Browsing through Success

A panorama of MES Applications with SIMATIC IT

Edition 2012

SIMATIC IT Reference Book

Answers for industry.
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The Only Way is Up

3A Composites - MES solution with SIMATIC IT

Value Creation through Data Analysis

Foam board producer 3A Composites in Osnabrück has ramped up its production and quality goals and for that purpose integrated a Manufacturing Execution System (MES) in their newest production line. The system automatically acquires all process and quality data and aggregates them into information that facilitates root cause analysis in the production, contributes to the continuous improvement of products and production processes, and helps reduce the overall production costs.

The customer

3A Composites GmbH (formerly known as Alcan KAPA) has over 40 years experience in the production and marketing of Aluminium-composite boards, structural composite materials, plastic and foam boards, under brand names such as Alucobond, Dibond and Kapa. The company has sites in Osnabrück and Singen, employing around 500 people.

The 3A Composites products are used in applications such as model-building, booth construction, production plant construction, carrier material for advertising, as well as in the automotive industry.

Innovation, creativity, reliability and a strong customer orientation are top of the agenda at 3A Composites.

The business challenge

The aim was to implement a state-of-the-art production plant, covering a considerably higher number of process parameters than was the case in the existing plants. In the past, recipes were issued and handled by SAP (in the form of master material data and bills of materials). Foam recipes were sent to the production floor in electronic format, each machine being provided with data through a machine record card. Material consumption was calculated based on the actual number of finished products that left the machine, using the data in the master recipe or the bill of materials.

The main goal of the MES implementation was to increase process reliability by providing complete visibility over production processes, so production deficiencies could be immediately traced back to the cause. This was particularly important in cases where defects could be attributed to different causes in the process.

The main goals of the project were as follows:

• error-free electronic supply to the production plant of recipe and machine data
• Collection of process and quality data in a common database, for quick calculations, tracking and tracing
• Fast and accurate troubleshooting based on historical data records
• Improved evaluation and calculation of costs based on actual material consumption
The solution

The realized solution based on SIMATIC IT the manufacturing execution system from Siemens, fully meets the requirements of 3A Composites. Important aspects in choosing the system were its process orientated and modular approach and the broad scope of functionality of the system.

The company had already had good experiences with Siemens automation products in the past and anticipated that the implementation of further products from this portfolio would significantly simplify their integration into the existing IT landscape. Another success factor was the good and close cooperation with the service provider and system integrator, advenco Consulting GmbH. All encountered issues were openly discussed and implemented into efficient solutions in close cooperation between the customer and the solution provider.

The project was implemented in three phases: the analysis of the processes with the creation of the requirements specification, the implementation of the requirements with SIMATIC IT and the go-live phase.

The main goals of the project, as mentioned above, were translated into a detailed description of the main tasks of the system:

- process data archiving and quality data visualization
- tracking & tracing
- facilitate paperless recipe management and integration with the Siemens SCADA (supervisory control and data acquisition) system WinCC for the automatic exchange of machine setting parameters (to WinCC) and logging of the actual machine parameters during execution (on SIMATIC IT)
- production order management and archiving on MES level
- simplify production data collection and automated feedback to SAP of material consumption and actual times
- Identification of key performance indicators for the targeted optimization of all production processes in the frame of the continuous improvement process (CIP)

The MES registers and visualizes the process data related to the execution of the production orders. This, contextualized with production order information and ingoing material batches as well as machine parameters, results in complete product traceability. The system also plays the role of central recipe database. From the SAP system, existing foam recipes are automatically adopted in the MES. These serve as the basis for the new foam recipes for this
particular production line, extended with missing or new process parameters, procedure steps and individual formulas, ....
The material management module synchronizes the material master data and bills of materials with the SAP system through the ERP interface provided by SIMATIC IT.

Combining order management, recipe management and material management functionality, the MES generates a production order and visualizes it to the plant manager who initiates the order execution through the WinCC SCADA system to the control systems. The MES is also responsible for the complete feedback of actual quantities, production times and status to the ERP system.

**The Result**
The open and modular approach of SIMATIC IT allowed for the integration of the existing quality management system, as well as the gradual roll-out of the system to additional production lines across the entire process chain. This significantly reduced the project engineering effort and ensured the consistency of the solution, but it also secured the investment towards the future.

The common database of process and quality data is the basis for real-time root cause analysis in case of in product variations. This enables immediate interventions in order to minimize further material loss. The analysis of process and product data also supports the optimization of processes and recipes. This leads to the continuous improvement of production efficiency and product quality.

At the same time the requirements regarding product tracking and tracing (e.g. for the automotive industry) are also met by the availability of historical data. The analyses and cost calculations based on actual (vs. theoretical) consumption information enable accurate material planning and thus help reduce costs.

**The future**
The integration of SIMATIC IT forms the foundation for the further implementation of product tracking, extended product genealogy, process data traceability (a specific requirement for the automotive industry), and RFID for material tracking.
At a glance

**Company:**
3A Composites GmbH
www.3acomposites.com

**Industry:** Chemicals

**Partner:**
advenco Consulting GmbH
www.advenco.de

**Key Challenges:**
- Integrated and homogeneous production system
- Acquisition of large volumes of production data
- Production transparency and actual cost calculation

**Solution:**
TIA:
- SIMATIC IT Production Suite
- SIMATIC WinCC

**Key Benefits:**
- Continuous improvements in production processes
- Improved product quality
- Reduced production costs

Screen 1: The MES-Portal offers each user a visualization of the data relevant to his profile

Screen 2: Recipe management: the MES plays the role of central recipe database and exchanges all relevant process data with SAP

Screen 3: Error alert: the System supports the user in data acquisition and error handling
Reliable Availability

Grupo AC MARCA: MES solution with SIMATIC IT

AC MARCA has achieved maximum flexibility and efficiency in the production processes at its plant in Sant Llorenç d’Hortons. This was the result of implementing SIMATIC IT MES (Manufacturing Execution Systems) to cover production management and establish real-time interoperability with SAP. To ensure optimum availability of both the plant and the systems AC MARCA opted for the Agent-based Diagnosis Services offered by Siemens, for predictive and preventive maintenance.

The business challenge

To AC MARCA it is of greatest importance to have the flexibility and agility in place to meet its customers’ requirements.

The construction of a new plant in Sant Llorenç d’Hortons was the ideal occasion to make this flexibility an integral aspect of production, and gain production efficiency and operational cost reductions at the same time.

The existing manual and paper-based processes and information exchange could not cover this strategy, so it was decided to bring in a MES to manage the production and automate production orders, material consumption, notifications, production quantities, pallet labeling, etc.

From a functional point of view this production management system had to offer the possibility to integrate different production units in one single system. It had to provide a standard interface with the SAP system to allow real-time mutual data exchange and communication with the machines in production, as well as personnel management and automatic label management.

The customer

Grupo AC MARCA is a Spanish manufacturer of a wide range of products for home and personal care as well as DIY products. From its headquarters in L’Hospitalet de Llobregat, near Barcelona, the company operates a total of five factories, two in Spain, one in France, one in Czech Republic and one in Mexico, and sales offices in 8 countries.

AC MARCA’s extensive product portfolio includes a large variety of detergents, floor wax, dies, shoe polish, hair gel, shampoo, glues, etc. Many of their brands such as IBERIA, NORIT, ORION, GIORGI, LIDA, ALEX, PASO, YAK, BRIL are local market leaders.

The location in Sant Llorenç d’Hortons covers the production of household products such as Norit, Gior, Iberia, Yak, Sanytol, and personal care products including Giorgi, Lida, Hidrogenesse, Cabello Sano Ecran, etc. On top of the manufacturing activities the 26.000 m2 premises also house the services and logistics and R&D departments. All of which is handled by a workforce of 150.

SIMATIC IT
The solution

Several arguments justified the selection of Siemens' MES SIMATIC IT. Siemens was the only vendor offering hardware, software as well as services, and able to automate both the discrete as well as the process manufacturing areas, and cover the connection to SAP with an MES system.

SIMATIC IT offers a single platform covering the complete MES layer and integrates seamlessly with other Siemens systems such as the PCS7 process control system. This was particularly important to accomplish the predefined integrated production management model.

Siemens was also able to function as the system integrator for the MES system. This reduced the number of involved parties, facilitated the communication during the project and helped speed up the start of operations.

When starting the production at the new plant in Sant Llorenç d’Hortons the management wanted basic MES functionality covered from the start. The entire system was in fact native to the plant. Being fully embedded from the design phase, when a new production line in the Greenfield plant was ready to become operational, so was the MES system.

SIMATIC IT now covers functionality such as process management, SAP integration, personnel management, production order management, material management, downtime management, box and pallet labeling, traceability, CIP/PIG registering, and basic data collection from process and filling lines.

Process management is handled through the SIMATIC IT Production Modeler which allows to define a clear and integrated model of plant operations.

The SIMATIC IT Production Modeler triggers the different system components to initiate certain operations. This also includes the functionality offered by PCS7 and Simatic Batch, such as recipe definition and management, automatic or manual batch execution, process control points and process data acquisition. For instance, equipment and pipe cleaning (CIP/PIG) are scheduled and can be registered to avoid contamination in case of product switchovers.

The interaction with SAP is bidirectional and consists in the downloading from SAP to SIMATIC IT of production orders, master data, and the uploading and notification from MES to SAP of information such as production output, order status, line personnel status, quality control, etc. SIMATIC IT visualizes which production order is active on which production line, and the output quantities.

When the pallet of final products leaves the production line SAP is notified and feeds back the product description for the labels to MES which functions as the interface to the label printer.

All of this is done automatically, no personnel traffic, no paper traffic required. This increased efficiency, and resulting cost savings and profit increases make it more important than ever to guarantee system availability and continuity. The people at AC MARCA were well aware of this.

In case of a system failure the entire production process may come to a halt. The time it takes to solve the problem is money lost, so qualified people need to be available to deliver immediate solutions. As work shifts at the plant cover over 16 hours per day, and master data synchronization takes place at night, ensuring a 24/7 supervision was hardly an exaggerated measure.

The SIMATIC IT Agent-based Diagnosis Service does just that. And more. Not only does it ensure that the system is constantly monitored.
It also offers assistance in the restart or shutdown of an application, ensuring that it is done properly and sparing the people at AC MARCA the trouble of studying the system in detail.

The Agents are installed in the systems at the customer site analyzing events related to the hardware, software and applications. When a problem is detected at the customer site, the agents alert the SIMATIC IT Technical Support Service (TSS) people who take immediate action. Say for instance that a system error prevents the loading of production orders, blocking the entire system until a system reboot is initiated. When Agents are in place the problem will be reported to the TSS as soon as it occurs or even before it actually happens. Through a secure VPN connection the TSS team has the necessary visibility on the system to verify the cause of the problem and, in agreement with the customer, can do a remote reboot of the system within minutes. No data are lost. The downtime is nil.

Afterwards this case is analyzed and the necessary steps can be taken to prevent the problem from occurring again.

The pay-off

SIMATIC IT has played an important role in the introduction of the integrated management model which in turn substantially contributed to the reduction of operational costs. The scalable and modular approach of SIMATIC IT allows roll-out and scaling of the solution towards other plants in the AC MARCA Group.

The implementation of the integrated production model has not only seriously reduced the amount of time and costs spent on administration and paperwork. It also helps avoid errors in the production management thus improving the quality of the information.
Qualitative and cost effective manufacturing of live stock nutritional products

A large-scale deployment of SIMATIC IT enables the complete vertical and horizontal integration of all IT and control elements at Ambar Feed - Mills. The system’s deployment, carried out by Ardan Control Tech in Israel, brings to life the complete integration of SIMATIC IT with other Siemens systems (PCS7, Simatic Batch, Route Control, Step 7) and 3rd Party systems including ERP, TMS & SCM. Installation of the system is carried out simultaneously in 3 of the company’s sites.

The customer

Ambar Feed - Mills is one of the biggest feed-mills in the Middle East, and it is run in compliance with the world’s most advanced manufacturing methods and regulations. Ambar produces and sells over 1.1 Million tons of feed yearly. Ambar which was founded in 1961 as a regional facility is presently owned by the Granot farms and by over 148 farming communities. Ambar owns two major production sites, Ambar North - located in the Granot industrial area, and Ambar South - in the northeastern Negev. The company produces its own vitamins premix in its independent production plant, from totally secure sources, thus ensuring maximum quality and reliability. Ambar produces animal-feed for several sectors, including broilers, turkeys, breeders, layers, dairy herds, calves, sheep and fish. Ambar’s mission is to serve all sectors of the livestock economy by supplying the optimum kinds of feed in terms of economic feasibility and nutrition. To provide response to each sector’s individual requirements, Ambar launched a special feed mill for the breeder sector, operating according to strict bio-security regulations. Ambar facilities also include a state of the art laboratory that works closely with the nutrition department. Its innovative production line makes it possible to provide solutions for the entire range of customer needs, and is fully backed by a dedicated technical office. Ambar’s shipping department operates a large fleet of the latest, clean and sterilized trucks.
The business challenge

The growing demand for both large production quantities that would satisfy market needs on one hand, and complying with specific demands from individual customers on the other hand, demanded a fully integrated industrial IT system that would ensure both reliable and cost effective manufacturing.

In order to accomplish such a system Ardan Control Tech applied the Siemens TIA (Totally Integrated Automation) architecture, enabling an overall integration of floor shop systems with all IT and control elements.

Another requirement of Ambar was that the system installed would enable future development of the IT infrastructure and allow the required flexibility to expand. This to keep in step with the organizational growth.

Ambar’s requirements demanded full synchronization of the business system level (ERP) down to the control level.

The need to centrally manage all plant floor elements demanded the deployment of a widely distributed control system that would fully comply with regulations and system standards ISA-88 & ISA-95, whilst enabling batch based manufacturing.

The synchronization with all production related activities, such as quality assurance, packaging, storage, loading & dispatch, etc., created the need for a 3rd generation MES system.

A system that would be both horizontally and vertically integrated to make these data available in real time.

Ardan Control Tech was asked to carry out not only the SIMATIC IT part of the project, but also all other Siemens IT products that are part of the TIA strategy: Simatic PCS7, Batch Engine and Route Control.

The mission was to carry out all project phases while all Ambar plants were running with no obstruction or disturbance to the operations.
Process

Ardan Control Tech

Ardan Control Tech is a leading provider of Industrial IT and control solutions, operating in versatile industrial markets: Process, Discrete, Hybrid, Energy management, Power plants and Petrochemical facilities.

Ardan expertise in the field of industrial IT encompasses the mastery of a variety of disciplines required for floor shop solutions: MES, DCS systems, control & PLC solutions, Data acquisition, RFID, HMI systems etc.

As a long term partner of Siemens, Ardan masters the execution of the TIA strategy and is experienced in the integration and deployment of the following: SIMATIC IT MES system, Simatic PCS7, Simatic Batch, WinCC, Plant intelligence, Rout Control, Step7 PLC's, RFID and others.

Ardan’s experience is based not only on implementing SIMATIC IT but also on its integration with third party systems in multi-site, large installations.

The company’s ability to integrate different technologies through the project definition, planning, engineering, supply of equipment, installation and programming, enables ACT to supply the customer with a comprehensive, end-to-end Industrial IT solution.

Based in Tel Aviv - Israel, ACT performs projects in Israel, Eastern Europe, Asia, and Africa.

ACT was established in 1984 as a member of the Nisko-Ardan group, whose annual turnover exceeds $ 340 M.

The company employs over 130 skilled engineers and technicians, a stuff aimed at supplying the customer with the best technical and cost effective solutions, combined with a developed service orientation.

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The solution

For the realization of a multi integrated floor shop system the choice fell on the 3rd generation MES, SIMATIC IT.

Covering all aspects of the production process whilst supplying continuous and online feedback to the ERP system, was made possible through the deployment of the comprehensive Production Suite.

The Production Suite imports and exports data to and from the ERP, SCM and Transportation Management systems through the data integration server. Communication and integration of the MES with Simatic Batch and PCS7, is done via the Real Time Data Server.

SIMATIC IT manages all data flows, both horizontally and vertically and validates all data before exchange with neighbouring systems.

The data exchanged with the ERP level include order data, master recipes, BOM, material consumption, work order status, lab sampling, freight data, loading data, etc. Bulk loading orders and trailer data are exchanged with the transportation management system.

Production data, batch data, execution reporting and alerts are exchanged with Simatic Batch and Simatic PCS7, thus enabling continuous monitoring of the production lines and data acquisition.

Future installations will include the LIMS SIMATIC IT Unilab and the Historian, thus broadening the horizontal deployment of the comprehensive suite.

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Quenching your Thirst for Quality

Birra Peroni SpA: Quality Management with SIMATIC IT Unilab

Birra Peroni SpA implemented Siemens’ LIMS SIMATIC IT Unilab for a centralized approach to quality management across several plants and labs.

They have realized substantial improvements in product quality and are now well equipped to address regulatory issues.

The business challenge

Before the decision to implement a LIMS solution, a software interface for quality data input and output was in place, however this was a customized solution and not centralized.

With the growth of the business it became increasingly difficult to manage and collect the equally growing quantities of data. On top of that came the necessity to respect the HACCP principles and the desire to obtain ISO certification for product quality.

This joint trio of requirements highlighted the need to centralize product specifications and quality data management and make it easier to change parameters and specifications, all located in a common server.

A system was needed that would offer easy data acquisition for product traceability along the process.

This demands deep understanding of the processes as well as a centralized system that allows configuration and offers the right level of uniformity in recording and reporting on data.

The customer

Birra Peroni SpA is a SABMiller subsidiary consisting of 3 breweries. The headquarters of Peroni as well as the largest brewery are located in Rome. The other two Peroni breweries are located in Bari and Padova.

