



Humana Milchunion's manufacturing plant in Coesfeld



Additions of powder are recorded via mobile barcode scanners for batch tracing and product management

Jürgen Dechow, Büchen, Germany*

Investment in the future

Automation, MES and ERP systems fully integrated at Humana Milchunion thanks to Tuchenhagen Dairy Systems

Refined quality management and a corporate strategy aimed at cost leadership – these were reasons enough for the Humana Milchunion cooperative to invest in the automation and IT infrastructure of its manufacturing plant in Coesfeld. The plan: to replace the existing automation technology, to introduce a new management system and to integrate the production line with the order management system (SAP) and the Qualifax quality system. Also required was the installation of a system for continuous Tracking & Tracing. Tuchenhagen Dairy Systems GmbH, a GEA Group company, was in charge of carrying out this task. The prerequisite: close coordination with Humana's central IT department.

Initial situation

Approximately 500 million tubs of yoghurt and speciality desserts are manufactured in Humana's manufacturing plant in Coesfeld each year. Built in 1991, the production line – which was state-of-the art at the time – was constructed with Simatic S5 control systems and a DOS-based management system. Since then, the system had constantly been extended in order to increase capacity in line with the requirements. This has resulted in the in-

stalled automated equipment operating at full capacity, a situation which means rising investment costs for expansions and renovations. Although the DOS-based SCADA system already had a recipe management facility, this was not linked to Humana Milchunion's IT infrastructure.

Objective

Key parts of production were to be converted to Simatic S7 control systems and equipped with a new management system. It was essential that SAP takes over production orders including the associated master recipes. In order to be able to operate the manufacturing plant independently of the central SAP system in the event of a breakdown, it was also important that the Manufacturing Execution System (MES for short), which was to be installed, also had a recipe tool and was synchronised with the central system. Deliveries and consumption of the raw ingredients were to be reported back in real time to SAP, and batch data and product movements were to be recorded. In addition to Tracking & Tracing, this helps to optimise the work processes in the laboratory.

Implementation

Automation and Management System

Simatic S7 control systems and WinCC visualisation software serve as automation

platform. The crucial element of the automation concept produced is the technology-specific OTAS toolbox with its standardised software modules. These connect the Simatic S7 control systems with WinCC visualisation using a parameterisable management system, with key functions being configured via a database application, so that they are easily understandable by dairy technicians as well. The three new control PCs in the central control room were each equipped with two monitors, making operation easier and making the entire process easier to visualise.

As the process of converting the automated systems from S5 to S7 had to be carried out during full production, extensive tests were carried out upstream of the actual conversion process and monitored by Humana production specialists. All of the process objects can be simulated in the OTAS system, which meant that the test environment was very close to the real environment.



* The author is working for GEA Tuchenhagen Dairy Systems; Dechow.Juergen@tuchenhagen.de

MES level

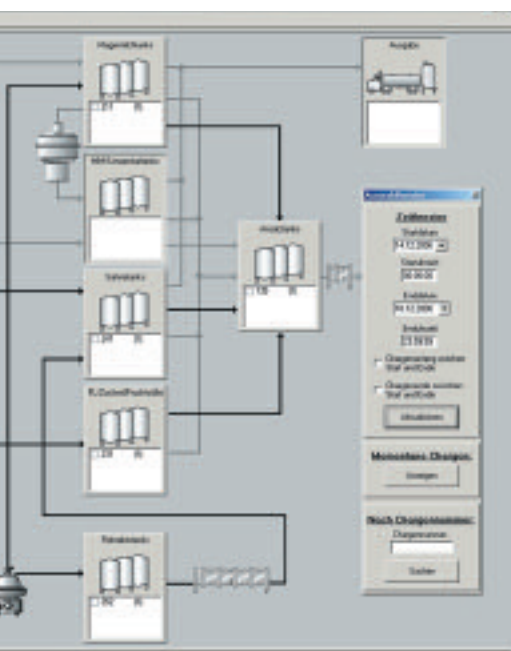
The key point of the project was the implementation of a high-performance MES system for the production site in Coesfeld, with the hardware platform comprising a separate database server using Microsoft SQL server. This communicates directly with an Oracle server, which Humana's IT specialists are able to use the SAP and quality management at the Group's headquarters in Everswinkel.

Recipe system

Production orders and current master recipes are supplied by the central Oracle server and converted for processing in the process automation. The metering quantities in the working recipe can therefore be adapted, for example, on the basis of the current laboratory values for fat and total solids contents. Management of the raw ingredients throughout the entire production process is an integral part of the system. In this way, the quantities of raw ingredients incorporated and used are recorded by the system and reported back to the SAP. Mobile barcode scanners record manual additions of powder, which are therefore also included in materials management and batch tracking.

