was seeking for the ice making and the delivery functions of the Deepchill™ ice system.

The S7-200 allows the dispenser to discharge a predetermined and precisely measured amount of slurry, instantaneously at the flick of a switch. The Slurry Ice Dispenser is fully automated and can provide variable ice fraction discharge (as high as 65 percent ice fraction) as well as variable quantity discharge depending on how the PLC is programmed.

A TD200 Display attached to the generator allows users to easily monitor the process

The introduction of built-in analog meant better system control as Sunwell could offer its customers the capability of using a TD200 display monitor to see the precise amount of ice in the dispenser. This allowed the ice-making process to be adjusted for maximum efficiency of the system.

“The Siemens technology allows us to maximize the performance of our equipment and push its operating capabilities beyond what would otherwise be possible,” says Sunwell owner Vladimir Goldstein, adding “and it allows us to offer a wider range of Variable-State Deepchill™ to our clients, and at the same time, operate the equipment in much more diverse and extreme environments.” In addition, the PLC controls many of the functions of the ModuPak™ Deepchill™ Ice Generator including ice temperature with an adjustable set point, motor starters, current relay overload protection and high/low pressure cutout to name a few. The implementation of PLC technology and Siemens large global footprint has made servicing customers much easier for Sunwell. With customers which are sometimes thousands of miles away, the modularity of the S7-200 made changing timers in the field a snap—a convenience customers applauded.

Because Sunwell has customers on six continents, the decision to choose Siemens PLC technology was made easier by the fact that Siemens has service in over 190 countries and already had many of the Maritime and Shipping approvals in place which eliminated unnecessary delays in servicing customers. One big upside is how the S7-200 has freed up Sunwell engineers to focus on product innovation. “The PLC has allowed us to expand what we do,” says Sunwell’s Roger Castonguay. “In the past, when you were on timers and relays you tried to limit what you did.” Today, this increased flexibility allows Sunwell to set its sights much further into the future than it did in the past.

ModuPak™ and Deepchill™ are Trademarks of Sunwell Technologies Inc.

The Micro PLC Simatic S7-200 in combination with a TD200 Display and Micromaster frequency converters allow the ice-making process to be adjusted for maximum efficiency of the system.

Simatic S7-200 controls Deepchill™ ice system

Canada
Corfisa has been one of the leading refrigerated warehouse operations in Uruguay for more than half a century. Battery-operated lifting platforms, forklifts and freight elevators are used to transport goods. Recently, the company began utilizing battery chargers controlled by LOGO! to improve the battery charging performance. As a result, previous shortcomings such as operational readiness, time expenditure and costs are a thing of the past.

Food items from well-known manufacturers destined for import and export markets are temporarily stored in the refrigerated warehouses. The goods are transported using battery-operated vehicles. In the past, recharging the batteries always proved to be problematic, resulting, for example, in premature transport vehicle breakdowns. This reduced the life span of the batteries, in some cases, by more than half, making new acquisitions necessary. Due to the sizable battery stockpile as well as the purchase price, the company incurred additional costs amounting to tens of thousands of dollars. Consequently, the company’s technical department decided to equip its existing battery chargers with LOGO!. Now, the upgraded units not only reliably control and monitor the entire battery recharging process, enabling the staff to fully focus its attention on the movement of the goods. They have also simplified maintenance and reduced the need for spare parts. Moreover, the logic module solution was extremely attractive in terms of price.

LOGO! improves charge management

The LOGO!-controlled battery chargers improve the overall recharge management and contribute to the desired extension of the battery life span. The recharging process is monitored for voltage and time. Thereby, the control of the temperature protection plays a key role. At the start of the recharging process, strongly drained batteries are charged with the primary current of the recharging unit, with the result that the capacity of the device is briefly exceeded by 100%. The collateral heat increase of the recharging device results in an interruption of the recharging process. Recharging does not resume until the unit’s temperature once again drops. Significant temperature increases lead to a blockage of the recharging process along with a fault signal. Upon completion of the recharging process, a corresponding message appears on the display. Apart from the actual recharging time, the battery voltage is also displayed. This ensures that only completely charged batteries go back into operation. If a battery remains connected to the device after completion of the recharging process – for example, over the weekend –, LOGO! initiates an equalizing charge. This extends the life span of the batteries.