Birra Peroni is the second brewer in its home market, whereas its mother company SABMiller is the world’s second large brewer.

Peroni stands for the style and the exclusive taste of Italian beer. The Peroni breweries produce two principal brands: Peroni and Nastro Azzurro.

Where Peroni is the number one beer brand in Italy, Nastro Azzurro has become an international brand and is the most exported of Italian beers. Nastro Azzurro is also produced under license in many countries.

The total beer production of the Peroni breweries is about 6.300.000 hectoliters with a total of about 800 employees on a total of 9 production lines at its 3 sites.
The solution

The SIMATIC IT Unilab LIMS including the Report Manager was the most complete solution and best suited for centralized collection and management of laboratory data in a company with several labs and plants.

The system is configurable and customizable according to the production needs. Realizing the best possible configuration required a deep knowledge of the production processes on the one hand and experience with the system on the other hand.

This involved strong support from the supplier in order to create a good and effective environment for the users, as well as involvement and training of lab managers and analysts, starting from day one.

Another important aspect of the project was the harmonization and automation of reports, based on the Report Manager. After an initial learning and guidance phase the Lab Manager was ready to run both SIMATIC IT Unilab and Report Manager and manage reporting autonomously, creating and customizing detailed reports according to the current needs.

The system is able to collect large quantities of data that allow fast response to increasingly complex regulatory requests.

But the prompt availability of this information also allows a statistical approach to quality, which helps support process management and development.
At a glance

Company: Birra Peroni SpA
www.peroni.it

Industry: Brewing

Key Challenges:
• Large data quantity handling
• Centralized quality management
• Harmonized and automated reporting

Solution:
• SIMATIC IT Unilab

Key Benefits:
• Product quality improvements
• ISO certification for product quality
• Process management support
• Product traceability
• Regulatory compliance

The pay-off

Birra Peroni now has centralized control on plant performances and product quality of its different plants.

This enables full product traceability and benchmarking between plants and against historical data to realize continuous improvements in product quality and processes.

SIMATIC IT Unilab significantly contributes to improved product quality and thus played an important role in the company’s achievement of ISO certification for product quality.

The positive impact of the LIMS does not only translate in improved quality of the product. It also allows for more cost-efficient quality, quality standards being met, less non-conformity alerts and incidents occurring, as well as a considerable reduction of time spent on quality and process checks.

Birra Peroni is constantly evaluating the system. An upgrade to a new version was already carried out, and plans are in the pipeline for improved integration with SAP and other systems to further eliminate duplicated data input.
Carlsberg implements a corporate MES standard in order to optimize the benefits from a Manufacturing Execution System in terms of efficiency, quality and traceability at the lowest possible IT cost of ownership.

The choice fell on a solution based on SIMATIC IT. The solution was developed by the solution partner ATS based on SIMATIC IT libraries.

The first part of this solution went live at the pilot plant in April 2009. A phased implementation and roll-out to 15 plants in 7 countries was planned over the next 4 years.

The customer

The Carlsberg Group is one of the largest brewers in the world, employing over 43,000 people and selling its products in more than 150 markets.

In 2009 the Group produced and sold more than 135 million hectolitres of beer, which is about 112 million bottles of beer a day.

The Carlsberg Group’s broad portfolio of beer brands includes Carlsberg, known as ‘Probably the best beer in the world’, and strong regional brands such as Tuborg, Baltika and Kronenbourg 1664, as well as a wide range of leading brands in local markets.

Carlsberg operates in over 50 countries, and in markets where they don’t have own breweries, operations are handled by the Export division.

The business challenge

In the past Carlsberg’s investment approach was to implement locally selected solutions that would then develop over the years with add-on solutions as required.

Together with heritages from acquisitions this led to a fragmented landscape of unconnected systems. And though these systems work they often require manual input with the inherent risk for data integrity.

Also, the fragmentation of the systems makes it very difficult to measure performance and gain improvements due to a lack of comparable KPIs for benchmarking between plants.

This made it clear at Carlsberg that a corporate standardization of the MES layer was needed to live up to the corporate excellence programs for efficiency and transparency.

This consistent MES approach is also fully in line with the ongoing Business Standardisation Program at the ERP level and is expected to optimize the benefits from a MES at the lowest possible IT cost of ownership and help achieve the strategic goals of lowering costs of production, improving quality and responding rapidly to changing customer demand.

The goal is to achieve a full integration of systems and obtain standard automated KPIs as well as reporting across multiple breweries. People at all levels in the organisation needed access to this information.
and these tools to detect areas of improvement and to support best practice sharing.

Next to automatic generation of reports and KPI data the MES is expected to enable tracking and tracing and real-time visibility throughout the brewery and so result in:

- Reduced machine down time
- Reduced energy costs
- Reduced overtime and labour costs
- Reduced manual data collection and report creation
- Reduced inventory
- Elimination of duplicate processes
- Improved equipment utilization
- Improved data accuracy for decision making
- Dynamic response to production or quality issues

The standardization and integration aspects in the project are to help restrict costs of IT software as well as hardware, facilitate the implementation of future changes and enhancements, and enable a central support environment, reducing local support costs.

The solution

The choice fell on a solution based on SIMATIC IT that includes functionality for Order Handling, Downtime and Utilization Management, Tracking and Genealogy, At-line quality management and KPI reporting for three areas:

- Filling and Packaging
- Utilities
- Brewing and Processing

In essence the new system was designed to follow the production process. The integration with warehousing systems and ERP lets the system manage orders received from SAP that are based on customer orders. This starts by handling orders received from customers.

For this purpose Master Data are interfaced with SAP, orders are downloaded from SAP to MES, and confirmations uploaded. All the while the orders are available for real-time scheduling and tracking of order progress.

The operators have full visibility on these orders and their progress. It is of course still possible to manually select and modify orders or to create orders to run independently from SAP.

The full visibility of the production lines offers the manufacturing intelligence required to continually improve processes and intervene in a timely fashion to avoid scrap.

This is realized by integrating the MES system with SAP for order handling, with warehousing systems and at the process layer with different control systems including Siemens and Rockwell PLCs, process control systems from various suppliers, SCADA systems such as WinCC and iFix.

KPI reports such as Utilization, Line Efficiency and Scorecard, are also available for packaging lines. These reports are fully aligned with the Carlsberg Group KPI manual and also include local KPI reporting for supporting lean initiatives.

KPI reports such as water or energy consumption, waste water, CO2 consumption/recovery will be available for utilities.

Full traceability and genealogy helps to understand at all times "when and how the product was made and what of".

Material movements can be traced backward and forward and full genealogy reports are available in no time at all, without a scrap of paper in sight.
The project team

The selection of a solution was not only influenced by the characteristics of the actual product/solution, but also by the suitability of the product vendor and the solution provider as project partners.

The main factors taken into account for partner selection were reliability, also towards the future, strategy and service concept, experience in MES as well as in the brewing industry and processes, plus understanding of the Carlsberg business goals and the capability to translate these into the technical implementation.

Both Siemens and ATS lived up to these criteria.

ATS was selected by Carlsberg as the Solution Provider for this project. ATS is an innovative, strategic knowledge partner providing products and services for all three levels of the automation pyramid; control, execution and information. For this project ATS formed an international team to facilitate roll-out and project support. Furthermore ATS engineers are involved in the actual development of the SIMATIC IT Brewing Industry Library and Filling & Packaging Library.

From a product point of view the importance lay in product completeness, product quality, deployment capabilities, product vision and confidence in long term performance and support offered by Siemens.

SIMATIC IT is a modular system, which means that only required modules need to be deployed. It provides a set of components, each addressing a specific MES function. These standard functions are coordinated by a graphical workflow.

Missing functions can be rapidly developed using the Client Application Builder. Components, models and rules are stored in a hierarchy of reusable libraries such as the SIMATIC libraries used in this project. The capability to re-use these libraries across plants reduces the time, cost and risk of a project.

SIMATIC IT has an open architecture allowing 3rd party applications to be integrated and synchronised with MES, and offers strong connectivity to shop floor and SAP.

SIMATIC IT is fully based on the ISA-95 standard for MES and ATS also used the ISA-95 MES model to translate the functional requirements from users at Carlsberg HQ and subsidiaries.

From the very start of the project a project management structure was set up including members of all involved parties, Carlsberg, ATS, Siemens.

The pay-off

The solution includes functionality for Order Handling, Downtime and Utilization Management, Tracking and Genealogy, At-line quality management and KPI reporting for the Packaging areas, Utilities and Brewing & Processing.

A full roll out of the complete solution to at least 15 plants is planned in a phased implementation approach.

This provides faster benefits and provides other breweries with an early opportunity to start gaining benefits and improvements whilst providing input to the design of the solution.

The connectivity of the MES platform to a wide variety of existing systems and the re-usable character of the libraries guarantee a long term solution.

In the end this project’s success is measured on its impact on lowering production costs, improving quality and ensuring rapid response to demand changes.
Implementing a complete and standardized MES solution helps reduce automation and IT costs, and integrate our systems to provide accurate planning and production status information.

“We get feedback from the plant about real savings in system and paperwork costs and considerable enhancements in visibility of orders and actual production status.

That, together with clear downtime reporting, empowers our people to make better decisions, almost on an hourly basis, resulting in improvements on production and quality levels.”
Smooth Switch to new Sugar Market

CO.PRO.B Italy and SIMATIC IT

The business

CO.PRO.B “Cooperativa Produttori Bieticoli” (Beet producers cooperative), was founded in 1962 and is the only sugar production cooperative in Italy. CO.PRO.B, with its two plants, in Minerbio and Pontelongo, and Italia Zuccheri Commerciale are the two core businesses of the CO.PRO.B Group.

The company’s 2011 revenue was 217 M €. CO.PRO.B represents 70% of the Italian sugar production, with a strong focus on quality in raw material sourcing and end products.

In 2012 CO.PRO.B will start new “green” power plants using the sugar production by-products to generate energy.

Bridge the gap

COPROB is investing in the modernization of its production facilities in order to be ready to successfully compete in the new sugar market after the reformation as set by the EU. In 2014 the current system of fixed production quotas will be replaced by the free competition, which stresses the importance for COPROB of competitive advantage i.e. product superiority, increased yields, reduced cycle times and production costs, and accelerated responsiveness to customer needs and market demands.

The modernization covers both manufacturing plants and manufacturing IT systems. Concerning the latter, COPROB’s efforts are aimed to bridge the gap between process automation and business systems in order to establish flexible information infrastructures that provide optimum responsiveness to changes in product, process, people and procedures. This goal has led to the decision to implement an MES in the manufacturing plants. The first two projects were the Tare Laboratory Operations Management System – in the Minerbio Plant - and the Packaging Line OEE System – in the Argelato Plant.

During the beet sugar production campaign CO.PRO.B’s laboratory analyzes 2 samples per minute from each of the 30 tons trucks delivering beets to the plant. All these analyses are strictly supervised by external beet producers’ associations and government offices.

The Tare Lab project had 6 main goals:

• Providing an advanced tool that allows staff to have an effective real-time control of the process

• Deploy all the necessary control procedures as per our contracts and agreements with the Italian beets producers’ associations

• Decrease paperwork and increase productivity, making the system easier to use

• Faster communication between offices

• Reduce input errors from the operators, who are typically seasonal workers who need little but effective training

• Guarantee to our associates and suppliers the integrity of the data recorded.

The OEE (Overall Equipment Effectiveness) application was implemented at the Argelato plant (sugar packaging plant) which was upgraded with new equipment.
The goals here were:

• Increasing productivity, improving maintenance and reducing downtimes
• Improving product quality
• Reducing production costs.

The solution

COPROB needed a technology partner which could offer a comprehensive MES solution in order to cover all the different production scenarios present in its manufacturing plants: primary production, secondary production, analysis laboratories, and so on. The solution based on Siemens’ SIMATIC IT was the most complete match in terms of functional coverage, adaptability to specific customer requirements, scalability and connectivity.

Implementation

A three way partnership was set up between COPROB, Siemens and Infinity Technology Solutions (ITS), a Siemens partner with specific expertise in implementing MES solutions in the sugar industry. Both projects started with a functional analysis in order to fix manufacturing processes in terms of plant model (physical layout and production activities flow), and functional requirements (i.e. actors, use cases). This resulted in the Functional Design Specifications (FDS) the basis for the SIMATIC IT solution. Both the Tare Laboratory Operations Management System and the Packaging Line OEE System were implemented by means of step-by-step releases. This helped COPROB key users to keep up their involvement, and the ITS software engineers to fine tune the system before the Factory Acceptance Test, with great time savings in terms of project rework as a result. The systems were put into operation on schedule, starting with the Tare Laboratory Operations Management System.

The system completely automates the activities performed by the personnel of the Tare Laboratory. Data samples are automatically collected from the Control Systems (a Siemens PLC S7-based system) and stored in the SIMATIC IT database. If any of the sample values is not valid (i.e. falls outside the expected range), the sample is marked as a “sample to record”. If the analysis is repeatable, a new test is done and the new value is stored. At the end of the shift all the samples marked as “to record” must be reported to the administration office, including the new values and all the instructions useful to identify the fault. Besides, all the valid and reported samples are transferred to the business system. This allows the administration office to consider the right values for each sample.

The second MES system, the Packaging Line OEE System, went live some six months later. It is integrated with the Control System of the line (an Omron PLC-based system), and gathers data about equipment downtimes and production counters. This helps calculate availability, efficiency, quality rate and OEE of the Packaging Line and contextualizes them for each product category.

At a glance

Company: COPROB
www.coprob.com

Industry: Food (sugar)

System Integrator:
Infinity Technology Solutions
www.itsinfinity.com

Requirements:
Tare Laboratory
• Automation of all laboratory activities
• Bridging the communication gap between the laboratory and the administrative offices
• Improvement of data samples processing

Packaging Line
• Monitoring equipments downtime
• Calculation of availability, efficiency, quality and OEE of the line

Solution:
• SIMATIC IT Production Suite
• SIMATIC IT OEE
• SIMATIC IT At-line Testing
• SIMATIC IT 21CFR 11

Key Benefits:
Tare Laboratory
• Automated operations for processing samples
• Reduces risk of errors
• Increased productivity
• Timely transmission of information between different company departments

Packaging Line
• Improved product quality
• Improved line productivity
Transparency and reduced Complexity

MES Solution with SIMATIC IT at Danone Group

The company

The Danone Group produces dairy products, bottled water, baby food, and clinical nutrition and is a European market leader in all of these categories. Of the 101,000 workers employed by Danone throughout the world, 670 work at Danone Belgium, active in the dairy products sector.

The Danone factory in Rotselaar is a state of the art production facility and one of the major production sites of Danone in Europe. Its main focus is the production and distribution of dairy drinks in small bottles (Actimel, Danacol and Gervais Drink); it is the most important production site for Actimel in the world with a yearly production and export of some 2 billion bottles throughout Europe, amounting to 210,000 tonnes.

With its 8000m² (say 5200 palettes capacity) the storage and distribution centre in Rotselaar is the largest Danone distribution platform in Europe.

The business challenge

The existing MES system was the main automation engine of the entire filling and packing - a crucial area for the factory, and also a potential bottleneck with direct impact on operational efficiency of the production lines. Due to the mix of systems that had been added for specific functions over the last decade the responsibilities in this MES layer were unclear. The landscape of custom applications also resulted in a highly complex communication pattern and multiple links between these applications and the different instances in the control layer.

Not only was the cost of ownership of such a system unjustifiably high, the black box character of the MES and the lack of operator visibility also meant that if a problem occurred the entire system had to be stopped to fix it, which meant production downtime. In view of the strategic production optimizations at the Rotselaar site, it was deemed crucial to reduce that downtime.

This could be achieved by reducing the number of links between MES and control systems, and by reducing the dependence between these systems.

The project

Further to their previous experience with automation in the process area at the Rotselaar plant, Danone contracted Actemium again, this time to carry out a pre-study, defining the system requirements based on the situation at the Rotselaar plant. Following this study they scouted the MES market for systems that would meet the requirements.

The eventual choice fell on SIMATIC IT for its standard-based and modular platform approach which meant the scope of the MES could be defined and grow according to the requirements.
The positive experience with the longstanding LIMS solution based on SIMATIC IT was an equally convincing argument.

The integration of the project was awarded to Actemium, which, being a certified Siemens partner for SIMATIC IT, had the required experience with the selected application package, and having done the pre-study, had already acquired the necessary insight in the plant's situation.

A project team was introduced consisting of Actemium project people as well as IT specialists and production experts from Danone.

The solution

The project affected different layers in the 15 production and filling lines as well as the 4 palletizing and the 3 wrapping stations, including all the printers and scanners.

On the control level an upgrade was carried out from the existing SIMATIC S5 PLCs to the S7 version. The lines were equipped with a SCADA layer, consisting of a redundant WinCC server for data buffering, with WinCC clients offering visualization to the operators of running production orders on the lines as well as work instructions. On top of this automation layer all functionality in the custom made MES system was mapped and re-assigned within the standard-based SIMATIC IT platform. This way all MES functionality was consolidated and integrated in a single application, that covers the interoperability of the control layer with the SAP system and offers a status overview of running production across the different lines.

The MES layer contains the product properties and information that are not SAP related, such as e.g. machine speed, which when assigning a machine (line) to a production order, allows the MES to fine-tune production planning and communicate this to the control layer as well as the ERP layer.

SIMATIC IT also conveys the labelling information related to the planned production orders from SAP to the controllers on the printers and palletizers.

The results

The Danone project team combined the necessary expertise and knowledge in production processes as well as system architecture. Their clear vision on the requirements and their commitment were the key success factors of the project.