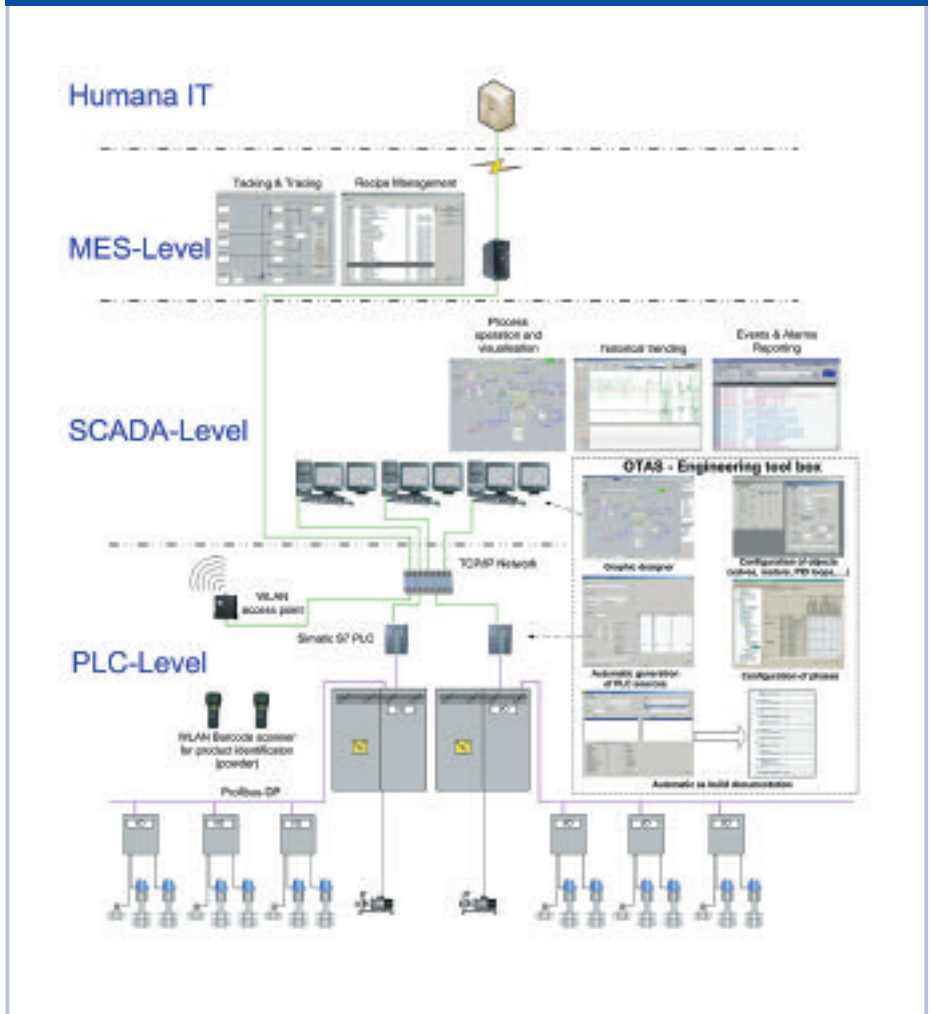
Batch tracking

A key function of MES is Tracking & Tracing which has been implemented using the OTAS Track & Trace software module. Batches and



Graphic representation of batch tracing

Automation System Architecture



product movements are recorded via standardised interfaces and put into the database's archives.

The graphic representation of the production line makes it possible to clearly track batches or individual product movements throughout the entire system. In addition, the user is provided with process data via the integrated Excel interface to carry out their own calculations. The processed data makes it possible to easily track batches back and therefore fulfils the requirements of EU decree 178/2002.

Successfully optimised, completely linked – overview of the project and results

Key areas of production have been converted from the existing S5 control system to S7 and an open management system. In addition, new systems for processing recipes and batch tracing have been installed and linked to the

Humana Group's central ERP system. The project was successfully concluded in June 2006 following a six-month period of project planning and commissioning.

The procedure for mixing products has been optimised as part of the replacement of the automated systems, which, in conjunction with improved metering and control accuracies, has resulted in considerable savings in raw ingredients that in turn meet the Humana Group's strategic objective of cost leadership. The new installation satisfied the two most important requirements of product control, namely:

- complete cost transparency regarding the raw ingredients used in each production batch and
- assisting risk management by means of constant batch tracking.

In the meantime, Tuchenhausen Dairy Systems GmbH has also been chosen to link the ice cream production at Humana's head office in Everswinkel to Humana's central IT infrastructure.