Food & Beverage Successes

Global References & Case Studies

90% of the world's top food and beverage companies use GE Digital software.

Our customers include:

- Beverage manufacturers

- Snack foods companies

- Meat and seafood processors

- Bakeries and mills

- Sugar processors & confectionery manufacturers

- Animal food manufacturers

- Fruit and vegetable processors

- Ingredient suppliers

- Dairies

- Food and beverage equipment suppliers / OEMs

- And more ...

Think Big

From super SCADA to on-prem & cloud-based MES to enterprise-wide industrial data management.

- More than 2,000 Food & Beverage customers – with thousands of plants around the world

- Tens of thousands of software users in Food & Beverage – on nearly every continent

- Majority of leading Food & Beverage companies use GE Digital software

- Our customers win awards – such as Food Engineering's Plant of the Year

- 2500+ GE software customers have systems with >500,000 tags — including some with systems >1,500,000 I/O points!

- #1 MES out of 19 vendors for Continuous Process according to Gartner report; we are a Gartner Leader

- SCADA with 99.999999999% availability
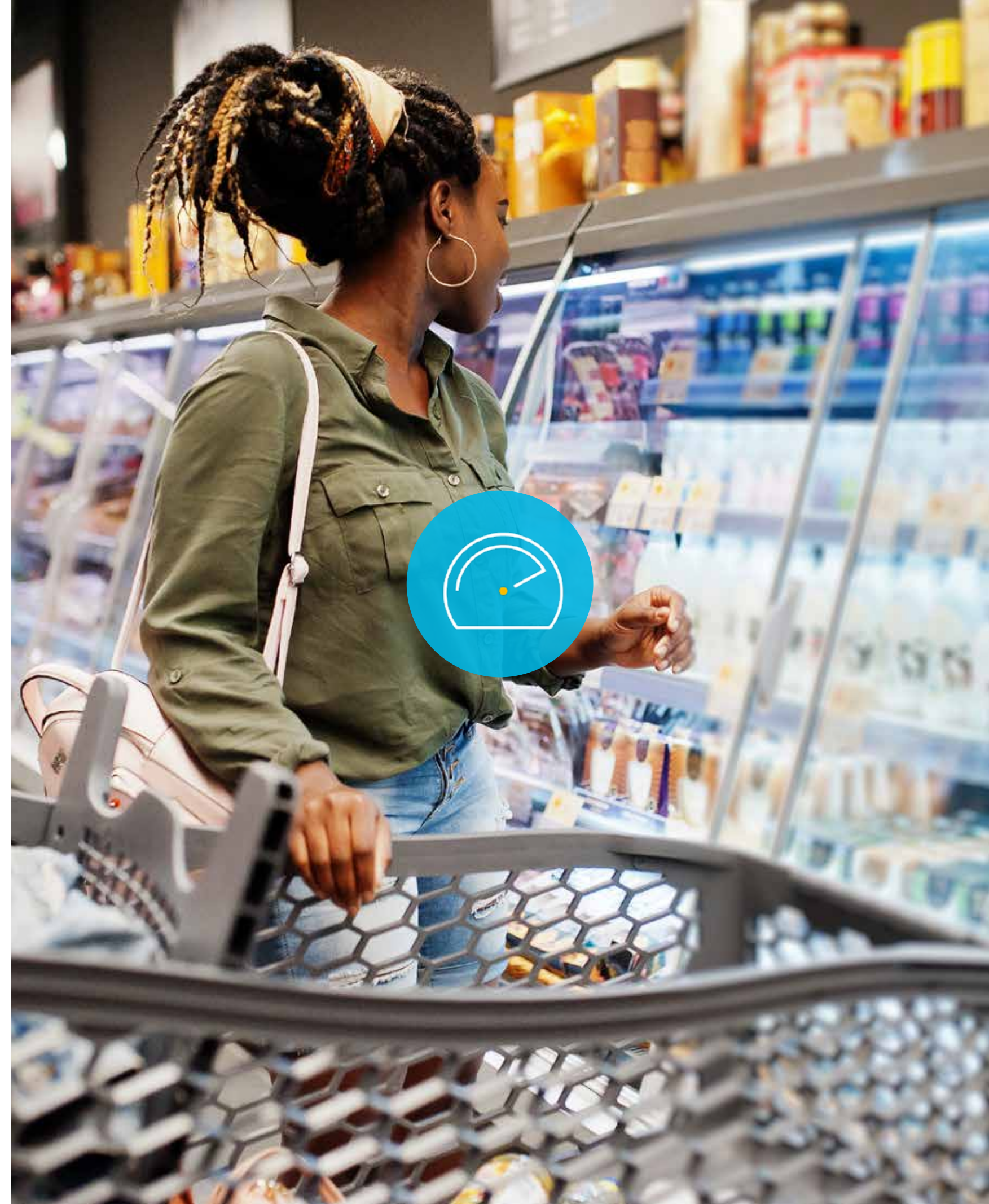
Delivering Real Results in Food & Beverage