The project was realized in 6 months, a challenging time-frame, which could be achieved thanks to the openness of the
application to other applications and its flexible architecture.
An additional challenge to the project was the requirement to limit the impact of the switchover on quality and OEE.
One of the main KPIs in this respect was the performance of the palletization zone – including the stack transporta-
tion. The targeted Performance Efficiency (whereby Performance = (Items handled * Ideal Cycle Time) / Available
Time ) after implementation was 99%, equal to the situation before migration.
The new integrated platform was to have no impact on the OEE of the pro-
duction lines, when it came to product changeovers and order handling. From a quality point of view no increase was expected in incorrect printing and labeling.
The communication and data flows through the plant are now not only re-
duced in complexity and more transparent, the architecture was also set up to allow production to keep running during MES interventions.
The operators now have insight in the status of the production order on their lines and get a clear view on the planned orders, the status of the line and secondary packaging and palletizin-
ing. This increases their sense of involvement and motivation due to better interfacing and more information.
On production management level all information is centrally available to improve production planning and asset utilization. This enables instant re-routing in case of failure and thus helps reduce production downtime.

**Future**

Though today, the implemented platform does not nearly utilize the full extent of SIMATIC IT functionality, the standard-
based and modular approach and transparent configuration of production line set-up ensures smooth extension of the system according to changed require-
ments, both from a functionality as well as from a production processes point of view. The investment is a secure one, also for the future.
Short term possibilities include more operator guidance (i.e. sampling, product selection ...) and further deepening of the integrated approach such as projects for tracking and tracing using reverse use-by-date, (e.g. distribution) or flexible use-by-date in view of the day and time of production, not fixed based on the order...

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**Quicker on the ball with LIMS**

The short shelf-life of the products made at this site makes their export a particularly delicate matter and causes the need for constant quality monitor-
ing to ensure the consistent quality of the products.
Danone Belgium implemented Siemens’ LIMS, SIMATIC IT Unilab to automate its quality data processing op-
erations, in order to be able to anticipate quality issues and facilitate management reporting.

“Firstly we wanted to automate laboratory results and data flows to be more responsive in case of unexpected inci-
dents, both internally and externally. Secondly, we needed a system that would warn us when a required sample was missing. Because of the steeply in-
creasing volume, the manual follow-up of sampling was no longer an option. Thirdly, the reporting on quality data had to be faster and more efficient.”

**Michèle Vandegenachte,**
**Quality and Food Safety Manager at Danone Rotselaar**
Homogenization at all Levels

De Miclén - MES solution with SIMATIC IT

SIMATIC IT MES in a Totally Integrated Automation Environment

When de Miclén (part of SafoSa Group) decided to expand their production capabilities with a new plant in Slovakia, they seized the opportunity to introduce a homogeneous production system there from day one. To realize this de Miclén selected Zenith Automazione as a technological partner and Siemens’ TIA offering including SIMATIC IT for process automation and manufacturing execution systems.

The customer

De Miclén is one of Europe’s leading cosmetic companies. They offer turn key solutions for new products/formulations as well as contract manufacturing of a product range including oral care (toothpastes and mouth wash, skin care (lotions and creams), hair care, deodorants and OTC products.

Around 310 million toothpaste units for some of the main European toothpaste brand owners are now produced at a newly established plant in Levice, Slowakia, covering 4 hectares. The toothpaste production was established there in 2007.

The business challenge

De Miclén sets very high standards for product quality, product safety and environmental sustainability. But it also wants to reconcile these objectives with efficient high volume production.

SIMATIC IT
The solution

De Miclén’s choice for a solution partner fell upon Zenith Automazione, a Siemens Solution Provider for industrial automation since 1998, also specialized in MES systems and business consulting.

This choice was justified by Zenith Automazione’s expertise in the CPG market segment and by the fact that they were able to handle all aspects of the project (ranging from electrical cabinets, to process automation, MES, and Batch control).

Equally compelling was the fact that the proposed solution was fully based on Siemens’ Totally Integrated Automation (TIA) concept with a native integration between Simatic Batch, Simatic PCS7 and SIMATIC IT.

The project covers all the phases of the toothpaste production and packaging, from raw material receiving, over mixing and processing, up to the final product packaging and palletizing. The project was implemented in two phases: one phase to set up the physical plant and get it up to full production capacity with basic batch functionality, the second to complete the implementation with production order generation & management and the SAP interface.

The plant set-up in Slovakia was a gradual one. The equipment for a certain production unit was brought in (mixers, powder tanks, liquid tanks, packaging lines, palletizing line, ...). Then, simultaneously with its physical installation, this equipment was also described with its technological interfaces (PLC, DCS, HMI, SCADA) in the SIMATIC IT Production Modeler, together with the production operations and the workflows. SIMATIC IT could now coordinate the process steps and trigger the batch engine, production could start.

This was repeated until the entire plant was transferred, resulting in a complete plant model. The result was a homogeneous fully integrated plant-wide production system architecture where PLCs, PCS7 and batch management are coordinated by SIMATIC IT (MES).

The SIMATIC IT Client Application Builder was used to build the Graphical User Interface specific to each operator’s tasks and responsibilities. The advantage was that not only SIMATIC IT functionality such as Material Manager can be accessed through this GUI but it also includes an interface to Simatic Batch, and Simatic PCS7.

This resulted in standard, consistent and user friendly operator interfaces ensuring smooth acceptance by the operators, a fast learning curve, and minimized production errors.

When the production lines were up and running the next agenda point was the SAP interoperability and production order generation and management.

The SAP interface was established using SIMATIC IT DIS (Data Integration Services), a communication service between SIMATIC IT and 3rd party systems, such as SAP. This enables the real-time exchange of relevant information between production and ERP.
The production system receives in real time from SAP information such as master data, BOM, inspection & test plans, warehouse and lot details.

Based on this, SIMATIC IT Production Order Manager and SIMATIC IT Material Manager can generate and schedule production orders, manage recipes, generate and manage quality tests based on inspection plans from SAP, handle materials, and collect genealogy data for tracking and tracing. SIMATIC IT in turn feeds SAP (also in real time) with production details regarding semi-finished and finished products, process data, quality test results, material consumptions and movements, and logistics, allowing for instance inventory updates thanks to full integration with SAP warehouse handling.

The pay-off

A major success factor for the project was the tight collaboration between the three involved parties: de Miclén with the production know-how, Zenith Automazione with the project management skills, and Siemens with the required integrated technologies and knowhow. One of the major and most stringent expectations of the project was the need to meet the set milestone dates. While the new plant was under construction, the existing one in Italy was gradually dismantled in parallel. This made it very important to start the production in the new plant without any delays. This goal has been 100% achieved thanks to the flexible and scalable nature of the Siemens technology. This made it possible to do an “incremental start-up” of the plant, starting the production as soon as a minimal set of equipment was installed, and gradually expanding as further equipment arrived.

Furthermore the products produced at the new plant have met the high quality standard set by de Miclén customers from the very first batch produced.

Key Challenges:
- Homogeneous production system
- IT and SAP integration
- Regulatory responsiveness

Key Benefits:
- Minimum production disruption during plant transfer
- Meet de Miclén standards for quality and compliance
- Proven repeatability of the solution for future-proof investment
A well-oiled Machine

Loders Croklaan: MES solution with SIMATIC IT

“With 30 km additional piping and 1200 possible routing the complexity of this plant grew enormously. Effective automation is a critical success factor for us.”
G. van den Berg, project manager at Loders Croklaan

SIMATIC IT MES in a Totally Integrated Automation Environment

The customer

Loders Croklaan is a subsidiary of IOI Corporation in Berhad, Malaysia and has its headquarters in Wormerveer, the Netherlands. It is a key global producer of oils, fats and nutritional ingredients with a strong focus on palm oil. Since its acquisition by IOI in 2002, Loders Croklaan has been able to provide customers with one of the few complete - and arguably the largest - integrated palm oil supply chains in the world, from the palm trees on more than 150,000 hectares of plantations to customer delivery of refined oil. This vertically integrated business together with the experience and scale, gives customers a competitive advantage, so they can profit from optimum quality and reliability, as well as increased transparency, sustainability and cost savings. These are major assets for a company seeking to be a partner for its customers as Loders Croklaan does. Loders’ primary manufacturing facilities are located in the Netherlands, the United States and Malaysia. Its state-of-the-art facility in the Port of Rotterdam, the Netherlands is Europe’s largest palm oil refinery and fractionation plant, and the first with the capability of enzymatic esterification on a large scale.

The business challenge

Market research showed that the end customers of IOI Loders Croklaan asked for a larger variety in products and sustainable products. Europe’s largest refinery, known as AMRO I, specialized in bulk production was to be upgraded to a plant with the ability of producing more products and more batches in smaller sizes. A second refinery was built to achieve this. The tank farm was enlarged and had to be more sophisticated.

The AMRO II is smaller in size, but contains a much more complex production process. Because of the increase of products, the number of routings, complexity of order handling and truck loading increased in complexity. Efficiency was and is the key word at the Rotterdam palm plant. The idea was to minimize the number of human interventions on the plant floor. This could only be achieved through advanced process automation where operator intervention is an exception rather than a rule. In view of compliance with regulations such as the US Bioterrorism Act, traceability was another major requirement, not only of changes in the processes, but also backward and forward genealogy of the materials.
and products. The truck loading had to be easy to operate so that truck drivers can load the truck by themselves with no or little assistance of an operator. 10 loading bays with a capacity of handling over 150 trucks per day with a large variety of products. The existing automation level of AMRO I was not able to handle the needs by far. A strong integration between ERP, MES and process automation was needed to fulfill the needs. The experience of IOI Loders Croklaan learned that a system integrator with thorough knowledge of all automation levels had to be involved. HVL TBI techniek was selected to design and build the complete automation for AMRO II from the ground up.

The solution

The TIA solution was implemented by HVL TBI Techniek. The solution consisted of SIMATIC IT MES, including SIMATIC IT Unilab LIMS and SIMATIC IT Historian, in connection with Simatic PCS7 for process control, Simatic Batch and ROUTECONTROL. SIMATIC IT forms the link between the existing central ERP system (SAP) and the process control system (PCS7). This guarantees the availability, remote if necessary, of a combination of info from all systems according to situational or functional information requirements. Experience with the existing situation was used to define a better solution to meet the new, higher demands.

From the arrival of raw materials right up to the shipment of finished products all process steps are covered.

All events, production operations, equipment, and tanks are defined in the SIMATIC IT Production Modeler. From here the necessary actions are triggered. For instance thanks to the integration of SIMATIC IT Unilab sample creation and analysis can be scheduled to check the product quality and release a shipment. This information is fed back to the ERP system which gives the impulse to create a production order through SIMATIC IT Production Order Manager, and with each process step SIMATIC IT triggers Simatic Batch to create a lot and carry out the actual execution of the order based on downloaded recipes.

A crucial factor for the success is an easy to use, intuitive user interface with multilingual support. With SIMATIC IT, HVL TBI Techniek was able to create a MES implementation with such a user interface which is now also used as a blueprint for MES application at the main office.

All the while SIMATIC IT Material Manager will keep track of all material movements and status changes, resulting in a full product genealogy. In SIMATIC IT Production Modeler, the calculation of production relevant KPIs is defined at particular points in the process. The KPIs are based on real-time process information collected from the control layer, captured, validated, and aggregated in SIMATIC IT Historian and appropriately associated with quality parameters and process specifications.

SIMATIC IT Report Manager provides an advanced functionality to create automatic time- or event- based reports, as well as ad-hoc reports, based on information retrieved from the control layer through Historian, from Material Manager, Unilab as well as ERP.

The pay-off

At the Loders plant in Rotterdam over a million tons of palm oil are produced daily by no more than 50 people. Large time-savings are the result of single data entry and easy and central data accessibility. The throughput time from raw material to pure palm oil is reduced to a minimum. Such a level of efficiency can only be obtained because the processes are well defined and supported by seamlessly integrated systems
At a glance

Company: Loders Croklaan
http://europe.croklaan.com

Industry: Edible Oils

System Integrator: HVL B.V.
www.hvl.nl

Key Challenges:
• Efficiency through maximum automation
• Advanced tracking & tracing capabilities
• Standard, modular & future proof solution

Solution:
• SIMATIC IT Production Suite
• SIMATIC IT Unilab
• TIA: Simatic PCS7 & Simatic Batch

Key Benefits:
• Cost efficiency through limited personnel requirements
• Customer satisfaction through flexibility
• Regulatory compliance and process optimization through data integration

at all times and all people involved have easy access to clear work instructions.

Additionally all captured information is available to continuously improve production efficiency and speedily and accurately reply to information requests from customers or regulatory bodies. This greatly improves customer services as well as regulatory compliance.

The flexible and open character of the solution allows Loders Croklaan to look into possibilities of further system integration and process optimization for this plant that can serve as a blueprint for other and future plants.
No Small Beer

Grupo Mahou-San Miguel - Integrated Quality and Traceability with SIMATIC IT

To strengthen its reputation as a top quality brewer, Grupo Mahou-San Miguel has implemented an integrated quality management and traceability system based on components from the Siemens MES portfolio SIMATIC IT. The solution includes a LIMS (laboratory information management system), a material management module, and a product specification management system.

The customer

Grupo Mahou-San Miguel has a history of more than 100 years. It is the number one Spanish-owned beer group and one of the major brewers in the world.

The company employs 2100 people at its headquarters in Madrid and its 7 breweries in Spain (Guadalajara, Lérida, Burgos, Málaga, Tenerife, Córdoba and Granada) where over 11.6 million hectoliters (hl) of beer are brewed yearly.

A large part of the produce is destined for the local market but a fair share also finds its way to several markets in Europe, Africa and America.

Product quality and service are top priority at Mahou-San Miguel. The company makes continuous investments in tools and methods to keep quality, security and efficiency at its plants at world class level.

Mahou-San Miguel is ISO 9001:2000 certified for its quality management system in product development and production and strongly committed to product quality.

Laboratory Information Management System (LIMS)

To enforce this dedication to quality a powerful tool was needed for continuous improvement of processes and products, and one that would support an integrated quality management approach across all plants with a structured way of handling product and process data.

Mahou-San Miguel decided to implement a LIMS (Laboratory Information Management System) that would integrate the management of the existing laboratories in each of the company’s production units, and could replace the different small homegrown systems for lab management.

A thorough screening of the LIMS market turned out SIMATIC IT Unilab, which is Siemens’ LIMS, and forms part of the Siemens MES portfolio. Decisive factors in the selection were flexibility, capabilities and performance.

SIMATIC IT Unilab was designed to fill the gap between lab and production environments. It manages lab workflows and optimizes collection, analysis and reporting of quality data from lab instruments as well as process data captured from the production lines.
The main LIMS functionality in use at Mahou-San Miguel is:

- Management of all quality data (raw material, finished products, environmental samples, etc.)
- Full and flexible support for definition and execution of complex test plans
- Direct connections to lab instruments and equipment
- Immediate feedback on quality exceptions
- Support of quality standards such as GLP, GAMP, ISO, FDA, HACCP
- Compliance support to 21 CFR Part 11

The labs at Mahou-San Miguel basically carry out chemical and physicochemical analyses. Next to the daily environmental analyses the labs take samples at various stages of the production process.

In their requirement specification Mahou-San Miguel defined an information management system to efficiently manage all quality data and activities in the labs. The tool had to support compliance with the EU food traceability law that applies since January 2005.

This law stipulates that a company must be able to trace back any substance involved in the production or distribution process of food or feed products.

"Above all we were looking for a system that would enforce quality parameters and environmental checks in each step of the production process.

Moreover it had to include a flexible reporting module to let us create different reports to evaluate the performance of the plants and the labs.

The Quality Management wanted to be able to consult the quality parameters of all breweries in real time.

They also wanted the system to register the activities of any analyst at any given time, which is going a step beyond the rules set by the ISO 9001:2000 standard.

And ultimately we needed the ability to monitor the equipment used for the analyses, including interventions and planned maintenance."

José María Villero Salas, Lab Manager at the Málaga brewery

The first 3 requirements were covered by the standard SIMATIC IT Unilab functionality. Since Unilab is used to check the quality during each process step it is also possible to extend the use of its functionality to actually manage traceability during each production step, from raw material intake to finished and packaged goods dispatch.
SIMATIC IT Unilab manages sample taking for each phase in the brewing process. Each sample gets an information card specifying which steps it has undergone, and storing all the related traceability information.

"In case of raw materials for instance, the information card describes the sample information, such as the date of receipt, the supplier, the material type, the lot number, the supplied quantity, the allocated tank, etc.

For an intermediate product the user has to specify what raw materials were used to make it and in which quantities. During each step in the process the user has to fill out the information card specifying what was used.

These information cards render the LIMS very configurable and offer a simple and user-friendly interface to the end-users."

José María Villero Salas, Lab Manager at the Málaga brewery

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**At a glance**

**Company:** Grupo Mahou-San Miguel  
[www.mahou-sanmiguel.com](http://www.mahou-sanmiguel.com)

**Industry:** Brewing

**Key Challenges:**
- Enforce quality procedures
- Integrate quality in production
- Regulatory compliance

**Solution:**
- SIMATIC IT Unilab
- SIMATIC IT Material Manager
- SIMATIC IT Interspec

**Key Benefits:**
- Cost-efficient quality operations
- Enterprise-wide Quality Management
- Brand value
Production Efficiency

Monsanto, Belgium

After the implementation of a Manufacturing Execution System based on SIMATIC IT, the Monsanto site in Antwerp benefits from Totally Integrated Automation (TIA) through seamless vertical integration and greatly improved traceability.