Naturally, the recharging time is stored after completion of the equalizing charge. Documentation of these times is important for tracking the life span of the batteries. The equalizing charges can also be performed manually. Also, synchronizing the recharging processes with the electric utility company's three tier tariff scale has proven to be cost-effective option. Thereby, the recharging procedure is automatically interrupted during the expensive daytime period and resumed at more favorable tariff time.
Major hotel chains are investing in building automation with the twofold intention of offering their guests both comfort and security while also reducing maintenance and staffing costs. Together with its contractor, DPM Engenharia, the Blue Tree Towers Hotel in Fortaleza, Brazil, selected an automation solution that uses Simatic S7-200 and AS-Interface.

A total of eight Simatic S7-200 controllers, linked together in a PPI network, assume the monitoring and control functions for approximately 450 data points in the hotel building. A CPU 226 forms the core of the system where all the information and data converge. Interfacing this CPU with the hotel’s surveillance system allows for centralized real-time surveillance. According to DPM Engenharia, the decisive advantage of the Simatic S7-200 is its ability to very flexibly expand or modify existing solutions with the help of these controllers. This enables the company to easily and precisely fulfill the needs of the customers. Thus, the controller was able to hold its own when compared with building controllers which operate with predefined options.

**Simatic makes it happen**

At the Blue Tree Towers Hotel, a Simatic S7-200 controls the lighting system in the public areas of the building and monitors the switchgear, motors and generators. With the micro PLC, the water supply is also “in the best of hands.” It controls the pumps for the service and drinking water circuits, the well water pumps as well as the waste water pumps and pressure supply for the sprinkler system. Other tasks include control and monitoring of the air conditioning system as well as the gas heater and circulation pumps for water heating. The cold storage rooms, various LNG sensors as well as smoke and fire detectors are also monitored.

**Hand-in-hand with AS-Interface**

To monitor the “standard” floors, the controller architecture was expanded with an AS-Interface. This was achieved with the help of two CP 243-2 AS-Interface master modules. The concept allows for control of the electrical circuits for lighting the public building areas as well as surveillance of the emergency exits and alarm buttons. Consequently, the power supply for all 22 floors is provided with a low-scale infrastructure. Supply and communication of the AS-Interface modules is ensured with only one cable. “We were able to achieve an elegant and robust solution,” as Jaime Alex Boscov of DPM Engenharia explains. The outcome proved to be so technically and cost-efficiently rewarding that DPM also plans to apply the solution to a current building automation project.
The danger lurks in the hot water shower: legionella. For years, Epro Impianti of Florence, Italy has directed its efforts at eliminating this bacterium from water supply systems. The LOGO! logic module integrated into the “Lilliput” mini disinfection system controls all of the manufacturing processes for the environmentally friendly disinfectant chlorine dioxide, as well as its measured introduction into areas at risk.

Legionella is a bacterium found only in fresh water, where it thrives at temperatures of between 25–55 °Celsius. As a result, hot water systems and tanks in houses, hospitals, residential homes, hotels as well as hot tubs are all potential incubators for germs, particularly if the pipes are poorly maintained, or only used from time to time. As a rule, legionella poses little threat to healthy individuals or when ingested as drinking water. It is only harmful when inhaled in large quantities by people with a weakened immune system, for example, through the water spray of a shower. Symptoms of an infection range from flu-like illnesses to Legionnaire’s disease, which may even be fatal. Chlorine dioxide, a long-lasting biocide disinfectant and not hazardous to the environment, is an effective combatant against legionella.

“Small” agent with a critical mission

In the Lilliput chlorine dioxide generator developed by Epro, small volumes of chlorine dioxide are synthesized, automatically dosed and distributed to one or two different systems. The compact generator primarily prevents the spread of legionella pneumophila in industrial hot water systems and cooling towers. However, it can also be used for disinfecting small water utility plants. The Lilliput system was also developed as an alternative for large scale, expensive systems fitted with industrial generators.