- $5M annual quality improvement savings

- >$10M energy savings over 5 years

- $500K annual waste savings

- $200K/yr SKU cost reduction

- $0.01/case SKU formula cost savings

- $850K/yr production efficiency savings

- 3-month payback on MES investment

- 39% decrease in downtime events

- 10% operating costs reduction

- 10-15% energy savings improvements YOY

- 30% faster new product introductions

- 25% defect reduction

- 25% plant downtime reduction

- 80% reduced furnace emission

- 50% waste reduction

- 20% OEE improvement

- 90% waste reduction

- 35% reduction in product waste

- 90% decrease in finished goods holds & packaging waste

- 9% increased production efficiency

Outcomes

Increase visibility

For many food manufacturing companies, the majority of the workforce is on the plant floor, working at individual pieces of equipment or on production lines. Establishing near real-time visibility into equipment health can empower operators to quickly identify problems and decrease unplanned downtime.

Optimize operations

By integrating and analyzing the data being generated on production lines, improvements can be made across plants including on batch variation, ingredient consumption, quality costs, waste, and management of abnormal situations. Optimizing food and beverage manufacturing also alleviates knowledge gaps between experienced and new operators.

Improve quality and output

By monitoring the health of your equipment and production lines with industrial applications, food and beverage manufacturing companies can shift from schedule-based maintenance practices to condition-based or preventative maintenance practices. This helps eliminate vulnerabilities in the production lines—improving both product quality and output.

Increase agility

Manage your batch execution for greater agility and reduced costs. You can streamline end-to-end operations, ensure product quality, and drive high-volume production, even when switching products between batches is a requirement.

Adhere to regulations

Complying with stringent regulations is a must. Support your traceability, data management, reporting, and continuous improvement needs with proven, modernized technologies. Furthermore, enforce Standard Operating Procedures by guiding operators through the right steps and tracking performance.

Speed time to market

Improve your ability to compete, penetrate new markets, and even speed production of existing products with digital transformation. You can improve local production operations while meeting global requirements. With a connected enterprise, you can accelerate time to market and boost competitiveness.

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With rapidly changing consumer preferences, tighter regulatory requirements and rising commodity prices, Food & Beverage manufacturers are under pressure. See how GE Digital has helped F&B manufacturers grow revenues and operating margins while cutting costs. With decades of industry experience and innovation, GE Digital is the proven partner of choice for F&B manufacturers around the world.

Browar Warka increases bottling line efficiency with GE Digital

READ

ASM Foods leverages integrated control system for strong production increase

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North American brewer sees millions in energy cost savings with Proficy

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Ocean Spray increases efficiency and productivity with Proficy

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Digital transformation at Copersucar

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Bolletje drives quality improvements and visibility

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Snack producer bags productivity gain

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Global pet food processor improves quality and yield

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GB Glace implements a new production system for 45 million liters of ice cream

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Soft drink bottler improves OEE and reduces costs

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Leading juice manufacturer increases production efficiency

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European brewery improves production and packaging processes

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Global brewer increases capacity while reducing costs

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Spomlek improves manufacturing line operations

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De Danske Gaerfabrikker increases production capacity by 20% with ROB-EX

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Leading American dairy has 50% decrease in time taken for quality control audits

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Toray Plastics (America), Inc. optimizes manufacturing operational performance with Big Data Analytics

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Australian sugar mill speeds cane processing with faster production

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Westfälische Fleischwarenfabrik Stockmeyer GmbH uses central production control

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Fipros gets more through their production as they spend less time on machine setup and changes

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Packaged foods manufacturer increases production capacity

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Major dairy system upgrade increases OEE by 15%

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Novozymes has reduced lead times by 30% and achieved a considerable increase in productivity

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UK brewery automates beer production

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Cabinplant coordinates all project plan and production schedules in ROB-EX Scheduler