The customer

Monsanto is a leading global provider of agricultural products and integrated solutions that bring together chemicals, seeds, and biotechnology traits to improve farm productivity and food quality. In terms of crop protection, the company is best known for its Roundup, the world’s top-selling herbicide. The Antwerp production site consists of a formulation units and several herbicide canning- and bagging lines.

In 1995, Monsanto implemented a combined manufacturing execution and warehouse management system at the Antwerp production facility. This system, developed specifically for Monsanto Antwerp, was modified and extended several times over the years and has suffered from a lack of flexibility, as Danny Van Looveren, process control systems team lead at Monsanto, confirms.

“We were faced with a system that was not performing well compared to the ‘best of breed’ systems available and that needed extensive and expensive maintenance,” he says. Consequently, in late 2007, Monsanto Antwerp decided to install a new Manufacturing Execution System (MES) to control and optimize the production. Van Looveren explains: “We wanted a solution that was compliant with the ISA 595 standard, and we wanted a system that was configurable, not a customized solution.”

Integration capabilities and flexibility

The Monsanto project team with Christophe Laureys (production systems engineer), Alois Kimpe (master operations scheduler), and Danny Van Looveren (project leader) performed a thorough screening of different suppliers in the MES and Warehouse Management Systems (WMS) market and decided that the SIMATIC IT MES environment, a solution utilizing the benefits of Totally Integrated Automation, was best suited to meet the company’s current and future needs, as Van Looveren states: “The MES is the key element to guarantee the integration of all our components, ensuring optimal production efficiency.

SIMATIC IT will help us by doing exactly that. It consists of a collection of highly integrated components, designed to integrate with our third-party systems, standardize our production, and keep our manufacturing processes aligned with our supply chain activities. The product provides a high-level framework concept that enables the description of our manufacturing processes and operation procedures.”

Another point in favor of SIMATIC IT was the fact that the system can be easily integrated with the other TIA components such as Simatic WinCC, which is used as a standard on the Antwerp site, as well as with the Simatic PCS 7 process control system and the Simatic Batch batch control.

With SIMATIC IT, Monsanto was also able to implement the project in phases, reducing the impact on production and enabling a smooth transition to the new system.
Staged implementation

In January 2008, Siemens received the order for the installation of the new solution. Siemens delivered a comprehensive MES solution covering functional areas such as production order management as well as goods tracking and tracing.

The SIMATIC IT solution consists of the standard-components Production Modeler, the Order Manager, and Product Manager. The MES is used as the standard integration platform for the production machines and the various business systems.

Siemens was also responsible for the requirements analysis, design and construction, and site acceptance tests. And because the installed solution is considered a mission-critical production system, Siemens guarantees the solution’s operation by means of a 24/7 support contract.

In the first stage of the implementation, starting in May 2008, SIMATIC IT was installed on the filling lines. In the second phase, which was completed in December 2008, SIMATIC IT was linked up with Simatic PCS 7 in the formulation unit. The project was developed on a virtual server infrastructure and was then transferred to the physical system.

“The project followed the Siemens project approach, and it went well”, says Van Looveren. “We enjoyed excellent collaboration between the Siemens team and the Monsanto team and greatly benefited from having different people with different competencies on the teams.”

Higher operational efficiency

Van Looveren is quite satisfied with the results of the implementation:
“The thorough testing ensured that we had the system up and running with little effort and in a short time. From start-up, we have had a system that runs smoothly, and it was very stable after only some minor interventions.”

The impact on production has also been positive: “The new system improves our degree of automation in operation.

All settings are established through the MES, eliminating manual processes – and that means we make fewer mistakes than before. Another important aspect is traceability – that is greatly improved compared to what we had before.”

The replacement of the MES legacy system with SIMATIC IT enabled Monsanto to lower its total cost of ownership.

SIMATIC IT also enables vertical integration between the process control and SCADA systems and the enterprise resource planning level, thus reducing manual operations and manipulations.

Accurate tracking and tracing functionality increases production visibility, resulting in faster production cycles, avoiding possible handling errors on production runs, and leading to fewer production losses.

After the successful implementation of the first MES project, Monsanto rolled out the SIMATIC IT solution on other lines as well. From a functional point of view they further expanded the MES functionality with the OEE module for monitoring overall equipment effectiveness. Future extensions may include: RFID for loading & unloading containers, resource planning, scheduling, tracking & tracing, alerts management (SMS).
Growth Vitamins for Chinese Dairy

Mengniu Dairy Group - Quality Management solution with SIMATIC IT Unilab LIMS

To be able to reconcile the exceptional growth of Mengniu Dairy Group with their strict quality policies and aim for continuous production efficiency improvement, it was decided to replace the existing traditional information systems with a single enterprise-wide quality information platform based on SIMATIC IT Unilab.

Now the people at the Mengniu Helingeer site, including 5 production plants, 4 QC departments, and an R&D Analysis Center, a total of 13 labs, carry out their daily work on the SIMATIC IT Unilab platform. Features such as direct instrument connection, advanced reporting and easy and secure data access are already contributing to lab efficiency, data accuracy and continuous quality improvement.

The customer

Mengniu Dairy was established in 1999 with headquarters in Helingeer County, Inner Mongolia, the Chinese Dairy Capital. The Mengniu Dairy Group employs 30,000 people and booked a revenue of 16.25 billion yuan in 2006. Their production capacity is 5 million tons per year. This makes Mengniu the world’s largest producer of UHT milk and China’s No. 1 for liquid milk, ice cream and yoghurt. More than 200 different products and product variations including liquid milk, ice cream, milk powder, and milk tablets are produced at the production plants in Helingeer as well as at more than 20 other Mengniu production sites in over 15 Chinese provinces. The market for these products includes China, USA, Canada, Mongolia, and Southeast Asia.

Mengniu is known as ‘the dairy manufacturer devoted to human health’. Several of its innovative products have received quality excellence awards.

The business challenge

"A cow runs as fast as a rocket" is a pun that expresses very well the exceptional speed of growth and innovation at Mengniu Dairy Group if you know that Meng means Inner Mongolian, Niu is Chinese for cow. The resulting production capacity increase and the strict quality control put a heavy burden on the lab personnel. The traditional paper and spreadsheet based information systems could not meet the increasing management information requirements.

Mengniu needed a quality information management platform to replace the time-consuming and error prone manual download and data entry of instrument test results and manual collection and merge of distributed quality data from different quality control departments for reporting purposes. The system had to be compatible with the current Mengniu Group quality management system and offer full LIMS functionality, including sample management, equipment calibration, personnel management, material management and related cost calculation and management.

It was expected to meet the requirements of different types of labs and support corporate quality control through flexible reporting and tools to improve work efficiency, standardize lab workflows, and optimize data analysis.
The solution

The system was fully operational to replace the old system within 6 months.

Now, SIMATIC IT Unilab manages the quality workflow and resources in different Helingeer labs, including production labs, quality labs, and R&D labs, for raw material, semi-finished product, finished product, packaging material, and environmental tests.

This amounts to over 1,500,000 samples per year.

The system offers a user friendly interface and flexible configuration tools. The configuration of main objects, such as sample types, info cards, parameters, methods, specifications, test frequencies, sample lifecycles does not require strong IT skills but can be done by the lab personnel themselves.

This drastically reduced the programming and customization efforts and allowed the lab users to be involved from the early design phase and ensure maximum coverage of their requirements.

One important function was the direct instrument connection to SIMATIC IT Unilab. Take for example, the FT120 analyzer located in one of the production labs. This instrument alone generates about 400 samples a day.

Now all the test results from all instruments in different locations are automatically sent to SIMATIC IT Unilab and stored there. This automatic data transfer resulted in more accurate and real-time quality data. And without the need for manual interruption, the analyst workload was greatly reduced.

At the same time, for regulatory compliance purposes data integrity and reliability are guaranteed by the Electronic Signature and Audit Trail rules defined within SIMATIC IT Unilab.

Unlike other LIMS systems SIMATIC IT Unilab is not just a stand-alone LIMS but also a component of SIMATIC IT, the fully integrated MES solution that is currently already active at one of the Helingeer plants, ensuring an efficient exchange of plant quality data between LIMS and MES.

Through its open concept, SIMATIC IT Unilab can also interface with 3rd party software such as the current Raw Milk Management system that provides raw milk sample information.

Finally, the flexible and convenient reporting tools ensure real-time availability of quality data throughout the company and display these data in a structured way for management information purposes.
The pay-off

The result is an advanced LIMS solution that saves time and reduces errors. Also thanks to the system’s open and flexible architecture, the solution could be rolled out quickly to other sites after the pilot.

Now, a centralized system serves all of the sites in China, which does not only limit system maintenance efforts but also makes it possible to share quality data in real time throughout the company across plants.

This provides Mengniu Dairy with the right tools for continuous quality and productivity improvements.
How many Bottles of Beer on the Wall?

MES solution at Palm Breweries

In 2008 Palm Breweries equipped its sites in Steenhuffel and Roeselare (Belgium) with an MES system based on SIMATIC IT by Siemens and implemented by Actemium.

An evaluation of the system shows that the strategic project targets, traceability, integrated quality and process improvements, have been reached or even exceeded.

The customer

Palm Breweries is a brewer of genuine Belgian Beers and the only brewer in the world to brew using all 4 fermentation methods (top, bottom, spontaneous, mixed). Palm Breweries is an independent family-run brewing group headquartered in Steenhuffel (Belgium) with breweries in Steenhuffel and Roeselare (Belgium). Palm also operates a joint venture with brewer Frank Boon in Lembeek (Belgium).

The business challenge

Palm Breweries is a growth-oriented company and doubles its volume every 10 years. Realizing this ambition and combining it with their high standards in terms of quality motivated Palm Breweries to want to become an example of wall-to-wall traceability.

Before, a custom made production information system had been in place and served its purpose quite well for over ten years. But come 2006 it was getting obsolete, no longer suitable to cover evolving business needs such as increasingly strict tracking and tracing requirements. It also lacked the capabilities to supply reliable information that was needed for continuous improvement and cost savings, such as raw and auxiliary material consumption and quality costs. Making that kind of information available in the old system took up to three days, which was discouraging, and often resulted in lost opportunities.

It was clear: the time had come for a new, standard solution. A reliable system that would facilitate regulatory compliance, help reduce and rationalize consumption of raw material and additives, as well as energy, and avoid costs of non-quality.
The project

At Palm Breweries a dedicated MES project team was put together consisting of production management, logistics management, lab management, and a number of IT people.

They made up a business case by carefully mapping and calculating the expected costs and advantages of such a new system so as to justify the investments with the board of directors. This business case was the basis for detailed user requirement specifications. Palm Breweries chose to work with a business consultant (S&V) in this phase to help them select a system that fitted their overall IT strategy. In retrospect, this is considered a strong success factor.

The user requirements were drawn up according to the ISA-95 standard. This proved very useful during the exploration of the MES market, ISA-95 being the common “language” of MES vendors and system integrators. Eventually the choice fell on a combination of Actemium as system integrator with a solution based on SIMATIC IT software. The chemistry with Actemium worked very well for Palm Breweries and the standard-based SIMATIC IT software was a good match for the user requirements. The future proof automation concept also anticipated the growing complexity within the company.

Throughout the project the steering group kept a close eye on project timing and budget, making sure both were realistic from the start, and that they were stuck to until the end.

The solution

The functional focus of the implementation lay in production and quality. The implemented solution is based on SIMATIC IT Production Suite and SIMATIC IT Unilab (LIMS).

SIMATIC IT Production Suite receives production orders from the production planning application based on sales forecasts. These production orders are visualized in a graphical way to facilitate detailed production planning and issue orders (to the brew hall, fermentor, bottling line, etc.). Operators receive their orders on-screen at the production line, together with all relevant details, such as which quality checks to perform, and the Bill of Materials. Data for tracking and tracing purposes are registered per lot.

Upon production order creation SIMATIC IT Unilab determines for each production step, including end products, which samples need to be taken, and which tests to be carried out by whom (e.g. by the operator, or by a qualified lab analyst). Lab analysts as well as operators now get clear work lists from the system and know which samples to take and which analyses to perform.

Thanks to the connection of the lab instruments to the system the capturing of test results is automated. This saves a lot of time, and helps improve data quality by avoiding errors through manual data entry.

All analysis results are checked against parameters and stored in SIMATIC IT Unilab. The release or hold of raw materials or products is based on these test results.

At the end of the bottling line finished products are palletized and labeled with a pallet label generated by SIMATIC IT. Related information is captured and fed back to the logistic system to ensure traceability towards the customers.

Reporting during each production step is covered by SIMATIC IT Report Manager. A number of the reports used at Palm Breweries were made by Actemium. But the tool is an intuitive one and allows for authorized users at Palm to create their own reports.

The reporting on KPIs is now fully automated and it is possible to further analyse and drill the data from different angles. This enables benchmarking and root cause identification, e.g. by comparing the same process step in different lots during a certain period. The system is also set up to make hourly comparisons and send email notification alerts in case of deviations.

The historian functionality of the system will allow Palm Breweries to realize process and quality improvements by interpreting, correlating, contextualizing and trending historical data.

This has already been put to good use in the case of two beer types when it was possible to indicate that a modification in the recipe would result in more constant quality.

The end user is unencumbered by the underlying systems and modules. Each user has an integrated screen that displays all required information according to his specific user profile, combining data from different systems.
Success factors

A key success factor in this whole story was the composition and continuity of the project team and the consistency in their requirements. The people who defined their requirements to the system remained available throughout the project to see to it that they were met. This strongly benefited mutual understanding between Palm Breweries and their system integrator and made the project actual fun.

Furthermore 3 employees of Palm Breweries spent a week at the SIMATIC IT training centre in Genoa to enable them to understand the standard system and actively contribute in the solution design phase.

The results

1% reduction in raw material, 2% in auxiliary material consumption
In the past one had to use Excel to compare purchased quantities of material with sold end products and deduce loss quantities from that. But finding out exactly when and where the losses occurred was complicated if not impossible. This was solved through storage of historical data in a historian. The resulting link between process and quality data makes it possible to relate losses to a specific lot, process step, or period and make comparisons in order to reveal potential for material and energy savings.

2.5% cost reduction packaging materials
Interfacing the planning module in the MES system with the purchasing module in the ERP system facilitated planning and reduced the need for rush orders. That put the brewer in a better position for sourcing packaging material.

25% reduction in cost of non-quality
Quality tolerates no compromises at Palm Breweries. That was the main motivation in the implementation of the LIMS (laboratory information management system) SIMATIC IT Unilab. Together with production monitoring, this led to improved quality consistency and an increase of the in-house quality index at Palm.

Improved Service level in B2B
In case of contracting for other breweries the MES contributes to B2B customer satisfaction thanks to the ability to provide quick and accurate reports about the production of their goods.

Having the same level of insight in production at your contractor’s as in your own production inspires confidence.

Job satisfaction
Having a reliable system in place contributes to a professional environment that empowers the workforce to be more efficient and inspires self-confidence. Working with such a system enables people to help reveal new potential for improvement.
Continuous quality and innovation

Qingdao Tobacco Factory: MES solution with SIMATIC IT

After an in-depth analysis of MES vendors Qingdao T.F. chose Siemens, based on its domain knowledge and global experience in the tobacco industry and its specific expertise with tobacco industry work processes and production practices.

Siemens automation products are implemented throughout the plant, which facilitated system integration, reducing the cost, time and risk of the project.

SIMATIC IT delivers all of the functions defined by ISA-95 and leverages the work-flow management concept (Production Modeler), and fully supports a Service Oriented Architecture (SOA).

This unique combination of capabilities, architecture and tobacco-specific knowledge fulfilled the requirements defined by Qingdao T.F.

The customer

Qingdao Tobacco Factory is the largest tobacco company in North China, with 1,600 employees.

The factory has an annual production capacity of more than 1.2 million boxes cigarettes. Fiscal year 2006 generated 5.42 billion RMB (0.7 billion USD) in sales, with 570 million RMB (74 million USD) margin.

Qingdao T. F. has in-depth knowledge of the Chinese Tobacco market and leverages that knowledge together with its industry-leading manufacturing capabilities to rapidly respond to trends and opportunities.

This success is supported by their ongoing quality management efforts as well as their research and development innovations.
**The business challenge**

Strong market competition led Qingdao T. F. to the realization that they needed to reduce manufacturing costs and standardize manufacturing operations.

MES became the logical solution for controlling costs and streamlining operations.

MES solutions enable decision making across multiple levels of the organization. Qingdao T. F.’s goal is to produce a digital plant supported by what they call a CIMS System.

CIMS supports the concept of Collaborative Manufacturing, where individual plant applications interoperate in real time, orchestrated by workflows.

Collaborative Manufacturing increases overall production profitability, by improving an individual plants' efficiency while improving decision support at the headquarters with real-time, focused key performance indicators (KPI). Within this CIMS system there are 11 subsystems. In such a complicated IT environment, chaos could easily occur.

MES, serving as an interoperability and coordination layer, communicates with all the other applications, creating a seamless IT “fabric” where each application is equally accessible.

Qingdao T. F.’s challenge was to overcome a disparate IT architecture and replace it with a collaborative architecture that could accommodate the work processes unique to the tobacco industry, while embracing international standards.

Their solution needed to completely cover the functions addressed by the ISA-95 specification. This level of complexity is a significant challenge for vendors and customers alike.

**The solution**

Qingdao T. F. entrusted Siemens with the challenge of improving their manufacturing information systems by implementing SIMATIC IT modules.

SIMATIC IT provided the framework that spanned the gap between the ERP, and the controls layer. SIMATIC IT linked together all other applications and delivered almost all of the functionalities mentioned in ISA-95.

Thanks to SIMATIC IT, the factory managers can now easily get the information from each production step and can monitor every key performance indicator.