Great success in small spaces

The LOGO! 12/24 RC logic module with two expansion modules forms the control center of the Lilliput unit, which is reliably supplied with current by the LOGO! Power 24 VDC 1.3 A. A lead-acid battery for buffering also ensures that spikes in consumption of the controlled devices are equalized, and that certain operating phases are not interrupted during a power outage.

LOGO! controls the solenoid valves and dosing pumps used to manufacture and distribute the chlorine dioxide. LOGO! is also used for quantity control, pressure monitoring and level control. When the manufactured chlorine dioxide stored in the tank is almost used up, LOGO! initiates the renewed production. This is achieved by switching on the dosing pumps for the reagents. The logic module monitors the reagent quantity in the converter diluter with the help of sensors located on the pumps, and ceases its filling when a predefined value is reached. After completion of the reaction, the concentrated solution is automatically diluted with water until the level sensor located in the converter diluter signals that the filling level has been reached. The diluted solution is then drained into the storage tank via a triggered drain valve.

System operation faults are shown on the LOGO! display. While simple fault signals result in a temporary suspension of generator operation, critical fault signals block operation of the device altogether until appropriate measures are undertaken by the operator.

During the development of Lilliput, LOGO! proved to be a versatile and, in particular, user-friendly solution. “The programming is intuitive and also very straightforward for novices,” as Mr Tavanti from Epro Impianti explains. “In addition, the option to simulate operation on a PC is extremely practical when it comes to eliminating programming errors.”
Italy is the second largest wine producer in the world, generating around 52 million hectoliters per year. A production volume of that magnitude would be unthinkable without industrialized manufacturing processes. Siemens controllers have long been a quality feature of the automated wine presses developed by Diemme S.p.A.

Diemme S.p.A., based in the province of Ravenna for more than 70 years, is a leading enterprise in the wine industry. With more than 100 employees, the company produces wine presses and other wine-making equipment. Related automation tasks were solved with Simatic S5 practically from the moment the controller was launched onto the market. The company has relied on the Simatic S7-200 micro PLC for approximately four years now, a decision prompted by the compact design of the controller, and by the options it provides for simple integration into existing systems.

**Fully automatic grape presses**

Once the user has selected an operating program, the Simatic S7-200 controls the entire pressing cycle by automatically selecting different motors and solenoid valves. The USS protocol for drives enables communication between the controller and the drives without the need for additional hardware. A simple, space saving communications bus is also included in the automation solution. This enables the company to offer customers cost-efficient, tailored solutions – an important requirement for competitiveness in today’s markets.

**Easy remote control**

The EM 241 modem expansion module enables remote control of the grape presses. The option of remote data transfer and remote programming reduces the costs for maintenance work, and allows programming changes to be made worldwide. The modem expansion module supports the telephone standard in numerous countries. Thanks to the Industrial Ethernet CP 243-1 communication processor, the Simatic S7-200 controller can also be integrated into Ethernet networks. The module can support up to eight TCP/IP connections fitted with other nodes for more complex applications. Examples include data exchanges with the Simatic S7-300 and S7-400 or with a PC. Likewise, PC applications can access the information from Simatic S7-200 via Ethernet and OPC – both to archive as well as process this data. The STEP 7 MicroWIN software also played a key role in Diemme’s decision in favor of Simatic S7-200. The program combines simplicity with an extraordinary number of functions, which, at that, are very quickly configured with the help of “programming assistants.”
Remote monitoring and control of immersion pumps from the electricity company DEI at Ptolemaida power station

Practical Telecontrol Solution

The Ptolemaida power station is supplied with processing water from a number of remote springs. Up to now, the springs have had to be controlled on site. A remote monitoring solution using the Simatic S7-200 makes routine checks redundant and facilitates selective maintenance and repair assignments.

