

Orley Foods

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Henk de Villiers
Operations Manager

World-class Chocolate Manufacturing with a Little Help From Wonderware

Goals

- Full product traceability
- Seamless and transparent integration of manufacturing and business systems throughout the company
- Trend and trace process issues in order to speed up trouble shooting while conforming to regulatory requirements

Challenges

- Re-engineering of Orley Foods' process control and information delivery infrastructure
- The plant model would have to be designed to handle the entire plant and not just certain aspects of the chocolate production facility

Solutions and Products

- Wonderware InTouch HMI
- Wonderware System Platform

Results

- Consistent batch sizes
- Raw material allocations tracked
- Better process control tracking
- Significant savings in fat usage
- Standardization of batch processing times
- Minimized batch/formulation corrections



Cape Town, South Africa – Over the past 40 years, this proud, family-owned business has produced a comprehensive range of quality ingredients for the South African food industry. The business has evolved into two distinct streams, one involving the ongoing innovation, manufacture and distribution of Orley Products and the other, the highly collaborative, development-driven Orley Solutions service.

Orley Solutions is a dynamic and extremely responsive service through which the company's New Product Development division researches and develops food solutions for South Africa's leading brand owners.

Orley Products consists of a large range of successful packaged goods for wholesale distribution to the catering, confectionery and baking trade, as well as limited retail distribution to consumers. The company's wide range of chocolate products (over 100 different formulations) include couverture chocolate made to international CODEX standards.

Needing to know the quantities of the costly materials that make up a batch of raw chocolate, Orley Foods selected Wonderware technology for the capabilities it offers to allow for accurate consumption and production monitoring per batch, which means never again having to wonder about the constituents of each batch. The merging of an effective production solution with their newly-implemented ERP system gives Orley Foods full visibility on detailed manufacturing information per works order as well as more effective decision support.

Background

Orley Foods is fully HACCP (Hazard Analysis and Critical Control Point - an FDA program) compliant and the company's quality management system conforms to ISO 9001. Compliance is audited regularly, not only by Orley Foods, but also by the South African Bureau of Standards (SABS). It is within this context of mandatory regulatory compliance that a material tracking solution was sought.

The Orley Foods plant is made up of four main areas. From Raw Material Receiving to Finished Goods, tracking and traceability is the key to regulatory compliance. This is especially true of the chocolate manufacturing facility, which manufactures chocolate in bulk according to the specifications of downstream chocolate confectionery manufacturers whose products are found on the retail market.

Project Objectives

"Before this project, we were working with a failing system while our multinational customers demanded more traceability information," said Henk de Villiers an Operations Manager with Orley Foods. "These large companies want certificates of analysis and conformity and can demand a full traceability report within two hours. They can also do flash audits on site without warning and ask any questions they wish about any batch. So we looked for a solution that would provide seamless and transparent integration of manufacturing and business systems throughout the company."

The manufacturing system would have to be capable of a yet to be defined expandability, ease of integration and the ability to provide data in context for the benefit of more informed decision-making. All the important, relevant and contextual information was to be published to a portal for easy access by appropriate personnel. It was imperative that the system had the ability to trend and trace process issues in order to speed up trouble shooting, while also conforming to regulatory requirements.



Project Requirements

In order to achieve its objectives, Orley Foods would have to implement some far-reaching initiatives that included the re-engineering of its process control and information delivery infrastructure. Some of the considerations included:

- Traceability of fat usage and additions against work orders – In the chocolate manufacturing process, the different fats used are incompatible with one another, so it is vital to ensure traceability of the fat used at all times.
- Monitoring and logging of process parameters – The chosen system would be used to monitor and track process parameters in the plant and for each recipe batch.
- ERP integration with Syspro – Orley Foods needed one version of the truth for the Bill of Materials in order to minimize formulation failures and needed this information to be fed directly from Syspro to the manufacturing system.
- Upgrading the overall system to the latest technologies – As the company's system could no longer cope, it needed to upgrade to the latest technologies that would address its network and Windows/SQL Server environment, as well as its SCADA and PLC system needs.
- Management of ingredient recipes – As Orley Foods has over one hundred different recipes for liquid chocolate, including different colors and fat combinations, the company needed a system that would be able to handle this variation seamlessly.
- Introduction of an expandable reporting infrastructure – With the new business environment and the need for key information, Orley Foods developed KPIs to which the manufacturing system had to respond to in order to deliver reports from a central source.