Through the tight integration between ERP and MES, the generation of the production plan was reduced from 4 hours to 10 minutes.

Through the implementation of a centralized product specification system (SIMATIC IT Interspec) natively integrated with SIMATIC IT Production Suite (that handles production execution), the release of the production process specification dropped from 4 hours to 1 minute.

By streamlining the production processes as defined in SIMATIC IT workflows, the production department realized an average of 1 hour drop in the cycle time for each complete production cycle.

Siemens has provided Qingdao T. F. with a SIMATIC IT library which delivers standardized information through reports and browser screens. These reports provide real-time information such as efficiency data.

The production departments use this information to optimize the process and to guide continuous production efforts.
The pay-off

Improving production management, increasing product quality and introducing new products to market faster were the main objectives set forth by Qingdao T. F.. They knew that a lot of the data they needed existed but was not readily accessible.

And, a lot of information was the result of the correlation of data from disparate applications.

Siemens, with SIMATIC IT, gave them the tools they needed to most effectively manage their production data and processes, streamline their work processes and deliver decision support information to their workers.

The time saved during operations and the dramatic reduction of errors during data input (now handled automatically) made the SIMATIC IT solution pay back very shortly. In the end Qingdao T. F. found that SIMATIC IT came out as the perfect solution.

At a glance

Company: Qingdao Tobacco Factory
www.etsong.com

Industry: Tobacco

Partner: Siemens Factory Automation Engineering Ltd., Beijing
www.ad.siemens.com.cn/sfae

Key Challenges:
• Reduction of operating costs
• Improvement of production management
• Enhancement of product features and quality
• Accelerated new product introduction
• Improvement of enterprise competitiveness

Solution:
• SIMATIC IT Production Suite
• SIMATIC IT Historian
• SIMATIC IT Report Manager
• SIMATIC IT Interspec
• SIMATIC IT Unilab

Key Benefits:
• Strengthening of the competitive edge
• Enhance product features and quality
• Rapid Return on Investments
• Total Cost of Ownership reduction
• Integration of data and information
• Optimization of Production Processes
• Improvement of Asset utilization
• Reduction of paper based activities
• Quality and Productivity Improvement
Market and Manufacturing Responsiveness

R.J. Reynolds: Specification Management Solution with SIMATIC IT

R.J. Reynolds Tobacco Company deploys SIMATIC IT Interspec as their Product Specification Management Solution in parallel with SAP deployment. SIMATIC IT Interspec is managing all Product Specifications, is fully integrated with SAP and supplying tremendous results.

The customer

R.J. Reynolds Tobacco Company, an indirect subsidiary of Reynolds American Inc. (NYSE: RAI), is the second largest tobacco company in the United States, manufacturing about one of every three cigarettes sold in the country.

R.J. Reynolds is based in Winston-Salem, N.C., and has about 5,800 employees. It has approximately 30 percent of U.S. cigarette sales. The company’s brands include five of the 10 best-selling U.S. cigarette brands: Camel, Kool, Winston, Salem, and Doral.

The business challenge

Following its 2004 merger with Brown & Williamson Tobacco Corporation, the “new” R.J. Reynolds Tobacco Company was faced with managing the complex specifications in support of a diverse product portfolio.

Product specifications had previously been managed in legacy (internally developed and supported) applications.

The legacy applications had expansion limitations and obsolescence issues and needed to be replaced.

Additionally, a new Product Specification Management solution was required that could interface to both their new ERP implementation as well as other legacy systems.

A more contemporary specifications management solution was required, that could provide more versatility and reduce the complexity of the processes required to manage and maintain product specifications from conception to finished product.

R.J. Reynolds made the decision to implement SAP as their new ERP system and made the selection of Siemens SIMATIC IT Interspec to manage specifications for all of their products.
The solution

An aggressive schedule of implementing SAP with SIMATIC IT Interspec and SIMATIC IT Data Integration Services (DIS) was undertaken. SIMATIC IT Interspec was deployed as an enterprise solution and the sole source for all product specifications.

Tight integration with SAP was vital to the success of this project and R.J. Reynolds utilized the SIMATIC IT Framework, with Data Integration Service (DIS) and Production Modeler (PM), to manage this interaction with SAP.

The tight integration allows for the detailed material and production bill data to move in near real time seamlessly between SAP and Interspec. SIMATIC IT Interspec as a Product Specification Management solution supports the creation and maintenance of the definition of all specifications used in the manufacturing process.

SIMATIC IT Interspec provides a very flexible approval process, in which all relevant parties can quickly collaborate on any required changes to existing products.

Product changes can be communicated and approved quickly, as it is easy to determine who still needs to take action for final specification approval.

SIMATIC IT Interspec also helps speed new products to market by streamlining review processes and eliminating manual data entry into multiple disparate systems.

SIMATIC IT Interspec fully supports key functional elements such as planned packaging rotations, global updates, change versioning, and multiple bills of material versions.

The pay-off

R.J. Reynolds now has SAP and SIMATIC IT Interspec up and running and producing excellent results.

Detailed Product Specifications are now managed for all products. Specification changes are being implemented in record time and time to market for new products is being impacted in a very positive way.

At a glance

Company: R.J. Reynolds Tobacco Company
www.rjrt.com

Industry: Tobacco - Cigarettes

Key Challenges:
- Replacement of Legacy Solutions for Product Specification Management
- Enterprise moving to SAP - new solution must integrate well with SAP
- SAP being deployed in parallel with tight timeline
- Integration of brands from R.J.Reynolds and Brown & Williamson

Solution:
- SIMATIC IT Interspec
- SIMATIC IT MIS Bundle:
  - SIMATIC IT Data Integration Services
  - SIMATIC IT Production Modeler
  - SIMATIC IT Historian
  - SIMATIC IT Report Manager
  - SIMATIC IT Client Application Builder

Key Benefits:
- Speed time to market for new products and product changes
- Tight Integration with SAP
- Flexible Specification Approval Process
- Quick collaboration between all Departments
- Interspec as a sole source for all product specifications
- Streamlining of specification review process

RJ Reynolds
Rosen Eiskrem, Europe’s largest private ice cream producer, has thoroughly modernized its process control and connected it with goods management in the ERP system.

The customer

Rosen Eiskrem GmbH has been developing and producing ice cream for the European consumer food market for more than 40 years.

With four factories in Germany and an annual capacity of 230 million liters, the traditional company is Europe’s largest private ice cream producer and can make any product the market wants within a short time on 31 production lines.

The existing process control and control system of the ice cream mixing plant at the company’s Nuremberg site were to be replaced after 15 years in operation.

There were other goals connected with this upgrade: quality improvement, a reduction in manual work, an increase in flexibility and process efficiency, absolute production transparency, batch processing on several levels, and long-term archiving. In addition, the new solution was to be commissioned quickly.

Modernization with Siemens

After an extensive comparison of available solutions, Rosen Eiskrem chose a combination of standard products from Siemens: SIMATIC IT Production Suite, Simatic PCS 7, Simatic Batch, and a special Manufacturing Execution System (MES) library for the food and beverage industry. Rosen Eiskrem can handle complete orders in the new MES.

Customer orders are created in the Enterprise Resource Planning (ERP) system and transferred to the MES, which generates the appropriate batches. The batches are created fully automatically in Simatic Batch. The operating personnel merely start the orders in the MES and monitor the execution.

The Simatic PCS 7 process control system controls and visualizes the entire weighing and mixing process.

The status of the batches and information about consumed material and finished products are archived in the MES during runtime and can be traced continuously.

A considerable improvement in quality was achieved by the introduction of a radio scanner solution that makes sure that additives can be added manually only at specific recipe times and checks the manual interventions for plausibility.

This largely rules out the faulty feeding of additives. The MES reports all order and consumption information to the ERP system automatically.

This communication prevents double entries and input errors and allows the automatic creation of reports and evaluations of production and quality.
**Proven benefits**

The system was successfully commissioned in January 2009, and Rosen Eiskrem now produces up to 450 tons of ice cream mix based on approximately 400 recipes every day.

All the production and material data are archived and are available clearly and consistently at the push of a button.

The new system reduces manual work, improves the quality and effectiveness of production, and is also an important step in the direction of a paperless environment.

Flexible and user-friendly Web interfaces allow company-wide MES access via the intranet. Redundant server systems make the solution highly available. The system can also be extended easily without impairing existing configurations.

This secures the investment for the future. Georg Hassil, CEO of the Central Supplies Department at Rosen Eiskrem, sums up: “We are very pleased with the entire Siemens system and the company’s service throughout the project. Our main goals were all achieved, and we would not hesitate to give this contract to Siemens again.”

**Project facts**

**Challenge:**
To replace the old process control and control system and integrate the new solution at the ERP level

**Solution:**
- SIMATIC IT Production Suite
- Simatic PCS 7
- Simatic Batch
- MES food and beverage library

**Results:**
- Improved quality and process control
- Improved data quality and data transparency
- Production know-how available in the MES at any time
- Less manual work (paperless production)
- Lower production costs
Discover the MES offering
tailored on your Industry needs

The new e-learning area based on SIMATIC IT solutions

www.siemens.com/mesmarketplace

MES Marketplace

The SIMATIC IT portfolio (Manufacturing Execution Systems) has reached the next level of maturity with dedicated out of the box functionality for Process, Discrete and Life Sciences Industries.

The objective in shaping the SIMATIC IT portfolio in specific functional packages, is first and foremost to offer our customers the best potential for optimum value, fast ROI and low TCO.

This approach will also help both our partners and their customers shape a successful business.
Siemens intends to keep up its relentless efforts in optimizing the MES portfolio to market needs.

This virtual demo room area supports our SIMATIC IT users with documentation and e-learning possibilities.

www.siemens.com/mesmarketplace
Excellence in product development and specification management

SIMATIC IT R&D Suite at Team

The customer

Team is a food company with operations in 6 plants in Colombia, Chile and Mexico and over 75 years of experience in the production of fats and vegetable oils. Over 2000 Team employees daily work on ‘Nourishing a better tomorrow’, which translates into a strong focus on added value, healthy products, and responsible nutrition. With a turnover of over 400 million dollars Team is a market leader in mass consumption products such as margarine, oils, sauces and dressings. Their special ingredients division is also a market leader in tailor made innovative solutions based on specialized lipid ingredients for the baking industry, confectionery, dairy, fried food, snacks and chocolate.

The business challenge

For a company like Team, which provides the market with a wide range of products that are branded differently from country to country, it is crucial that the product information and specifications be managed in an efficient and secure manner. Each country has a R&D department that is responsible for the management of product specifications and product lifecycle in their country. Before the implementation of the TEAMSPEC project, specifications were created and managed in programs such as Excel or Word, which meant that data structures differed by country and by archiving system used. Additionally there was no information security. Any person could open a computer file or read a sheet of paper. This threatened to undermine two of the greatest values of the company: the finished product and intellectual property. In addition, the response times involved in new product introductions or the time-to-production of recipe modifications of existing products tended to be really long because there was no communication channel available that allowed sufficient access to information in a timely manner.
The solution

In order to address this situation the TEAMSPEC project was developed. This consisted in the implementation of the Siemens SIMATIC IT R&D Suite component SIMATIC IT Interspec, a specification management system.

After a comparative evaluation of different software suppliers and their respective specification management tools Team decided that the SIMATIC IT R&D Suite of Siemens best suited its needs, which included managing all types of specifications, supporting formula and recipe development, and handling trials and experiments.

TEAMSPEC now offers a single central repository for all specifications of finished product, raw materials, goods in process, ingredients, packaging and supplies in all plants. The R&D department specifies and maintains all product components in SIMATIC IT Interspec - TEAMSPEC.

All staff requiring access to information that is stored in TEAMSPEC, can access via a web interface, more particularly on the corporate intranet. Access to the tool requires a user account to be created and configured by an administrator (one per country), thus ensuring the confidentiality of the content.

Another control mechanism offered by SIMATIC IT Interspec is the management of the modifications made to a record based on a “who did what” principle. This way it is possible to see what modifications were made to a specification and by whom. Additionally, the system provides an approval flow for specifications informing the appropriate department heads about a change in product recipe or the creation of a new product and notifying them when their approval is required. The status flow of a specification is modelled in the system, making it possible to know the stage in which the approval process is (in development, approved, rejected, effective, historical).
Easy implementation

From Team side, the project implementation team consisted of a project manager, a number of key users from different locations, and IT specialists. They were supported by Siemens technical consultants and project management. The project did not involve the acquisition of additional physical infrastructure, all of which was already available at Team. The database can be accessed from any computer, by any member of staff defined as a SIMATIC IT Interspec user, and according to his or her access rights. The only technical prerequisite to have access to the system is to have Internet Explorer installed and to be connected to the corporate intranet.

Since the corporate intranet covers all countries where Team is present, it was possible to install the centralized servers in Colombia, all the while making them accessible to any Team site, showing the same information to all sites, or only country specific information, according to the profile of the user. The significant savings in infrastructure thus achieved were possible thanks to the multi-site, multi-plant and multi-time-zone approach of SIMATIC IT Interspec.

SIMATIC IT Interspec – TEAMSPEC communicates with multiple systems:

- with ERP - Aurora - receiving material information and product master data, such as the ERP code, description, etc., and sending information to the ERP about the bill of material of recently created or modified specifications
- with SIMATIC IT Unilab (LIMS), sending the quality parameters that must be measured in the product, their respective upper and lower limits and the methods to be used for measurement
- SIMATIC IT Interspec can also communicate with CAD systems attaching image files to the specification of the finished product packaging.
Team is in the middle of automating all its production and product lifecycle processes with software tools. The implementation of SIMATIC IT Interspec encouraged Team to also implement SIMATIC IT Unilab as its laboratory information management system. After overcoming the challenge of harmonizing the previously disorganized information throughout the company, both systems are now sharing and exchanging all the information.

The result
The implementation of this product specification management system helped to reduce the workload, improve data visibility, secure information, and standardize the data structure and methods. Bottom line: the work efficiency is vastly improved thanks to the standard platform designed to optimize the way product specifications are managed.

At a glance
Company:
Team
www.team.com.co

Industry: CPG

Key Challenges:
- Decentralized production with product variance risk
- Diversified system landscape for R&D and specification management
- Integration between ERP-LIMS-R&D

Solution:
- SIMATIC IT R&D Suite
- SIMATIC IT Unilab
- SIMATIC IT Interspec

Key Benefits:
- Consistent product quality and image
- Intellectual property protection
- Shorter time-to-market
Extracting Benefits from Integrated Quality

SIMATIC IT at Zumos Valencianos del Mediterráneo, S.A.

The company, headquartered in Parc Sagunt carries out a production management project based on SIMATIC IT MES for the extraction and processing of citrus fruits.

The customer

Zumos Valencianos del Mediterráneo, S.A. is a company dedicated to the production of NFC (not from concentrate) juices from orange and clementine, always using fruit of the highest quality. Their top modern factory, located in the new industrial park Parc Sagunt (Puerto de Sagunto, Valencia) houses facilities that allow to get the optimum yield from the processed fruit, including the production of derivates from citrus fruit extraction such as: pulp cells, oils and pellets.

ZuVaMeSA is an innovative project driven by the main Spanish producers/exporters of citrus fruits and supported by a team with great experience in the sector of fruit juices. The combined use of top quality fruit with the deployment of cutting edge technology helps the ZVM factory deliver the best possible natural juice.

By controlling the production process down to the smallest level of detail, they are able to ensure a consistent and homogeneous supply to the plant of fruit that is brought directly from the field, with their commitment to quality always at the forefront.

The equation is simple: fruit from the best producers + the most specialized technical equipment of the country = the best juice in the country.

Background

The consumption of NFC juice has been growing steadily in Europe in recent years, a trend that will continue in the future, because freshly squeezed juice perfectly fits the consumers’ increasing preference for fresh produce. Bearing in mind that the citrus fruit grown in the Valencia region is known for its high quality both in taste and appearance, it is reasonable to expect high quality juice from a producer who uses nothing but this local fruit as raw material.

The catch was to find in the fresh fruit market that fruit, which by appearance would not meet the expectations of fresh fruit consumers, but which on the inside retained all of its organoleptic qualities, making it perfectly suitable for juice production.

A consort of 60 fresh citrus suppliers agreed to re-assign this fruit category to be used for the development of high-quality juices. The fruit also fetches a better price this way, as it is put to more than one use, generating greater profit.
The project

As a modern factory ZVM understood the need for a mentality and strategy that would give them a head start on the competition. They decided to differentiate themselves in the market by combining quality, efficiency and innovation. These keywords were the guide in the technological path they chose to follow.

The ZVM factory was to be a model of environmental and economical sustainability, where extra efforts were made to optimize the production environment and final product quality, as well as optimize the use of materials, energy, and human resources.

To know where you want to go is one thing, but harder still is to define how to get there. That is where MAVAL came into the picture. As a system vendor and integrator they had the necessary knowledge of technologies for automation and control of processes in the food industry to help ZVM’s technical team design a factory that would match their vision.

This was realized by modeling the coordination and control of the factory within a totally integrated framework, implementing a MES (Manufacturing Execution Systems) solution for production management, based on SIMATIC IT. From minute one of production, SIMATIC IT helped the factory operate in an intelligent manner, managing all process information acquired through industrial communication networks based on Siemens SIMATIC NET technology.

MAVAL took the lead in the project, coordinating the different sub-processes and the system integrator in charge of automating them, and making sure they spoke the same language, with a clear view of the process as a whole and not just isolated clusters. Only seamlessly designed and well aligned continuous process models can make a factory like this work efficiently in all of its areas:

- 30 silos in the receiving bay
- 2 extraction lines with capacity of 35000 kg/h of processed fruit (around 250000 tonnes of fruit per year)
- juice and pulp processing plant
- pellets processing plant
- pasteurization installation
- Sterile hall with a capacity of 40 million litres of juice
- dispatching zone

The fruit is received in trucks in the silos area. The entry and exit of trucks is controlled electronically. Samples of the received goods are checked in directly to the lab, which needs to carry out the necessary analyses and approve the products for storage. This fully integrated quality control and laboratory management system is based on SIMATIC IT Unilab, Siemens’ LIMS.