Until now it has been necessary to switch the respective spring on or off on site. Due to the location of the individual springs and because of the prevailing weather conditions in winter, a number of the springs were off line for longer periods than they were accessible. Status information (operation, faults etc.) was also lacking.

To solve these problems, Siemens installed and commissioned a remote control system for the immersion pumps. A micro PLC from the Simatic S7-200 CPU 224 range was used and a Simatic IL40 industrial PC was installed in the control room. Protool/Pro visualization software runs on the computer. Communication with the micro PLC is wireless and via Ethernet TCP/IP using the CP 243-1 communication processor and a radio modem.

323 rooms and suites at the Hotel Calypso on Rhodes have been fitted with LOGO! and the DMB expansion module, increasing the comfort of the hotel guests.

Outside each room, there are three LED displays which signal whether a guest is occupying the room, does not want to be disturbed or whether the room is accessible to housekeeping. At different points in the room, there are buttons for operating various functions (e.g. lights, air conditioning, blinds) and sensors. All these room functions are controlled by LOGO!. When a guest enters or leaves the room, inserting or removing their magnetic key card from the reader at the door, LOGO! automatically starts a series of specified functions. For example, LOGO! switches off all appliances when the guest leaves the room. Only the outlet for the minibar and one outlet for charging a number of devices remain switched on.

The application was developed by Kostas Vrouchos (electrical engineer) and Michalis Karras (mechanical engineer) and programmed by Kostas Vrouchos. The installation was carried out by Stirixis Techniki and Rhythmos A.T.E., the companies which had jointly been awarded the contract to renovate the hotel.
The “50/10t” overhead gantry cranes produced by Jiangyin Kito Crane Co., Ltd. are among the creme de la creme of speed-regulated cranes. The company’s recipe for success is based on the perfect interaction of LOGO! and frequency converters. Customers of Jiangyin Kito who have benefited from the promising combination include General Motors Shanghai.

The control of cranes is notorious for its difficult alignment, as deviations and, in particular, steep acceleration and deceleration ramps can lead to unstable load behavior. This is not the case at General Motors. Its overhead “50/10t” gantry type cranes are fitted with frequency converters for speed regulation. For the past two years, they have successfully performed up to the Group’s complete satisfaction. Other customers are also increasingly utilizing the speed regulated cranes for many important projects. In fact, their areas of application are constantly growing.

It is easy to understand why LOGO! was chosen for the control technology. LOGO! scores very well with its simple operation and control qualities. Engineers also consider the option of carrying out tests directly on the system a highly important feature. Moreover, high output currents can be made available by using corresponding expansion modules with relay outputs. At General Motors Shanghai, this saved on relays, and the resulting simplified system structure led to the improved stability of the entire system. Commissioning and maintenance were also simplified.

Automatic speed control
Signals such as lifting/lowering speed, slow, medium or fast travel are detected via the LOGO! inputs. Automatic speed control of the motors is achieved via activation of the frequency converters by LOGO!. Motor speed, motor braking, direction of rotation and ON/OFF switching, for example, are controlled by LOGO!. Thanks to this technology, the speed-controlled overhead cranes at General Motors are able to execute lifting and lowering in four speed phases, as well as travel at slow, medium or fast speeds. The power supply is provided by a separate transformer. This reduces susceptibility to faults.

Simply logical and robust
LOGO! is easy to program, requiring no additional programming unit. The LOGO! programming language is practically designed and easy to learn – a factor which many customers greatly value. Programming is performed smoothly with the help of the LOGO! user interface. The available logic functions, including AND, OR, NOT as well as the options for time control, are ideal for controlling cranes. Moreover, LOGO! is also a very reasonably priced solution. Given that the programs are saved in an EPROM, the functions continue to be available when the power supply is interrupted. With the “50/10t” gantry cranes at General Motors Shanghai, high-frequency resonance and magnetic fields may be produced in the converter. Here, LOGO! also scores well with its low fault susceptibility, and need not shy away from any comparison with a PLC. The simulation software also enables the process to be represented on the PC, as well as using the PC for programming purposes. As a result, it is very easy to conduct tests.

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