Integrated process control system

Sachsenmilch remains on an expansion course

Sachsenmilch AG in Leppersdorf near Dresden/ Germany is the largest dairy in Europe. Integrated process automation from ProLeiT AG has ensured fluid production across expansion phases and across the years. Maximum quantity with maximum quality is a phrase that characterizes the working method of Sachsenmilch AG. 1.5 billion liters of high-quality milk is processed there every year. This rather sensitive foodstuff is subject to extensive quality controls. In addition, production in these dimensions means that a seamless workflow is particularly important, as plant efficiency can only be secured by means of high availability. ProLeiT AG of Herzogenaurach/ Germany has provided an integrated process control system, which ensures the smooth flow of operational data in the context of the third largest expansion of the Leppersdorf Sachsenmilch site.

It is not only large volumes of milk that are processed at Sachsenmilch AG. The unique arrangement of five dairies under one roof means that an extensive range of products are manufactured in Leppersdorf, ranging from traditional basic products such as milk, butter, cream and quark to cheese products such as mozzarella and cheese slices to specialized products such as dried milk powder for the processing industry.
The fresh milk products under the MÜLLER brand form an important element of the range, including the examples of the “corner” and “Froop”. Also, Sachsenmilch AG is a subsidiary of the Theo Müller group. The “Sachsenmilch” brand is represented by a broad product range. In Saxony, this house brand enjoys a level of recognition of 85 percent as a classic fruit yoghurt. Innovative product ideas mean that Sachsenmilch AG is also attractive to health-conscious consumers. For example, its “master butter” is one of the first brands on the German butter market to be refined with vital iodine salt. In addition, “probiotic yoghurt butter” is increasingly viewed as enjoyed with a certain fitness factor.

Rearranged capacity limits

After Theo Müller bought up Sachsenmilch AG in 1994, he systematically expanded it into Europe’s largest dairy. The first expansion was a consequence of the current trend towards milk-based and yoghurt-based drinks, in particular in PET bottles. As the production plants were running at full capacity and there was no more space in the existing buildings, it was decided that an expansion should be undertaken. As in the case of the two previous large expansion phases, Sachsenmilch AG also enlisted the competency of ProLeiT AG in Herzogenaurach for this year’s expansion, in direct proximity to the high-tech location of Erlangen, Germany.
A comprehensive process automation system was implemented, based on the ProLeiT-developed OSNT. The aim was process automation of the plant and recording of operational data. The system was as today with Plant iT based on client server architecture, as was the case with the previous system.
MS Windows NT Server 3.51 and MS SQL Server 4.21 were used as standard software on the server. The operator stations ran on the Windows NT Workstation 3.51 operating system. In terms of controllers, Siemens SIMATIC S5 of CPU types 945 and 948 were used. Communication between the controllers and the operator stations took place back then as today via Ethernet.

In the course of the following years, the plant was constantly expanded in smaller steps. During these expansions, there was an upgrade of the entire plant to ProLeiT OSNT. At the same time as changing to the ProLeiT system, the system basis was also changed to Microsoft Windows NT 4 and the higher performance Microsoft SQL server 6.5.
Later, the system was upgraded considerably in the course of the expansion. As the more modern Siemens SIMATIC S7 controller of the type 416/2 was to be used for process control at the plant for the first time, the decision was made to use the ProLeiT Plant iT system, which could be upgraded to OSNT. Four years later, the plant was finally transferred to Windows 2000 and SQL Server 2000 and the Plant iT system was replaced with a later Version of Plant iT. In the course of this modernization, the OSNT 4.10 system was also ported to Windows 2000 and SQL Server 2000, so that still today both OSNT 4.10 and Plant iT can be operated on a single server system.

INFO

Company:	Sachsenmilch AG
Sector:	Dairy
Location:	Leppersdorf
Country:	Germany

Full connection to the existing system

In the course of the now completed third large site expansion, among other things, a completely new CIP system for fully automatic cleaning was established. This was in addition to an inline mixing facility with complete environment and connection to existing tank farm, two high-power heaters including homogenization with a performance of 30 and 50 cubic meters per hour, a cultures station with four tanks and direct starter, a yoghurt maturing tank farm with four tanks and a cooler and the complete environment for four new filling machines with a performance of 36,000 bottles or 40,000 pots per hour.

The solution conceptualized by ProLeiT dealt with this challenge by means of twelve new Siemens SIMATIC S7 controllers. Of the three

communications processors, two function for reasons of redundancy and the third exclusively for the acquisition of production data. In relation to integration at the Leppersdorf plant, the decision to use ProLeiT Plant iT software was a logical choice.
The plant upgrade was linked to the existing network via Ethernet, as is usual practice at the site. The ProLeiT Liqu iT system is responsible for the fine control of processes. Using the example of a fully automatic cleaning process of the new CIP system, this means that all necessary objects, valves and amounts are automatically selected and the progression of reserve water, brine, acid and fresh water takes place via Liqu iT with recipe control.

Intelligent communication with SAP

In addition to the logistical link to the existing system, this production expansion necessitated a special solution: thanks to a specially developed job list it was possible to transfer data such as quantity details, batch number, source or target tank from the superimposed SAP R/3 ERP system.
Automatic data transfer to the sequencers means that operation is significantly simplified. At the same time, acknowledgement to the SAP system is implemented. The operator is thus able to transfer a job in the traditional way in the form of an operating cluster or to separately execute the individual operation steps.
In general, the system is implemented in such a way that production is fully automatic across as many areas as possible over hours or days. However, as soon as a fault or other neuralgic issue arises, the operator is consulted by the system and has maximum power to intervene.

Availability at all costs

Seamless operation is of absolute priority in relation to a complex production organism such as Sachsenmilch AG. Three shifts are worked, 24 hours a day, 365 days a year. In relation to an availability that is as high as possible, the plant works with more Siemens SIMATIC controllers than are actually necessary. In this way the plant remains highly flexible despite massive capacities and extremely maintenance-friendly, as production only needs to be interrupted selectively in the case of repairs, maintenance or upgrades. The quantity structure of the entire plant comprises after this new expansion in addition to the 40 S7 controllers an additional 29 S5 controllers and 65 operator stations with direct access to OSNT and Plant iT. The processes of the entire plant are controlled by 2,500 sequencers, ensuring the high flexibility of the plant. Further, around 25,000 drives and valves are controlled by the whole system, around 5,000 analog values are evaluated, 1,000 analog control loops are processed and 7,000 analog values are displayed.

Precise implementation

The particularly tight deadline meant that precise timing was necessary and in addition, due to the number of companies involved, a narrow logistics plan had to be complied with. The green light was given when the job was allocated, leaving just six months until the commencement of commissioning. For the commissioning itself only six months were available, whereby the first product runs had to take place after two months. However, implementation was successfully and duly undertaken. Production downtimes were hardly necessary thereby in the older area of the plant. Despite the impressive dimensions, the expansion of the Europe's largest dairy is far from over. The consumer will not notice any change as Sachsenmilch AG's products will retain their consistent high taste and quality level.