This plays an essential role throughout the process.

Also, production order processes are fully automated and handled electronically, so that the system is able to:

- offer real-time stock management
- control production orders, from the extraction process up to the expedition
- ensure the traceability of the product from origin to final customer
- control the quality of products and processes
- define the production strategy
- manage assets and energy resources associated with the process
- exchange information with the ERP system at business management level
- provide historical and real-time production reports to production and top management

In short, MES is the plant management platform that supports all departments and facilitates decision making.

Fruit is a living raw material whose properties vary depending on its origin and seasonality. This makes it even more important for quality management to be tightly integrated with the production process, to ensure maximum safety and hygiene, and a homogeneous product whose organoleptic properties meet the customers’ expectations.

Integrating quality and production through MES enables:
• Management of analysis plans
• Management of laboratory staff
• A platform for the enforcement of quality checks throughout the process
• Approval cycles to release or reject production batches and finished product
• Strategy definition for blending
• Compliance with food safety regulations
• Management of HACCP plan.

Analyses of the fruit and all products derived from it (juice, pulp, oils and pellets) are carried out to determine its organoleptic and physicochemical as well as microbiological properties based on samples taken from each process step in order to:
• Control the quality of the processed fruit lots
• Control the quality of the production process
• Identify and manage the quality of the product in the store room and its suitability for blends and mixtures.

This availability of information about the quantities and qualities of products in inventory enables the production manager to plan production and blending of the right end product according to the exact requirements of a specific customer.

The powerful control panel greatly speeds up decision making and informs the plant manager instantly of the right mix, based on quantity (available stocks), quality (organoleptic properties) and energy (minimum operational and energy costs) involved.

Once the blending orders are designed they are sent electronically to the control systems in the production hall and to the dispatching area, which after completion of the order, feed back material movement data to the MES.

This way the MES keeps tabs on completed operations, produced quantities, waste, etc. This information goes to ERP where the necessary delivery papers are generated and the shipment is released. SIMATIC IT provides real-time reports on orders during execution, as well as cumulative reports for production campaign evaluation and follow-up, and comparative studies.

Benefits achieved

The implementation of SIMATIC IT from day one of this plant’s life cycle helped it achieve a reputation as a modern juice NFC plant where production excellence and intelligence are the operative words.

It helps ZVM:
• Ensure the high product quality, natural and without additives, to match the expectations of its raw material origin
• Ensure an efficient and homogeneous supply their customers
• Ensure backward and forward traceability: from origin to final customer
• Know the real cost of each litre of juice produced
• Manufacture in a green, environmentally friendly way thanks to the optimal management and use of resources
• Gain visibility in real time on relevant production information without paper trails
• Understand the product’s full "DNA" by integrating of production and quality
• Make optimum use of the surplus of fruit of their raw material suppliers
• Create synergies between agriculture and industry thanks to the technology applied.
Ferrania Solis installs MES to achieve traceability of all production batches of raw materials, semi-finished products and finished products. In addition to product traceability the goal is also to keep track of all transactions and operations: answering the question who did what and when? The focus for traceability is on all assembly of components and semi-finished products, aesthetic and functional checks, and palletization of finished products. Everything regarding master data, production orders, consumption and work in progress is integrated in the corporate business system, Oracle Applications.

The solution

The main functionality the system offers is:
• Integration with the ERP system
• Production order management
• Management of the workstations in the plant
• Management of material and production lots
• Statistical Process Control
• Traceability of production lots and of process data.

Interoperability

Using a real-time connection, the system continuously exchanges data with the management system (Oracle Applications). The data received from the management system are:
• Material master data
• Production orders
• Material stock quantities

The master data are sent on a daily basis, while production orders and inventory loads are exchanged whenever they are generated in the management system. The data are sent to the management system are:
• Production progress of the solar panels based on panel serial numbers, including all details of all production lots involved in their production
• Production time of each individual panel testing data.
Production Order Management

Production orders are generated by the management system, whereas their allocation to the production lines and the material assignment is done in the MES when a production campaign is started. The system traces each individual panel from its first production step up to its transfer from the production line to the palletizing area.

The palletizing is done using RFID for the accurate association between the panel and the container, as well as the pallet it is stored on: this is done using bar code labels that are managed and generated by the MES.

Work Station Management

Along the production line there are a long sequence of workstations manned by operators who perform the various stages of the product assembly. Some of these operations are manual, such as connecting components, aesthetic (visual) control, fastening components, finishing; while others are automated and handled by testing robots or welding machines.

All these phases are managed in MES integrating with the line automation, based on Siemens PLC’s, or with third party systems (for example the solar simulator for functional testing of the panels).

Material Management In Production

Material management is done by checking the stock levels in the various buffers between the operational steps in the line, as well as the central warehouse. Each batch of material used is immediately identified by the operators whenever it is used.

The system checks for the proper use of materials, thus avoiding the declaration of materials that were not actually used in that particular product. This way the system can anticipate stock shortages and alert the supply chain responsible that a certain type of component is running out.

Statistical Process Control (SPC)

The system acquires a large number of process variables (pressure, temperature, ramp-up time) data from several machines, laminators, stringers, which help the line operators monitor the production process.

All these data are collected in real time and presented to users in the form of graphs or tabular views.

Traceability

The MES system registers every detail on the consumption of raw material batches (inventory loading, assigning material to a line or workstation, consumption for the production of a certain panel, waste, etc.) in order to be able to reconstruct the history at any time.

It is possible to search these recorded data in two ways:
- Backward, i.e. starting from the finished panel and relating it back to all batches of raw materials or components used for its production, to the time of execution of the various production steps, to the process data of the machines used
- Forward mode, i.e. starting from a batch of raw material and tracking it to all the finished panels that were produced using that lot.
The SIMATIC IT portfolio holds all the cards to enable responsiveness and openness, and link the manufacturing environment into the supply chain.

SIMATIC IT Production Suite is a plant-centric yet fully scalable collection of MES functionality designed according to the ISA-95 standard. The scalability applies to the scope of functionality as well as the number of plants within an organization. SIMATIC IT R&D Suite, an offering dedicated to process industries, is a software platform managing all work and dataflows related to R&D in an integrated way. It links the R&D environment with the production floor and speeds up time-to-production and time-to-market.

SIMATIC IT Intelligence Suite translates critical, real-time manufacturing information into business-level performance indicators, managing and distributing the information at every level in the organization with advanced role-based visualization based on the latest Microsoft technologies. SIMATIC IT also includes specific packages that cover the requirements of the process, the discrete or the life science industries. These are best practice solutions bundling dedicated functions and operational expertise for these specific industries.

The SIMATIC IT offering comes completed with an innovative offering of Value Added Services. These cover the entire product and project lifecycle, from the consultative analysis of the investment requirements with the value framework tool, over the project implementation, product training and including post-installation technical support. The cooperation with certified partners ensures a worldwide service and maintenance network with an outstanding skill level and expert know-how.

This entire portfolio fits within the Siemens concept of Totally Integrated Automation’ – linking shop floor to top floor, as well as offering the possibility for a ‘one stop shop’ from control and automation, to MES, ERP and even PLM activities from order creation to finished goods. Seamlessly integrated with automation and business systems, MES helps you manage your entire plant operations on a global scale.
Certified Transparency

Johnson Matthey, Germany

Johnson Matthey gives its performance a double boost: with the SIMATIC IT Manufacturing Execution System (MES), the company improves process safety as well as productivity and makes employees’ jobs easier.

The customer

Johnson Matthey is a global leader in manufacturing Selective Catalytic Reduction (SCR) converters for heavy goods vehicles. The company operates an ultramodern manufacturing plant for catalytic disk and honeycomb converters in the German town of Redwitz. Production must comply with strict guidelines from both official regulatory authorities and customers, such as the ISO TS 16949 for automotive suppliers, and must be completely documented and traceable, as this is a prerequisite for ISO certification.

Standard system instead of individual solutions

To optimize production, Johnson Matthey already had an MES in place, but in October 2007 the company decided to replace it with a new, platform-based system. The company required an MES platform that would be highly configurable, increase operational safety and productivity, and guarantee absolute traceability. Johnson Matthey’s chief concern was high stability during use, together with high availability. The order was won by the Bayreuth software company Xavo AG, which is a longtime certified Siemens Solution Partner with many years’ experience with the SIMATIC IT MES.

“We opted for SIMATIC IT because we are certain of its technical suitability. It is an excellent platform that can be readily configured to meet almost any customer requirement. A further important consideration was that Siemens, the global leader in automation technology, provides backup service covering system maintenance and development,” explained Hans-Jürgen Postler, project manager at Xavo.

The size and complexity of the module production was a particular challenge. Several different processes run simultaneously around the clock, and up to 40 users have parallel access to the system. User guidance must support widely different tasks. The transparency of the processes must always be guaranteed, even when users are on the move with PDAs in the plant. Additionally, an enormous volume of data – generated by the complete traceability of all components – needs to be managed. Moreover, devices and systems with different file formats must be integrated for the individual processing steps.
Conversion to the new MES was performed in stages, with the implementation phases oriented to the material flow through production. In the first phase (weighing, mixing, and kneading), the technology engineers needed to optimize the composition of the materials in such a manner that the required specifications were achieved.

The process for this was modeled using the SIMATIC IT Production Suite. The Product Definition Manager took on the task of recipe management with its complex calculations of recipe parameters. The conversion was automatically documented, without the requirement for manual logging of offset versions. The second and third phases included straining, extruding, and calcination.

The SIMATIC IT Material Manager maintains the product characteristics and administers the batches and individual components throughout the entire process. This includes management of pallets and frames as well as complete, seamless tracing. The modules are identified by means of a data matrix code that is applied during extrusion.

Data handling is extremely simple: once the pallets are driven into the furnace, a laser captures the label and the assignment is coded.

Should the module code become unreadable for any reason, the system reliably prevents the assignment of a replacement code, and the component must be rejected. This is a significant contribution to improved operational safety.

The interface to the robots has also already been implemented for the conclusion of production phases in sawing, measuring, sorting, and packaging.

In the final control stage, the system is also impressive in its display of the remarkable data volumes it can process: 25 measurement values relevant to quality are captured and processed within one second, on a per module basis.

Positive results

The new MES has significantly increased transparency in production and has also been well received by employees.

The decisive factor is the improved clarity that has been achieved without cumbersome logging activities.
MES system makes solar cell production more efficient

When the REC Group in Norway decided to expand and develop one of their factories for the production of solar cell components, ÅF was contracted to implement the Manufacturing Execution System (MES). This was done for the entire production scheme, from order to delivery. By introducing the best available technique, ÅF could help its client to reach a higher quality of product, a greater degree of capacity utilization and production as well as improved energy efficiency.

Solar energy

The sun has always been an important source of energy for humankind.

Solar energy has heated houses and dried food for preservation. In the future solar energy is likely to play an important role in meeting increasing energy demands.

The development of solar power has been tremendous over the last few years, and the world market for solar cells has grown with about 40 percent each year.

ÅF integrates the new system

REC produces wafers, a type of thin silicon plate used for solar cells. As this is a growing market, REC decided to expand one of their factories with a new production line, as well as upgrading their original production system. Production had so far mainly been manual, and the machines were old and in need of an upgrade.

A Manufacturing Execution System (MES) platform was needed, and for this REC chose The Siemens SIMATIC IT. ÅF was chosen to be responsible for integrating the system.
Monitoring wafer quality

The production of wafers is performed in several different stages, and there are quality control tests throughout this process in order to maintain a high quality of product.

The production process can briefly be described as follows: silicon is heated in an oven and grown into a long silicon ingot.

This is sliced up into wafers using a high precision wire saw. Each wafer is tested and given a quality certificate. With the monitoring system installed by ÅF, the history of each wafer can be traced, and any divergence from the expected quality can be tracked down and analyzed.

The solution

The solution is based on the SIMATIC IT Production Suite. It handles product genealogy, tracking and tracing as well as orders. A major part of the plant equipment has been integrated with the SIMATIC IT system using different techniques. Lab equipment and about 70 crystal growing furnaces are integrated with an XML interface.

Two large shaping lines are integrated with a database interface. Finally lots of other equipment and lines are integrated using OPC.

Apart from web forms in the SIMATIC IT web portal, rich Windows clients that directly interact with SIMATIC IT have been developed. These clients handle more complex user operations.
Standing out through Traceability

Siemens Cornellá: MES solution with SIMATIC IT

In an effort to optimize both plant control systems and business processes, Siemens Cornellá decided to fill the gap between the shop floor and the ERP system with SIMATIC IT MES. This communication platform optimizes the efficiency and quality of production data acquisition, which not only contributes to the plant’s efficiency, but also makes Siemens Cornellá the only vendor of traction motors for railway systems to offer this level of traceability to its customers.

The business challenge

The management at the Cornellá plant saw room for improvement in the manufacturing area, both with regard to quality and efficiency of plant control and business processes as well as capabilities in terms of traceability.

Additionally they wanted to introduce a higher level of information technology to the plant floor.

The implementation of systems to fulfill such requirements fitted with the strategy to strengthen the competitive position of Siemens Cornellá as well as that of its customers.

It was important to automate data flows in order to be able to have quick and reliable access to the large quantities of information that are needed for business.

A system was needed for automated acquisition and aggregation of data from production control systems for statistical analysis and trending in order to increase plant availability and support quality assurance. The system had to offer easy integration with the ERP system (SAP R/3), and allow for acquisition and archiving of large volumes of machine data for statistical purposes, offering similar access to information to people on the plant floor as to white collar employees.

Furthermore it was of major importance that the system be easy to use for less IT literate people, such as operators on the plant floor.

The customer

The Siemens factory in Cornellá belongs to the Siemens Industry Sector and is active in the division DRIVES Technology, more particularly in the business unit LARGE DRIVES. This business unit counts about 20 factories worldwide, employs 9000 people and generates a yearly revenue approximating 5 billion euros. Siemens is the worldwide market leader in the industrial drives segment and the European number two manufacturer of drives for railway tractions. The factory in Cornellá de Llobregat (near Barcelona) accounts for a yearly sales volume of approximately 60 million euro. For the next fiscal year the expected growth is in the range of 40%. The Cornellá plant covers 30,000 m2. Here, 320 people are responsible for the yearly manufacture of nearly 1,700 traction motors and converters for railway systems. From metal sheet cutting, over production of coils, parts machining, up to the assembly and final tests.
The solution

Several factors pointed to SIMATIC IT during the selection of a MES system. Siemens is the market leader in the field of industrial automation and the solution offered covered all of the requirements and specifications.

All physical components in the wireless network covering the plant were Siemens too, as well as the controllers of the machine tools.

This only facilitated the integration with the SIMATIC IT MES (Manufacturing Execution System).

Siemens is the only automation vendor to cover such a broad area with its offer. Having one single vendor for all systems improves communication and responsiveness in case of incidents or system extensions or roll-outs.

The SIMATIC IT solution was offered by the Spanish SIMATIC IT Solution Partner Specialist MESURE who could offer a broad expertise in the MES area.

The project was implemented in a step-by-step approach. Eventually each of 5 areas related to the different manufacturing methods (production of rotors, of coils, of stators/armatures, assembly and final testing, and parts machining) are to be covered by functionality for plant management, quality assurance, material traceability, and maintenance.

This way one area can serve as a pilot and the experience thus gathered can be applied during the functionality “roll-out” to other areas.

SIMATIC IT provides a standard platform for integration between the control layer and the ERP level. This capacity of mutual information exchange strongly contributes to efficiency and traceability. Data on materials as well as updated material master data are transferred from SAP to SIMATIC IT at regular intervals.

All material movements during production are registered by SIMATIC IT Material Manager. When using a critical material the system allows its in-line registration.

Operators receive production orders from the system which gives them a real-time view on pending jobs. They can also register their activities as they are carried out at their work station and update the order status using ‘Panel PC’s’.

The system also makes manufacturing instructions, construction plans, regulations and guidelines available at the working stations in their most recent status.
The MES system enforces the execution of standard quality procedures by making available a quality protocol for each part to the operators. The quality measures are scheduled in the production model and through Autocontrol the operator knows which quality assurance parameters to check.

This can be registered in the system at the working station ensuring not only that the necessary checks are done but also speeding up decision making by the operator.

Data on the quality measures, times and the operator who carried them out are stored in the system for both internal and external quality control.

SIMATIC IT serves as a central information exchange platform and also enables realtime communication on events.

This allows immediate feedback to SAP for the creation of a maintenance order and the notification of the maintenance department in case of machine or system failures.

This can be done in real time from the working station rather than from a terminal located in the offices.

Any initial reluctance of people in the plant to adopt the novelty of working with IT systems was surmounted by the methodical project approach, the fact that end users of all affected departments were involved from the start, particularly the people on the plant floor.

The user friendly web-based interface offered by SIMATIC IT, supporting the use of barcodes and touch panels, also contributed to a smooth adoption of the system by the users.

To secure maximum system and plant availability Siemens Cornellá opted for the Intelligent Agent principle in terms of maintenance. The Intelligent Agents enable predictive maintenance.

They allow the SIMATIC IT support department to monitor the plant application and alert Siemens Cornellá in case of imminent system failure and thus prevent downtime of systems and production lines.
The pay-off

All the manual processes, including quality processes are now automated. The communications platform between SAP and production covers order management, material management and guarantees availability of up to date master data.