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Frozen meat and fish packaging materials manufacturer builds lean production environment

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Global food & beverage processing and packaging company reduces waste and downtime through insight into paper breaks

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Australian brewery improves scheduling accuracy and inventory tracking

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Palsgaard has a better visual overview while being able to plan according to capacity and constraints

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Americas sugar and ethanol producer improves quality and throughput

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Major frozen food manufacturer increases quality with visibility

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International rice producer supports global environmental agreements and reduces downtime

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European margarine and cheese manufacturer achieves personalized production information

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Food packaging manufacturer complies with the General Food Law with Proficy software

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African dairy producer increases profitability

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Corn syrup producer enjoys sweet rewards

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European fruit concentrate manufacturer increased productivity

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Chinese dairy increases quality and yield

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Multi-plant beverage manufacturer achieves high quality

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"We can compare the performance of plants, lines and even individual machines."

— **Ioan Batran, Automation Engineering Director, Coca-Cola Refreshments (CCR)** on the company's 70-plant deployment of KPI dashboards based on GE technology

Sugar producer in Europe maximizes efficiency

READ

Major food manufacturer harvests low-hanging fruit with digital tools

READ

The J.M. Smucker Company

Harvests value from data to drive process & people changes

Summary

J.M. Smucker Company

Solutions

- Production Management: efficiency, quality, traceability, and more

- Enterprise- and plant-wide monitoring, visibility, and control

- Industrial data management with enterprise-/plant-wide historian

Products from GE Digital

- Proficy Plant Applications

- iFIX HMI/SCADA

- Proficy Historian

- Proficy Workflow

Big Wins

- Saved $500,000 a year by reducing product overfill at pet food facilities

- Expanded Uncrustables production capacity through error recognition & reduction

- Data flowing to senior-level leaders is highly relevate; no longer outdated

The J.M. Smucker Company was founded in 1897 when Jerome Monroe (J.M.) Smucker created his first product, apple butter, in Orrville, Ohio.

Guided by a vision to engage, delight, and inspire consumers through trusted food and beverage brands that bring joy throughout their lives, Smucker has grown to be a well-respected North American marketer and manufacturer.

The Fortune 500 company's brands spans pet food and pet snacks, coffee, and consumer food and natural beverage.

Two years ago, Smucker's didn't have a data analytics group.

Now it has a team of four focused on how to harvest value from all the data consolidated from its production facilities. What changed? Smucker's leadership recognized the huge potential of harnessing big data to dig into production challenges such as product overfill, hidden plant capacity and equipment downtime. Plus, IS Operations colleagues John Baier and Kevin Briggs were willing to "pick a fight" by suggesting data analytics and visuals could produce real savings for Smucker's.

"We have the largest data set in the entire company, our operations data. How do you leverage that information so you can take action?" said Baier, the Senior Manager of IS Operations at Smucker's.

The Challenges

Smucker's wanted to enable a near real-time flow of information to facility operators to optimize production and spread the opportunity to make strategic adjustments from senior leaders to plant floor professionals.

Some adjustments require hours to flow through a production system. Other processes occur in batches, meaning the sooner a negative data trend is spotted, the fewer batches get rejected. Fine-tuning Smucker's ability to target hot spots and act quickly has been a focus for Baier's team. Baier said Smucker's has made huge strides in making that data available, but it still contends with messy data—data that doesn't accurately reflect production realities or is incomplete.
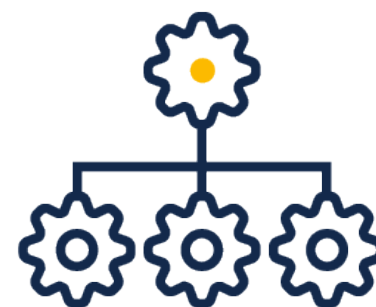
"We dabbled in a small portion of the business and saved $500,000. If we keep getting organized around that, we can save even more."

— John Baier, the Senior Manager of IS Operations at Smucker's

The Solutions

"GrayMatter was one of our key partners," Baier said. "Our leadership trusted the IS organization enough to say, 'You guys have a right to be at the table and speak,'" Baier said. "And we're now into a phase where the business is saying, I want to do reliability acceleration for fiscal 2020." Baier said Smucker's has been able to build out its capabilities to spot issues and address them. Company leaders have also asked for those capabilities to be ready on Day 1 of a new facility that's opening soon.