Solution Selection

While realizing that there were a number of potential technologies to address their needs, Orley Foods decided to look for prospective solution providers who could use the technologies they thought most appropriate to the task at hand.

“We started the project by defining our needs and then drew up a tender process allowing various vendors and systems to be evaluated,” said de Villiers. “It was vital that we had a well-known system but it was equally important that we had a Cape-Town-based system integrator who needed to have experience in the development of PLC, SCADA and databases, especially SQL. It was also a prerequisite that the SI should have prior experience in a food and beverage environment and was well acquainted with the complexities of working in a HACCP environment. We chose AMR Automations because they met all these criteria.”

Several prominent technology suppliers were considered and eventually Orley Foods selected Wonderware.

“We found that the Wonderware solution was best suited, as it had a proven track record in the food and beverage industry and was used in many local and international plants involved with food production,” said de Villiers. “We were also shown examples of integration between Wonderware production and control systems and our chosen ERP system, Syspro. Finally, there are numerous system integrators and solution providers with an extensive knowledge of the Wonderware suite of solutions which meant that we wouldn't be stuck in the case of an emergency.”

Solution Architecture

Wonderware System Platform, based on ArchestrA technology, was used to develop a model of the plant.

“Although the project only addressed certain aspects of the chocolate production facility, we designed the model to cater for the entire plant,” said Stefan la Grange with AMR Automations.

An important part of the project was replacing the existing PLC with an Allen-Bradley CompactLogix unit and Beckhoff Ethernet TCP/IP remote I/O units, which AMR found to be a good and rapid solution for upgrading installations where PLCs could be kept out of harm's way.

"We design PLC programs to run autonomously with no interference from the SCADA system," said la Grange. "In this case, the PLC runs the recipe and handles the fat transfer route allocation. Obviously, processes for which the necessary raw materials are not available are not started."

Orley Food's ERP system, Syspro, places the work orders into a "holding" or intermediary Wonderware Historian production database where they are picked up by the SCADA system. The works orders specify the raw materials to be used, as well as the tank and equipment allocation and scheduling. Operators then use the dual-screen SCADA system (Wonderware InTouch HMI) to view the state of all the conches in the system and the works orders they are executing.

"We use the SQL data grid from Wonderware to show the production plan, which displays which work orders are queued or being processed. A simple click on the column headers will sort the display according to the chosen criteria," explained la Grange. "Operators can modify the execution time of work orders or switch machines for a specific work order if authorized by production supervisors. This is useful for bypassing breakdowns or maintenance problems."

The Wonderware Information Server reports tabulate all aspects of work order status and production information such as temperature vs. pressure charts, process variations, timings and operator interactions for traceability purposes.

Realized Results

- Consistent batch sizes – In the past, this could be a hit-and-miss affair, with corrections having to be made for marginal or failed recipes.
- Raw material allocations tracked – What fat goes where? Previously this tracking was done manually and prone to operator error.
- Better process control tracking – Alarming (e.g. motor trips) is now available at the SCADA level as well as trouble-shooting information (temperatures, pressures, grinding times, etc.) and operator involvement.
- Significant savings in fat usage – In the chocolate industry, Cocoa Butter is called "Liquid Gold" because of its high cost.
- Standardization of batch processing times – Allows for critical evaluation of plant performance reduced consumption or resources, especially electrical power.
- Minimized batch/formulation corrections – Savings by not having to add raw materials to batches, which could result in batches that were larger than the customer ordered, and therefore wasted, have been minimized.

Conclusion

Phase 2 of this project will capitalize on existing gains and extend functionality across the entire plant, while closing the loop with feedback directly into the Syspro ERP system. Orley Foods has shown itself to be a prime example of adaptability in a more demanding world with a globally-competitive marketplace.

There's no doubt that the integration of information technology at the business and production levels is helping the company deal with the mechanics of sustained profitability. But it's doing much more than that. It's allowing Orley Foods to focus on its original mission of delighting us all.



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