Generally improvements can be seen in compliance with delivery dates, the through put times, and final product quality. The increased efficiency in data capturing has resulted in serious improvements in the availability and reliability of production and quality data. The system enforces sequential handling of working steps and identification of used materials. This has helped increase plant efficiency and traceability.

When the project is finalized Siemens Cornellá will be the only vendor of traction motors for railways to offer its customers full and automated traceability of critical components.

The implementation of SIMATIC IT MES has also positively influenced the perception of the Siemens Cornellá plant by the Siemens headquarters.

What’s next?

The first of 5 project phases, being the production of rotors has been up and running since April 2007.

Additionally Quality assurance and material traceability have been activated in the manufacturing of casings and coils. Right now the system is activated in the last two sections, assembly and final probes and parts machining.

This project will be presented as a best practice to the 20 other plants worldwide in the Siemens Drive Technologies - Large Drives division to highlight the potential.

At a glance

Company:
Siemens Cornellá
www.siemens.com

Industry: Discrete manufacturing

Partner:
Mesure Systems
www.mesure.es

Key Challenges:
• Introduce IT to the shop floor
• Large volume production data acquisition
• Interoperability
• Traceability

Solution:
• SIMATIC IT Production Suite
• SIMATIC IT Report Manager

Key Benefits:
• Fully automated production and quality processes
• Improved quality and throughput
• Reliable data for tracking and tracing
Increasing performance through visibility on the shop floor

The customer

Volkswagen, as leaders in the automotive industry, need no introduction. Volkswagen of South Africa, established in 1946, is a wholly owned subsidiary of Volkswagen AG in Germany. Volkswagen of South Africa is located in Uitenhage, an industrial town some 35 km from Port Elizabeth in the Eastern Cape. For generations, Volkswagen of South Africa has led the pack in the key areas of transformation. Setting key targets and measuring their success, that is how they achieved such a proud record as a responsible corporate citizen.

The business challenge

Due to inherent intricacies of a logistically intensive production line, Volkswagen required visibility of plant floor operations in order to analyse trends in the production process and identify areas of inefficiency. Such visibility enables improvements towards the best possible performance, and keep it sustainable.

There are so many factors that contribute to manufacturing operations, therefore it is a difficult task finding the bottlenecks, small inefficiencies and identifying minor maintenance trends. The only way these inefficiencies can be ironed out completely is by monitoring and recording each component of the operation automatically, in order to analyze production trends and identify areas of inefficiency. This increased visibility of shop floor operations allows these operations to be tweaked to produce the best possible performance.

However in a manufacturing environment and especially within a production line, where there are hundreds of machines, workstations and operators, not knowing why the plant performance isn’t living up to design is not an uncommon scenario.

Increased visibility was expected to shed light on key pain points such as operator tardiness, constant minor stoppages, unnecessarily lengthy cycle and equipment switchover times and less than optimal intermediate product buffering.
The solution

To address this Volkswagen of South Africa turned to Business Connexion Industrial Solutions, a provider of high availability industrial IT systems for manufacturing environments. The assignment was to provide a Manufacturing Information System to increase visibility of their production operations on the new 2010 Polo body shop floor.

To integrate control and HMI devices across different areas of the shop floor enables centralized data collection to provide real time production information across the shop floor, and aggregated, contextualized reporting to the office management level. This was achieved using Siemens SIMATIC IT, Simatic WinCC and Simatic S7, resulting in a standard, configured solution which is open and expandable, yet customizable to meet specific user requirements.

Real time information such as current throughput performance, running status and problem stations are identified and visualized in real time to operators, team leaders and maintenance staff through 46" LCD Andon displays. Andon pull cords are available to allow operators to quickly alert team leaders of quality or operational problems, aiding in quick resolution on the fly, therefore increasing the direct run rate.

All control and HMI devices are connected centrally via a fibre ring, allowing view of all shop floor areas via SCADA terminals in each area.

Centralized data acquisition enables all recorded data to be contextualized and presented on the office level by means of pre-defined and ad-hoc reporting. These reports provide multiple aspects of the operation. Downtime reports identify problem areas by showing equipments with the most downtimes, and which types of downtimes occur more frequently, therefore enabling optimization of maintenance.

Equipment downtimes are logged automatically with an automatic machine state and reason, and where the downtime reason cannot be automatically determined from the equipment, the operators are notified of downtime instances on the SCADA terminals, which they can then declare by means of a finger touch screen interface, eliminating unknown downtime causes.
Cycle time reports show which areas are not performing as quickly as they should, possibly starving following areas. Buffer reports show if buffer areas are always able to supply parts when they are required.

Key performance indicators can be evaluated throughout the shift, or the day, in order to identify performance dips in certain shifts.

Availability of equipment can be determined and compared, to identify bottlenecks. The amount of inspected and reworked units can be verified against the recorded amounts.

Gantt views of historical equipment statuses can be used to view multiple equipments in parallel to identify and improve operational dependencies.

Such operational dependencies also include operators, and therefore operator bad habits can be identified and corrected to be more efficient. An ad-hoc reporting option allows more custom report queries and data contextualizations.
The pay-off

This increased information and visibility has given VWSA increased insight and understanding of operational intricacies which can be used to optimize processes to be more fluid and increase throughput.

Similarly, the general performance indicators available are an easy way to see if these optimization efforts increase performance, and if the improved performance is sustained.

At a glance

Company: Volkswagen of South Africa

Industry: Automotive Manufacturing

Partner: Business Connexion Industrial Solutions

Requirements:
- Cross-area availability of shop floor data
- Standard, configured solution, yet open and customizable
- Data available to management level via deployable web interface

Solution:
- SIMATIC IT Historian & OEE on top of Simatic WinCC and Simatic S7

Key Benefits:
- Increased optimization agility
- Increased operations visibility
- Identification of recurring problems
- Real-time identification of production problems
- Key Performance Indicators for general performance assessment

This increased information and visibility has given VWSA increased insight and understanding of operational intricacies which can be used to optimize processes to be more fluid and increase throughput. Similarly, the general performance indicators available are an easy way to see if these optimization efforts increase performance, and if the improved performance is sustained.
Just like a part of the family

Whirlpool: MES solution with SIMATIC IT

As a global player in the market for home appliances, it is essential to Whirlpool to optimize the efficiency of their plants and to be able to promptly react to changes in the manufacturing cycle.

As a solution, they decided for SIMATIC IT. The result was increased software standardization throughout the plants.

The customer

Whirlpool Corporation is the world’s leading manufacturer and marketer of major home appliances, with 2006 annual sales of approximately $18 billion, more than 73,000 employees, and more than 70 manufacturing and technology research centers around the world.

The company markets Whirlpool, Maytag, KitchenAid, Jenn-Air, Amana, Brastemp, Bauknecht, and other major brand names to consumers in nearly every country around the world.

The business challenge

Step 1
Whirlpool wanted to integrate the business level with plant operations, in particular concerning orders, material master data including BOM (Bill of Materials), and production performances feedback.

The existing MRP is exporting to and importing from MES these messages using the Business to Manufacturing Markup Language format.

During production execution, the requirement is to monitor the WIP (Work In Progress) of materials and orders. Additionally, Whirlpool wanted to apply the "Lean Manufacturing" concept to its manufacturing lifecycle.

For this reason, they wanted to implement an order dispatching strategy in order to properly handle the different.

Step 2 (future implementation)
Quality management is a strong initiative for the project. In order to monitor production defects in an efficient way, every individual item is monitored along the production cycle by acquiring measures from field devices (such as testing stations) to certify the production.

In particular, quality assembly measures (such as torques, stress, and others) are acquired in order to calculate drifting curves to prevent quality drops.
The solution

Whirlpool has implemented the solution based on SIMATIC IT libraries in all of its European plants. The SIMATIC IT libraries contain all functionality needed to develop an MES. Their use has allowed a greater standardization of software installations and has allowed Whirlpool to implement the system in record time.

The existing MRP exports its orders and material information in B2MML format (XML files) that SIMATIC IT automatically receives and dispatches it to the relevant SIMATIC IT components for the use in production execution. Production performances are fed back in XML files at a very high rate from SIMATIC IT to MRP. Particular care is placed in dispatching the right materials to the various equipments (workstations) where they have to be worked. This is aligned with a global strategy of Whirlpool to implement Lean Manufacturing concepts. Around this concept, the strategy of handling the “pace maker” is defined.

This strategy requires to find out the pace maker that is the production area with the longer lead time and the right product complexity, and to relate to this point the execution production plan and the material flow.

Reporting and GUI (Graphical User Interfaces) are native features of the entire implementation.

The pay-off

Leveraging the SIMATIC IT production modeling capability, from the IT point of view the result was increasing the software standardization throughout the plants by using a common library. The SIMATIC IT Cross-Industry Libraries contain basic functions for a range of functionalities needed to develop an MES system.

The possibility of building a manufacturing system that uses this wide range of technological bricks is one of the reasons that allowed Whirlpool to implement the system in a very short time.

Thanks to this infrastructure, also the migration to SAP R/3 will be “bumpless”. Due to the B2MML interface and to the interoperability capability, MES and MRP are coupled and the migration on the ERP level will fully rely on this integration. This is also very supportive of the rollout of the application that is guaranteed by the SIMATIC IT approach.

Whirlpool welcomed the performance guaranteed by SIMATIC IT, as the requirement for feeding back performances at a high rate to the MRP was a crucial point. And SIMATIC IT effectively addressed this point.

At a glance

Company: Whirlpool Corporation
http://www.whirlpoolcorp.com

Industry: Home appliances

Key challenges:
• Integration of the business level with plant operations
• Monitoring of materials and orders for efficient quality management
• Applying “Lean Manufacturing” concepts to the manufacturing lifecycle
• Detailed production scheduling

Solution:
• SIMATIC IT Production Suite
• SIMATIC IT Report Manager

Key benefits:
• Increased software standardization throughout the plants
• Feeding back performances at a high rate to the ERP
The Dream Scenario in MES for Aerospace OEM

Most manufacturers have to deal with thousands of legacy solutions deployed over many years. Often, manufacturers strive to resolve this by reducing the number of IT applications. Typically a top down approach is taken and an attempt is made to squeeze the solutions into an existing ERP application. The shop floor becomes flooded with booking stations which increase workloads and reduce efficiency. While IT happily books this down as a successful deployment, the manufacturing team grind their teeth at another complete failure.

**Strategic approach**

The OEM in the case at hand took a careful look at their long term strategy and decided to engage ATS in a consultancy role to provide expert MES advice. This resulted, in an early stage, in the installation of a Manufacturing Systems Centre of Competence (CoC) in which all important disciplines are represented, including manufacturing, design, engineering, IT and maintenance. This was vital to the success of the project as the process of designing a solution and realizing the dream scenario was only possible by first understanding the environment.

Aerospace OEMs are driven to achieve excellence in design, continually improving their product. Developments and inventions are essential to the continuous product improvements. At the same time an Aerospace OEM is also subject to fierce market competition and thus needs to reduce manufacturing costs. In this regulated market Aerospace OEMs have a zero tolerance for design or manufacturing errors.

**Design based on standards**

In designing the MES, rather than reinventing the wheel, industry standards i.e. ISA-95
were adopted. However the key to the design was to fully integrate into the Product Lifecycle Management process. The result is a truly strategic solution which supports the OEM’s strategic objectives and helps them deliver better products to the market, faster, at lower manufacturing costs, and at guaranteed quality. This is how it works:

Teamcenter is used for product design.
Teamcenter for manufacturing is used to design and document the manufacturing process.
SIMATIC IT is used to execute the manufacturing process.
SAP covers the supply chain integration and financial reporting.

Project team

The implementation of this project gave rise to the creation of the first Aerospace Library. Due to their significant expertise in the Aerospace industry, ATS specialists were asked to assist the Siemens library development teams in Genoa. This cooperation accelerated the library development and ensured optimal knowledge transfer. Siemens took the lead in the project and ATS was responsible for direct implementation support, both for the application and the physical layer required for the shop floor team.

Global project

This is a global project with the first implementation completed in 2011 and the team now moving on to new sites and new ideas being generated to make the most of the new solution. SIMATIC IT MES has provided a keystone for this OEM’s long term strategy. The ATS and Siemens teams have built up considerable expertise in this important industry and are already working on the next Aerospace OEM project.

At a glance

Industry: Aerospace OEM
Solution:
• Full integration of Siemens SIMATIC IT MES with Teamcenter for Manufacturing
• SIMATIC IT Aerospace Libraries (ACM)
Key objectives:
• Faster time-to-market
• Guarantee 100% quality
• Reduce manufacturing costs
• Simplify the complex enterprise
Integration team:
Siemens
ATS International B.V.
www.ats-global.com
Manufacturing Execution Systems (MES) are becoming ever more critical in manufacturing operations. The life science industries are currently facing many challenges, ranging from increased competition, cost pressures and regulatory compliance to patient safety and reducing time-to-market. Today, being able to produce better and faster is critical and achieving operational excellence is the required strategy for modern life science manufacturers.

Efficient manufacturing is about consolidating and optimizing available manufacturing resources, including equipment, people, processes and products at and across plant level. Manufacturing Execution Systems (MES) with embedded Manufacturing Intelligence, address these requirements. MES encompasses real-time production execution and data availability, delivering production and quality information that supports optimization of production activities from order creation to finished goods. Seamlessly integrated with automation and business systems, MES helps you manage your entire plant operations on a global scale.
SIMATIC IT for Life Sciences

Siemens has been active in the pharmaceutical industry for many years. The mission of the Siemens MES Centre of Excellence for Life Sciences is to provide pharmaceutical and life science companies with the right MES software and services to help them achieve operational excellence.

SIMATIC IT for Life Sciences is a modular, flexible and scalable MES platform that meets the ISA-95 standard.

SIMATIC IT for Life Sciences bridges the gap between R&D and manufacturing, and integrates and optimizes development, quality and manufacturing processes to ensure optimal manufacturing and market responsiveness.

SIMATIC IT for Life Sciences is a configurable solution that offers a wide range of MES functionalities. The SIMATIC IT compliance package includes a clear validation methodology which enables advanced interoperability and reduces complexity throughout the implementation.

SIMATIC IT for Life Sciences guarantees full compliance with GxP and FDA procedures and ensures fast deployment, low TCO and high ROI.

SIMATIC IT for Life Sciences optimizes manufacturing processes, enforces quality and regulatory compliance and shortens time-to-production and time-to-market.

With SIMATIC IT for Life Sciences, improve factory productivity and quality at a lower cost.
Going Paperless

Baxter - Full electronic Batch Record & Release

Baxter implemented an MES system to be sure to manufacture products right the first time. Baxter Healthcare relied on XFP-MES for Medication delivery and Renal divisions. The solution deployed includes Weighing & Dispensing, Material Management, electronic Work Instructions and Electronic Batch Record & Release.

The customer

With approximately 46,500 employees worldwide, Baxter applies its expertise in medical devices, pharmaceuticals and biotechnology to make a meaningful difference in patients’ lives. Baxter International Inc. operates in three main businesses: BioScience, Medication Delivery (MD) and Renal.

This case study focuses solely on the MD and Renal divisions. Baxter MD is a leading manufacturer of intravenous (IV) solutions and administration sets, premixed drugs and drug reconstitution systems, pre-filled vials and syringes for injectable drugs, electronic infusion pumps in addition to other products used to deliver fluids and drugs to patients.

The business challenge

Back in 2003, Baxter Medication Delivery and Renal Divisions in Europe were eager to implement an electronic batch system with the principal objectives of cost reduction, increased quality compliance, enhanced flexibility and acceleration of batch release.

Error prevention and cost reduction

The main goal was to avoid solution and product discard, via the automatic prevention of manual errors in production, specifically in mixing, printing and packing. The Irish plant of Castlebar operates with over 1,000 employees. As the manufacturing process is primarily manual, the process is always prone to human error.

Enhanced flexibility

All European Baxter MD & Renal plants plan for increased growth in products with numerous different product codes in each product type. This can involve complex production processes. One of the key objectives was to deploy a flexible system that could enable rapid change of the production schedule. In addition, Baxter needed the flexibility to change its batch record workflow as the manufacturing process changed.

Full quality compliance

The electronic batch system must guarantee full compliance with internal standards, industry standards and customer requirements. As an example of an internal standard, the system should highlight any specific product code requirements such as unique sampling and inform the operators to take the right amounts of samples at the right time.

Accelerated batch release

Previously, three days lead time was needed to pre-print the blank paper-based batch documentation. The large amount of paperwork completed by manufacturing for each batch led to a significant time in secondary batch review and also in returning paperwork for correction.

This added additional unproductive time to the release cycle of the batch.
The solution

The European divisions of Baxter MD & Renal selected the XFP-MES solution to manage all production operations.

The implementation of XFP includes material flow and inventory management, weighing, counting and dispensing, directed manufacturing, daily equipment checks, mixing, printing, filling, sterilizing, electronic batch records (eBR), batch testing and reviews, packaging and labelling operations and finally data warehousing.

All data is stored in a central repository available for use and review, enabling Baxter to perform trend analysis such as laboratory trends, scrap analysis and measure manufacturing output and scrap.

At Baxter MD & Renal Europe, XFP integrates with the ERP and LIMS systems making sure that information is always accurate in all systems. Material consumption and reconciliation, dispense, inventory adjustment, flow management and batch information are pieces of information that are constantly updated in XFP, the ERP and LIMS systems.

At the time of writing, the XFP-MES Solution is deployed at the following Baxter manufacturing facilities: Ireland, Belgium and Italy.