GrayMatter, a GE Digital partner, collaborated with Smucker's to enhance its MES capabilities and equip it with powerful operations management tools that analyze data and manage fast-moving processes. Baier said Smucker's is working to further enhance traceability of raw material that enters a facility, is transformed into a product and then leaves a facility. *"It's been an interesting two-year journey,"* Baier said. This year, Smucker's IS Operations team—the one that didn't exist two years ago—earned an Innovation Award for its business operation analytics.
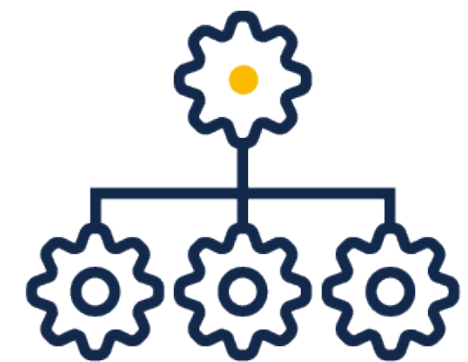
Visible Data Means Operations Excellence for Coca-Cola

Coca-Cola Uses Proficy Software to Streamline Refreshment Production

Seeing is believing and bringing operational information into the light makes it usable by everyone in an enterprise—allowing them all to make faster, more productive decisions.

Coca-Cola gained new insights to help further optimize production, while also taking advantage of cloud-based data gathering, analysis and protection. These experiences were described by Ioan Batran, automation engineering director at Coca-Cola Refreshments (CCR), in their presentation, "Operational Excellence: Improve Data Visibility Across the Enterprise" at the GE User Summit in Orlando, Florida.

"Now we can compare the performance of plants, lines and even individual machines."

Ioan Batran - Automation Engineering Director, Coca-Cola Refreshments (CCR)

Refreshing Soda Pop Production

Though it's been using Proficy software for many years, Batran reported that Coca-Cola revamped its application at 70 manufacturing facilities. "We focused on reducing complexity in our supply chain, pushed back against inefficient customization, did a lot of root cause analysis and concentrated on useful action," said Batran. "In our line information systems (LIS), we sought to better track line assets, increase efficiency, reduce equipment losses and downtime, and improve our decisions. Our LIS basically tells us if we're meeting our promises."

Batran added that all levels at Coca-Cola's production facilities need data from their LIS, so simplifying their software and standardizing their control architectures makes them easier to deploy and support. This 70-plant renovation began by updating the LIS server at each facility with Proficy Historian, iFIX HMI SCADA and dashboard software. These solutions allow each LIS to deliver real-time and historical data, and then push reported KPIs to an SQL enterprise database via Sync Agent software and Microsoft Azure to Coca-Cola's cloud-based server.

"LIS management routines and practices measure and manage our manufacturing processes to maintain and improve performance," said Batran. "We're also implementing paperless guidance, so we can further un-cloud our crystal ball and focus our decisions more precisely on what we need to do."

This article first appeared in Control Magazine, by Jim Montague, Executive Editor. Reprinted with permission.

"These improvements allow the LIS to generate tactical reviews that let users respond to specific operational events and produce strategic reviews that let them address continuous improvement efforts by identifying trends, patterns and root causes. "The reviews help us implement better management routines, which need to be backed up by appropriate levels of change management," added Batran. "You also have to secure leadership support and stakeholder buy-in."

> *"The enterprise LIS even lets us see selected KPIs on multiple lines, so we can compare the performance of different machines."*
>
> **— Ioan Batran - Automation Engineering Director, Coca-Cola Refreshments (CCR)**

