



CUSTOMER CASE STUDY

Baltika Breweries Masters Brewing Automation

Baltika Breweries - www.eng.baltika.ru
Industry - Food & Beverage

Goals

- The brewery required a modular automation software solution that would enable operations management to scale the system to meet future production requirements
- To reduce costs through improved equipment performance, lowered material losses, reduced production costs and better supply chain processes from distributor warehouses

Challenges

- Ensuring that a new automation software solution could effectively integrate with existing hardware and software while increasing overall equipment performance

- Because accurately monitoring supplies of source ingredients is critical to maintaining adequate levels of brewing production, there was concern that an appropriate software solution may not be available
- With increasing global competition, reducing the facility's production cost was a top priority for any new software implementation

Solution

- InTouch HMI
- MES Operations
- MES Performance
- Historian Clients
- System Platform

Results

- Lowered overall operating costs through a 8 percent reduction in energy usage during the manufacturing process
- Achieved a 5 percent reduction in steam consumption during the beer manufacturing process
- Lowered the cost of packaging materials has been lowered by 1.8 percent annually
- Baltika can now accurately determine production losses per batch and has achieved a reduction of 0.56 percent in extract loss.

ST. PETERSBURG, Russia – Beer is one of the world's oldest beverages dating back to the 6th millennium B.C. Today the popularity of the beverage continues with more than 133 billion liters sold worldwide each year. The simple process of fermenting a mixture of water, barley and hops has become a \$295 billion industry, and almost every country in the world has a stake in making brew.

With more than 200 years of brewing history, beer production in Russia is considered one of the potentially fastest growing commercial industries in the country. The Carlsberg Group quickly recognised that beer production in Russia was a potentially lucrative business and invested in Baltika Breweries, one of the country's oldest brew houses.

To remain competitive and to keep profits flowing, Baltika reviewed its manufacturing processes in 2007 and decided to invest in new solutions to help improve its automated production processes and increase the profitability of its operations. In conjunction with its parent company, the Carlsberg Group, Baltika production management decided to standardise the company's corporate and manufacturing IT systems on Manufacturing Execution System software from AVEVA. The company's decision was not only based on the advanced technologies incorporated in the MES solution, but also the reputation and experience of AVEVA and the Wonderware by AVEVA brand in successful implementations at other breweries around the globe.

"The comprehensive MES solution from AVEVA has provided a significant increase in the accuracy of our process control system enabling our operators to monitor the manufacturing lines in real time and more quickly react to anomalies that might occur."

- Yuriy Chentyrev,
Director of Operations, Baltika Breweries

Bandwagon

Baltika Breweries is the largest beer producer in Russia with a 41 percent market share and a production capacity of 50 million hectoliters per year. The company maintains brewing sites throughout Russia as well as in Azerbaijan. With its extensive product portfolio of 30 beer and 10 non-beer brands and exports to more than 60 countries worldwide, Baltika needed a technology solution that would enable it to better manage manufacturing and maintain accurate production records. Management's overall goal was to reduce costs per unit through improved equipment performance, less material loss, better supply chain processes from distributor warehouses and tight controls on production costs.

Baltika outlined very specific system design parameters for the new automated software solution including a modular, scalable platform that would enable the company to expand its manufacturing capabilities to keep pace with market demand. The automation solution also had to provide an open architecture that could easily integrate with current and future third-party systems, lower overall maintenance costs and keep engineering expenses to a minimum.

Working with Vent Company, a AVEVA certified system integrator, the implementation of AVEVA's MES began in 2007 at Baltika's Samara facility. The AVEVA solutions installed included InTouch HMI powered by Wonderware for process visualisation, MES Operations for tracking and traceability, Historian Clients for corporate-wide access to data, and MES Performance to collect, track and communicate real-time equipment performance and efficiency information and KPIs. The foundation of these powerful Wonderware by AVEVA technology components is System Platform powered by Wonderware, which provides Baltika with a single, scalable platform for all SCADA, supervisory HMI and MES applications required by the company.

“Prior to implementing the AVEVA's Manufacturing Execution System, Baltika used a custom-built system for data collection and analysis,” said Yuriy Chentyrev, Director of Operations at Baltika. “All process data was manually entered by plant operators into Microsoft Excel or the Monolit Production database, which was a time-consuming process and prone to errors. The data was then incorporated into a spreadsheet to generate production and data analysis reports for management, but these were not always accurate. Baltika desperately needed a more precise method to manage data detailing plant operations and final beer production statistics.”

AVEVA Software Elevates Brewery Precision

To overcome the shortcomings of the prior custom production management system, Baltika's objective for the AVEVA solution was to lower overall labor costs, improve timing of information analysis reports, facilitate faster decision-making and improve the credibility of data acquired detailing production processes and the final end product.