The next sites to be deployed are in Spain and Canada. Ireland served as a pilot site and Belgium has become the MES excellence center.
The pay-off

The implementation of a full electronic batch record solution has shown good returns. The e-batch system guides operators through the complete process, acting as an electronic router with controlled task execution and automatic calculations while recording all actions. Human error risks have been significantly minimized, quality has increased.

Examples of added control in the following areas had led to increased error reduction:

- All samples are tracked on the system preventing samples from being mislaid
- Scanning of WIP into line cleared manufacturing areas/departments.
- Automated checks of Batch Number & Expiry for product labelling
- Batch review by exception/deviation only.

It is now possible to manage more volume with less resource and better quality. Less storage space is required and a reduction in headcount has been achieved due to the continuous checking and interrogation of data. All samples are tracked on the system preventing samples from being mislaid.

Thanks to the traceability, electronic signature and security features, the system helps ensure total quality compliance with any industry regulations, including FDA. Finally, the new system has led to the reduction of batch release time and of course cost.

All data is gathered in one batch report, which is accessible at any time. Reviews are only done on exceptions, which translate into significant time and cost savings. Over 6,500 batches and 9,500 mixes have been released electronically in the Castlebar site.

The Right The First Time ratio is above 99%. Cost savings account for more than $250K per annum. Efficient paperless manufacturing has become the new motto of Baxter MD and Renal sites across Europe.
Production plant at Fresenius Medical Care modernised with IT and automation solutions

Bad Homburg Ober-Erlenbach/Germany. The Siemens Industry Automation division is modernising the business IT and process control technology of the production plant for dialysis concentrates at Fresenius Medical Care GmbH in Bad Homburg Ober-Erlenbach.

SIMATIC IT, the Manufacturing Execution Systems (MES) software, acts as a link between SAP and the PCS7 process control system, optimising plant capacity utilisation and increasing flexibility.

SIMATIC IT supports integrated data flow for all necessary information into and out of production. System support is provided at every stage of the production process and creates a tight integration of the different system levels.

This considerably reduces the amount of effort and the error rate associated with the previous, paper-based production process. Electronic data capture makes the manufacturing path traceable and transparent.

Detailed planning and automatic activation of orders and batches are standard, along with total product genealogy and production analysis.

As well as supplying the software products and associated hardware, including the relevant field devices, Siemens also provided planning, engineering and installation services.

The online connection to the ERP system and automation level enables fast and secure data exchange. Thanks to the resulting flexibility, it is possible for production to adapt and react easily in the area of order management.

Plant-specific, configurable order scheduling and activation makes it possible to achieve a high level of capacity utilisation of physical resources and to minimise idle time.

It can also help make considerable savings by moving some automated subsidiary plant maintenance processes to idle periods.

The operator user interface is tailored to the plant, and offers secure, near real-time data capture. Sophisticated input checks prevent input errors and inform the user directly.

Comprehensive standard analytical functions provide options for detailed data analysis and analysis of the finished products for further process optimisation.
Nuclear Materials Accountancy

Client: British Energy
Industry: Nuclear Power Generation
Location: UK
Brief: Monitor the inventory of controlled nuclear materials and generate reports for the EU regulatory authority
Application Area: Track and Trace
Architecture: Siemens SIMATIC IT
Statistics: Rolled out to all UK nuclear power stations

“DAI have successfully delivered a well executed project which has deployed a high quality system across our plants. We are delighted with the effectiveness of the implementation and are already seeing its benefits.”
British Energy Project Manager

The customer

British Energy - part of EDF Energy, operates 8 UK nuclear power stations. All these power stations have been operational for many years and some of the systems within them have been in place for a long time.

Within the nuclear industry, compliance with regulatory requirements is essential.

As such, when the international legislation that provides the regulatory framework was revised, requiring electronic reports that track the movement of nuclear materials throughout the business, British Energy needed to develop an accurate, reliable and efficient way to comply with the modified regulatory requirements.

The business challenge

The existing system used for tracking nuclear material, FORCE, had been in place since 1992. As such it was based on technology that could not easily be adapted to meet the new requirements. However the old system was very well suited to the user’s existing needs and had proven to be accurate and reliable over many years.

The challenge was to provide a new system, based on current, well supported technology that would continue to meet ongoing operational needs while also addressing the new requirements and providing the flexibility to adapt to changing future regulatory demands.

All this to be done while maintaining high levels of safety, reliability and integrity.
The solution

British Energy decided to commission the design and implementation of a new state of the art nuclear materials accountancy system to replace the existing one.

The new system, NuMAS (Nuclear Materials Accountancy System), is a configurable Track and Trace application which allows British Energy to monitor its inventory of controlled materials, and meet its regulatory commitments to report on the balance, movement and transformation of these materials to the appropriate European Commission authority.

At its core NuMAS tracks and reports on both nuclear fuel and other controlled components throughout their full lifecycle, including Receipt, Movement, Assembly, Nuclear Composition, Parameters (Decay Heat, Isotopic Composition), Status (Good to Go, Cooling etc), Dismantling and Disposal.

Where necessary is has automated links to other existing IT systems allowing direct import of specific tracked parameters and thus reducing duplicated entry and potential data inconsistency across systems.

NuMAS is an auditable system that tracks movements of nuclear material at each station via a centrally based enterprise architecture. It has the flexibility to be used in an individual station or fleet context, and has the capacity to generate the principal regulatory reports embedded directly into the main user interface.

In addition this thin client graphical "drag and drop" user interface, and additional custom report writing tool provide a marked improvement in flexibility and operator experience when compared to the previous system.

The system was procured from DAI, a system solutions provider with long term experience in both the energy sector and Track and Trace systems.

NuMAS was based around the Siemens SIMATIC IT system framework providing a system that is entirely configurable and is suitable for Track & Trace and reporting throughout the Energy Sector, both for operational and regulatory compliance requirements.

NuMAS was delivered by DAI in a series of releases that led from prototype through pilot to final build. The initial phase defined and developed a generic prototype containing the full range of functionality that would be required across all stations in the fleet.

This phase involved input from a customer stakeholder group consisting of users, engineering, IT security and management. Throughout development,
DAI provided regular demonstrations of prototype progress, and sought feedback to ensure that the final prototype met the expectations of the full stakeholder group.

After rigorous testing the prototype system was then configured into specific station solutions and rolled out station by station over a number of months, with each station solution consisting of the same base product and look and feel, but with station specific characteristics and requirements captured and delivered in full.

This provided individual stations with the system they wanted, but gave the fleet a system commonality that would deliver simplified maintenance and management. Full legacy data migration from the predecessor FORCE systems on each station was a constituent part of each station’s rollout.

This was followed by a phased changeover from FORCE to NuMAS, with the two systems operating in parallel for a period, to allow full comparative evaluation of NuMAS in operational mode, prior to completing the switchover and decommissioning the previous system.

The project ran on-schedule and on-budget, and was proposed for nomination to the BCS IT Project of the Year awards by British Energy.

The benefits

NuMAS has provided British Energy with a new logistics solution that has a more sophisticated tracking process and greater levels of IT support than its predecessor. At the same time it has maintained the high levels of integrity and accuracy needed to ensure continued regulatory compliance and has replaced a system that was closely tailored to the business in a way that rapidly allowed the new system to gain a high degree of user acceptance.
Rationalizing Laboratory Operations

SIMATIC IT Unilab helps SLN (Société Le Nickel) in New Caledonia refocus on Core Activities

Modern, productive laboratories are subject to considerable demands. To offer optimum service to internal and external customers, they need to distinguish themselves in terms of traceability, quality assurance and connectivity.

With the implementation of its LIMS, SIMATIC IT Unilab, Siemens Industrial IT has fully computerized the operations of the Doniambo laboratory at Société Le Nickel (SLN).

The business

Société Le Nickel is a subsidiary of the French group Eramet, founded in 1880. With over 120 years of history in New Caledonia, Société Le Nickel has a wealth of experience in the field of mining exploration and metallurgy.

The company has five mining centers and a number of subcontracted sites. The ore is extracted there and then shipped by ore carriers to the factory in Doniambo where ferronickel is produced (which is used to make stainless steel). This structure currently allows the company to aim at long-term production of 72,000 tonnes of nickel per year. With approximately 2400 employees SLN is regarded as the leading private employer in New Caledonia.

To process the ongoing flow of samples for analysis, SLN uses 30 employees in three areas: the sampling workshop, the Fluorescence-X laboratory and the Wet Process laboratory. The laboratory carries out all analyses, from geology to finished products (ferronickel and matte) via ongoing control of the manufacturing process, not forgetting the environment.

Around 300 analyses per day are carried out, amounting to some 10,000 samples a month. Most of these analyses are carried out in the Fluorescence-X laboratory.

The need for modernization

In the early 1980s, the Fluorescence-X laboratory was fitted with an IT system: the centralizer. This in-house Cobol-based software made it possible to manage all the analyses carried out in this laboratory automatically, from scheduling certain samples to sending the results to various customers.

However, this system quickly showed its limits: restricted coding and hardware which had become obsolete, making maintenance increasingly complex.

The laboratory’s managers therefore wanted to introduce a more comprehensive system which would also integrate all of the analyses carried out in the various areas and make use of the most up-to-date methods.

The demand stems from the need to meet the specific requirements of a modern,
productive laboratory: requirements in terms of traceability, quality assurance and connectivity (simplifying how results are sent to the relevant customers/departments).

“We want to simplify operations relating to the processing of samples, thus improving productivity and optimizing the way our teams work.

This will improve the service we offer to our customers.” says Jean-Lucien Policisto, Head of the Laboratory Analysis section

A solid partner which considers specific requirements

SLN needed a solid partner which could offer a lasting solution. “Siemens provided a favorable response to our request while also continuing to listen to our requirements.

The presentation on SIMATIC IT Unilab – which is the Siemens LIMS – caught our interest and then won us over.

This solution allowed us to integrate specific requirements relating to our company: in terms of interfaces with other IT systems, connections to measuring instruments, and specifications which are particular to the laboratory (managing certain analyses, internal coding of samples, and so on).” Claude Bon, Head of the Industrial IT section.

Implementation

To optimize the implementation itself, Siemens and SLN firstly carried out a preliminary analysis. This procedure lasted several months, to allow the SLN project team to get to know the work of the laboratory and to provide them with the opportunity to consider all requirements and interpret them correctly.

The information obtained was used to prepare a detailed specifications document. The SLN project team started by setting up the LIMS in the Wet Process laboratory. This installation was accompanied by regular visits from Siemens and regular remote monitoring. After 6 to 7 months, the software was entirely set up and integrated in this part of the laboratory. The SLN project team is currently completing the rollout of the LIMS in the Fluorescence-X laboratory.

The considerable motivation of the project team, close involvement of all parties (laboratory and Industrial IT staff) and the way the group works together were key factors in the progress and success of this project.

Due to geographical constraints a three-way partnership was set up between Siemens Industrial IT in Belgium, SLN and IS2I – a local Siemens partner – so that the solution could be deployed with greater flexibility. “This helped us to make quick progress, with complete confidence, toward finishing the deployment of the LIMS”, said Claude Bon.

Greater customer involvement

Implementation in the Wet Process lab is already a success, users are discovering the benefits of the new system in full. In the next stage, the SLN project team intends to extend the LIMS to more of the laboratory’s customers (the factory and mining centers) so that they can fully manage their samples.

Higher involvement of the customers will help the laboratory return to its real role: providing analyses.

At a glance

Company: SLN (Société Le Nickel) in New Caledonia

System Integrator: Siemens Industrial IT
www.siemens.com/industrial-it
IS2I
www.is2ichalon.com

Requirements:
• Integration of all analyses in different areas
• Up-to-date methods
• Connectivity
• Traceability
• Quality assurance

Solution: SIMATIC IT Unilab LIMS

Benefits:
• Simplified operations for processing samples
• Reduction in manual inputs (bar codes, bar code readers)
• Reduces risk of errors
• Increased productivity
• Increased involvement of customers in the analysis process
• More time for core activity: the analyses
Production Process and Quality Improvements

MES Solution for metals at Salzgitter Mannesmann Stainless Tubes

How Salzgitter Mannesmann Stainless Tubes standardized solutions at its four sites with a high-availability and flexible MES solution based on the ISA-95 standard and so reduced waste and increased production efficiency, as well as quality.

The customer

Salzgitter Mannesmann Stainless Tubes (SMST), headquartered in Mülheim an der Ruhr (Germany) is a worldwide leading manufacturer of seamless stainless steel and nickel based alloy tubes and pipes. The company employs over 1000 people and books a yearly turnover of ca. 354 million € (2009). SMST has 4 production sites, each of which has its own area of expertise in terms of tube diameters, ranging from 6 to 250 mm: Montbard, France, Remscheid, Germany, Costa Volpino, Italy, and Houston, USA. Based on different processes (Hot extrusion, Cold pilgering or Cold drawing ) products are manufactured ranging from small instrumentation tubing up to large pipe sizes with wall thickness up to 50 mm and up to 25m of length. The materials range from standard austenitic stainless, duplex and super-duplex steels to highly sophisticated nickel-based alloys, depending on the requirements for the application in terms of corrosion resistance, heat resistance and high-temperature, high-strength materials.

The majority of products is exported to over 100 different countries for usage within plants, products and processes in industry sectors such as chemical and petrochemical, power generation, environmental technologies, oil and gas applications, mechanical and plant engineering, construction, and the automotive industry.

The business challenge

SMST was already working with Logica France preparing the implementation of SAP ERP for the consolidation of orders and finances across the four sites production sites. It was part of the project to replace the different existing local systems with a common specific tool for shop floor operators and the availability of shop floor data. An MES (Manufacturing Execution System) would cover that, providing scheduling and execution of production on the one hand, and a smooth exchange of production information with the ERP system on the other hand. However, the data from the shop floors of the four different plants were all different from each other. This was due to historical reasons but also to differences in production processes and commercial orientations in the plants. The existing software varied according to those different approaches. What was needed was a product based solu-
tion that would support standardization and could be rolled out across the four sites and replace all different existing solutions. Ideally suited would be a core MES based on the ISA-95 standard, providing a template that covered the different factories, and at the same time offering the flexibility to accommodate plant specific requirements. The implementation of such a high availability solution was expected to help minimize waste and loss of material, and increase production efficiency.

The solution

The cooperation with Logica for the ERP project being a positive one, SMST continued the partnership and a selection process for a suitable MES was started. The Siemens MES solution SIMATIC IT, fully based on ISA-95 was the best match for the requirements. SIMATIC IT being an open system, it was possible to a certain extent to carry out system changes without the need to be a software engineer.

Also, the MES includes the functionality to achieve integrated quality (such as a LIMS) and offers the possibility to generate certificates. A strong asset in this particularly regulated segment. Another decisive factor was the strong expertise of Siemens in both metals and MES which made Siemens a strong partner for the realization of the MES project. In a number of technical workshops the specific requirements of SMST were mapped which were taken into account during the functional analysis and the further project. The project includes the implementation of full MES functionality (SIMATIC IT Production Suite) including the LIMS SIMATIC IT Unilab in the four sites Montbard, Costa Volpino, Houston, and Remscheid. Following the project kick-off in October 2008 the project went live successfully at the four sites in the frame of 6 months between January 2010 and July 2010.

SIMATIC IT Production Suite now covers all stages in the production, extrusion, pilgering, finishing, … and offers the possibility to schedule operations, handle, merge or split bundles of tubes, handle the results of non destructive tests, all the while keeping track of the production data related to these operations.

SIMATIC IT Unilab manages the destructive tests and other lab-related data. The solution includes SIMATIC IT Report Manager which offers a user-friendly way to create reports based on all data stored in SIMATIC IT. The integration and communication between the ERP, MES and LIMS systems is handled through the component called Data Integration Service, which also enables communication via XML files with several shop-floor equipments.

“The MES project gave us the possibility to re-architect our 4 production systems in order to realize one common solution based on ISA-95 standards. In general terms this was a key factor in reducing cost, improving quality, simplifying maintenance.”

Giacomo Rizzi, IT Manager at SMST
**The pay-off**

The parallel progress of both the ERP and the MES/LIMS projects proved to be a success factor as well as a pain point. A continuous alignment between the two during implementation, from a timing, technical and functional point of view was an organisational challenge but did contribute to the consistency and standard aspect of the solutions. It can be safely said that all the agreed and challenging time frames were respected and all worked well at the time of go-live.

From the start the project took into account the requirements of the various stakeholders, combining 4 different countries, with 4 different cultures and local requirements related to specific products. This provided a vehicle for debate about the system solution and how to best align the requirements in order to achieve one “template” for all plants and processes, and eventually resulted in a better knowledge of all existing aspects of the plants.

The up to 200 screens that used to be in use in the 4 plants have now been reduced to 25, usable by all plants. The system is based on a common framework, which makes it configurable according to specific requirements and extensible in view of additional needs related to new products or equipments. The project was strongly focused on the use and creation of reusable assets which reduce the overall cost of a system.

**Paper and error reduction**

The screens were especially designed to directly provide the end users with all the needed information from the MES. This quick and easy access to key product and process data enforces adherence to correct manufacturing procedures and eliminates both record-keeping errors and the time-consuming reviews.

**Efficient data collection**

The data collection features enables easy acquisition of shop floor data about process execution. The analysis of this feedback is used to improve the production processes.

**Improved quality control**

The strong integration between MES and LIMS guarantees efficient quality control.

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**At a glance**

**Company:**
Salzgitter Mannesmann Stainless Tubes (SMST)

Project (MES) carried out by Siemens in consultation with Logica France

**Solution:**
- SIMATIC IT Production Suite
- SIMATIC IT Unilab
- SIMATIC IT Report Manager
Get more information

marketing.simatic-it@siemens.com

Siemens AG
Industry Sector
Industry Automation

www.siemens.com/simatic-it

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