Views available on Coca-Cola's LIS-based system include plant overviews, production line layouts, historical machine status, short-interval control reports, enterprise-level displays and others. These displays can be presented on PCs, tablet PCs and smartphones.
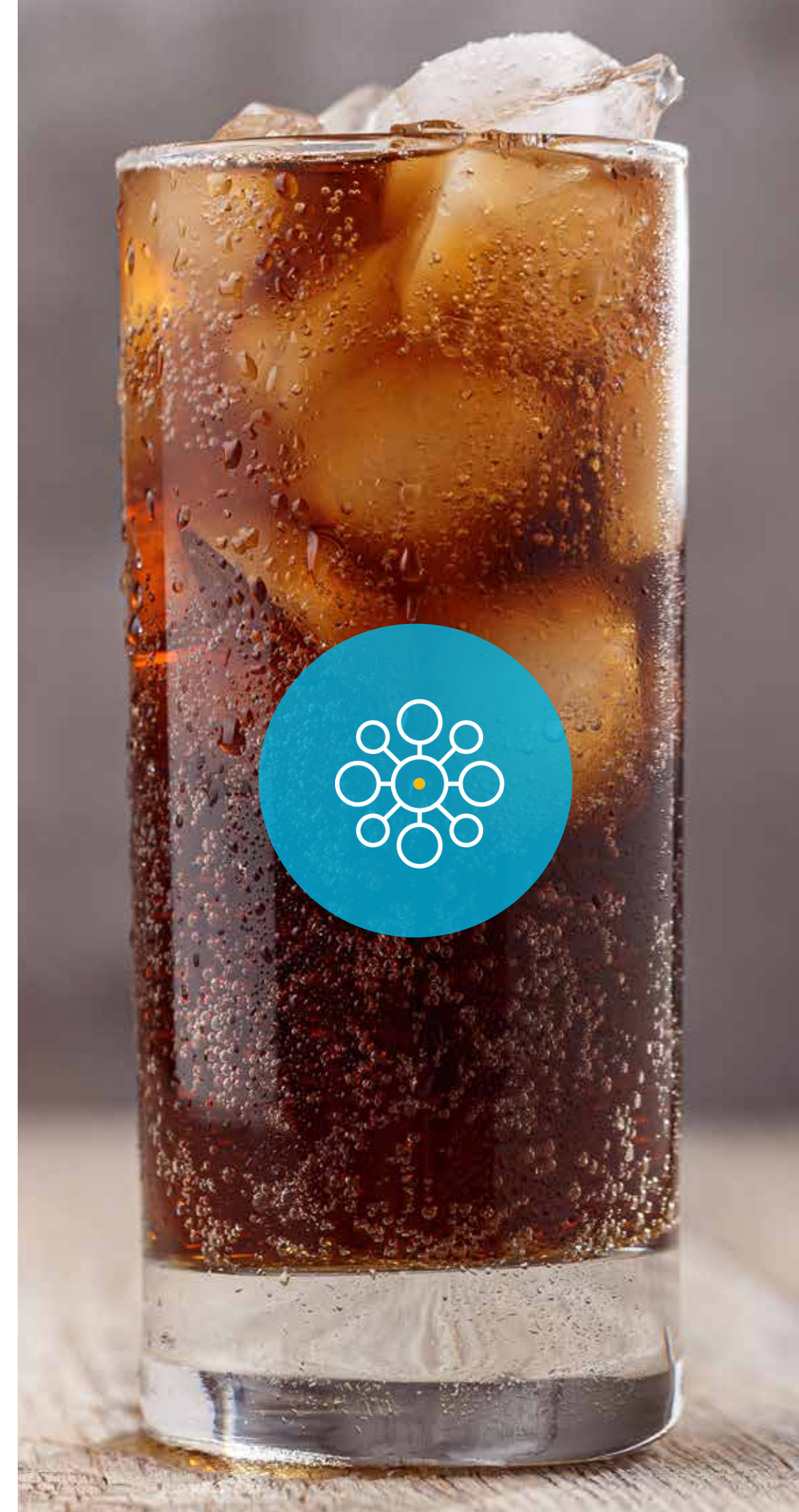
Products

- iFIX HMI/SCADA
- Proficy Historian

Next Steps

"Next steps include implementing more paperless capabilities and autopilot management routines, as well as improving overall management routines, coaching and auditing," Batran added.

Download a reprint of this customer story from Control Magazine.

Premier Foods

20% overall equipment effectiveness improvement

Premier Foods is among U.K.'s largest food producers. Premier manufactures a series of well-established food brands, including custards, cake snacks, bouillon cubes, ramen noodles, and a diverse spectrum of other foods.

Challenge

Aging systems, lack of operational insight. Understand root causes of issues and generate data-driven insights to improve critical processes

Action

- Implement GE's manufacturing software solution including
  - Proficy Plant Applications, Proficy Historian, iFIX HMI/SCADA, Proficy CSense analytics
- Deploy enterprise industrial data management
- Model the processes to visualize what was happening on Premier's production lines
- Perform analytics to understand the correlations and root causes of issues for continuous optimization