The scope of the project based on the AVEVA solution included successfully integrating the MES system with the brewery's existing ProLeiT process control system as well as with various control systems that manage Baltika's filling line machines from different equipment suppliers. The first stage targeted several operational and performance functions including the plant's supervisory control systems to address downtime control and efficiency analysis for the filling shop.

The solution also was to manage genealogy and traceability functions for the production process and the industrial database for process data storage. In addition, a web portal would be established for publishing reports that could be accessed company-wide.

The scope of facilities operations to be managed by Wonderware by AVEVA software was extensive and included the production laboratory, elevator and warehouses as well as malt preparation, boiling,

brewing and filtration shops. In total, more than 200 pieces of equipment needed to be run by the AVEVA solution.

To provide extensive visualisation of the entire brewing operations, InTouch HMI powered by Wonderware was the software of choice. InTouch HMI provides Baltika plant operators real-time views of the production processes to ensure all lines are functioning at optimum levels. The InTouch HMI screens at each operator station provide sophisticated graphic visualisation displays detailing operational status throughout the entire manufacturing process, from brewing to packaging.

InTouch HMI also offers features that were not available to operations management by the prior system including resolution-independent graphics and intelligent symbols that enable direct interaction with the processing system. The technology also includes sophisticated scripting to extend and customise applications for the company's specific needs, real-time distributed alarming with historical views for analysis, and built-in, real-time and historical trending for reporting and analysis of operations efficiency.

Not only are plant managers at the Samara facility now able to access critical production data, but so can executives at the company's headquarters in St. Petersburg. Using AVEVA's Historian Clients, decision-makers throughout the company can quickly gain visibility to production operations through web reports published in the Historian Clients. As an integrated web server, Historian Clients simplifies the organisation and delivers operations information for use across all functions in Baltika's organization.

Baltika also employs AVEVA's MES Operations to capture real-time process data and provide detailed batch data reports for analysis. With the MES Operations, Baltika can track each raw material that is used during the brewing process.

The software also captures traceability records which enable rapid response from plant operators to events



Pouring beer. Photograph courtesy of Shutterstock

such product recalls. In addition, the software's recipe management system enables the brewer to control ingredients in a more precise way and provides product development genealogy that enables the company to track problems back to the source if necessary.

Paired with the System Platform powered by Wonderware, a comprehensive industrial software platform for SCADA, HMI and MES applications, MES Operations provides comprehensive data management and seamless interaction with the InTouch HMI and other plant floor visualisation systems.

"The comprehensive MES solution has provided a significant increase in the accuracy of Baltika's process control system enabling plant operators to monitor the manufacturing lines in real time and more quickly react to anomalies that might occur," said Chentyrev. "The implementation of the AVEVA solution also provided Baltika with a higher level of traceability based on accurate real-time data. AVEVA's Manufacturing Execution System has now become an effective tool to promptly react to the changes in qualitative indicators or disclose hidden deficiencies that can lead to production losses or equipment shutdowns."

With the MES Performance software, Baltika is able to better monitor plant performance and the use of raw materials as well as provide detailed downtime analyses for greater asset utilisation. Baltika has also achieved significant increases in plant productivity and efficiency through OEE (Overall Equipment Effectiveness) monitoring and reporting. The production events can now be adjusted and controlled at the production level and the company is able to better calculate material loss in real time by product lot.

“Baltika has also greatly improved its approach to planned maintenance activities,” said Chentyrev. “Prior to the Manufacturing Execution System solution, management kept a paper trail of various facility downtime occurrences. Now operators can rely on more accurate Pareto charts and machine statistics data which have vastly improved Baltika’s maintenance management operations. In addition, by recording all production events and machine statistics, Baltika is able to automatically define the cause of unplanned line shutdowns.”

Baltika Achieves a Blend of Benefits

The AVEVA project has brought even larger economic benefits in both the manufacture of Baltika’s various beverages as well as streamlining management of facility operations of the brewery. Some of the key operations savings included an annual decrease of 5 percent in steam production costs during the beer making process; a reduction of 0.56 percent in extract loss; an 8 percent enhancement in energy use; and a 1.8 percent decrease in packaging material costs.

Baltika also plans to use the Wonderware by AVEVA technology to optimise its supply chain activities by extending integration of the software to the company’s

ERP Monolit scheduling system. The objective is to enable management and key plant operators to download production data from the ERP system and coordinate it with scheduling and production tasks managed by the AVEVA’s Manufacturing Execution System. The MES will then be able to generate reports that will assist in more efficient management of the overall production process ranging from monitoring raw material supplies to managing the manufacturing process to packaging and distribution.

Though early brew houses were fairly primitive and used a variety of methods for making beer, the beer manufacturing process has not changed much since the Industrial Revolution introduced modern methods and tools. Today, government regulations and increasing public demand have put more pressure on breweries to improve product quality and reduce costs to remain profitable. Technology from AVEVA is making it easier for Baltika and other breweries to more effectively track the production process, manage raw material processing and deliver to market a high quality product.