20%
overall equipment effectiveness improvement

Results

- Payback period < 2 years
- Improved process consistency and higher quality products
- Decreased raw materials usage
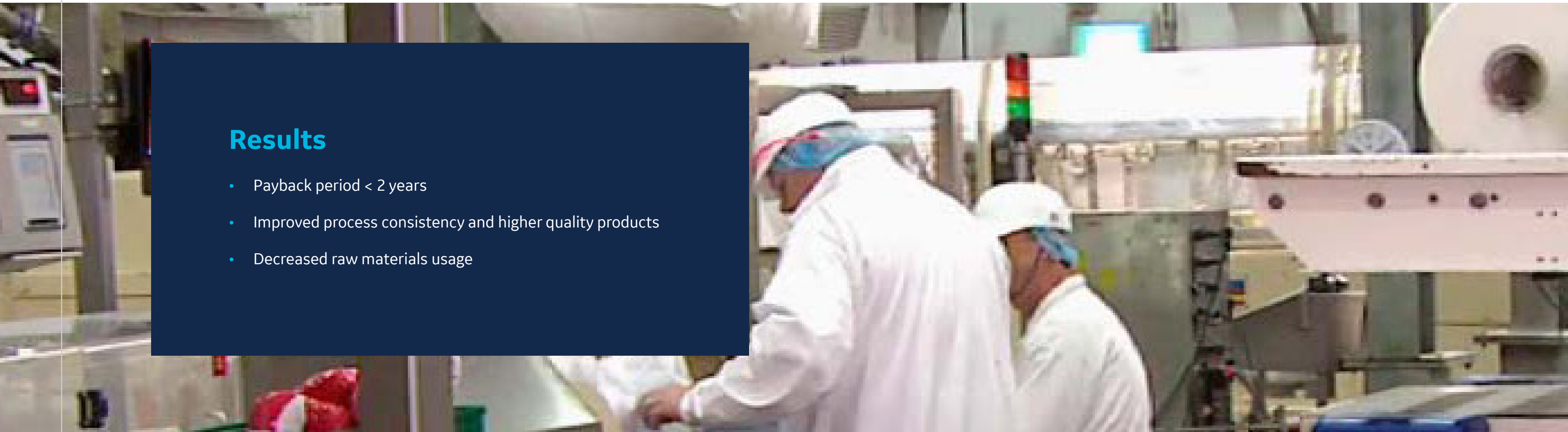
T. Marzetti

Saves Millions with Digital Transformation

Manufacturing Execution System (MES) Solution

- Proficy Plant Applications

- Proficy Historian

- Industrial Gateway Server (IGS)

Predictive analytics and connected kitchens unlocked millions of dollars in savings at specialty food producer, T. Marzetti Company. T. Marzetti Company, a subsidiary of Lancaster Colony Corp., is based in Westerville, Ohio.

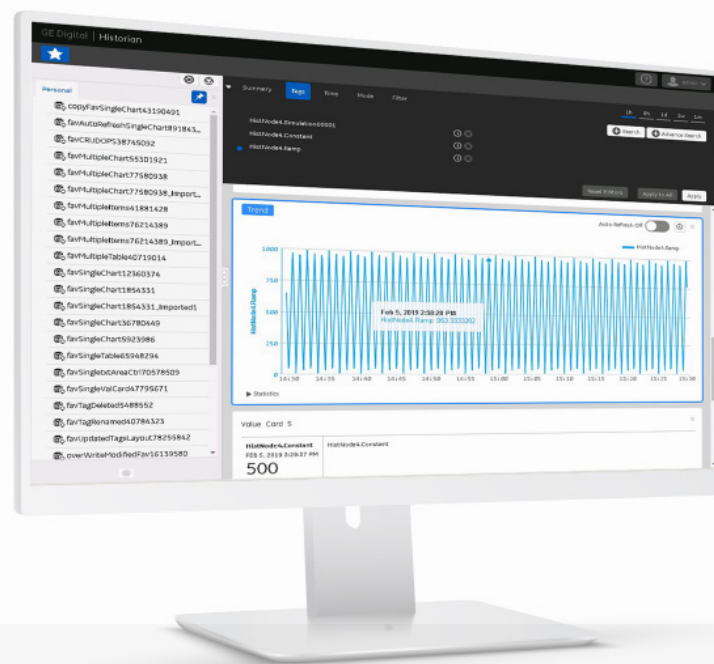Marzetti began in 1896 when Teresa Marzetti, an immigrant from Florence, Italy, opened a small Italian restaurant in Columbus, Ohio, which grew into a four-star dining establishment with an upstairs factory that produced the restaurant's popular salad dressings.

At Marzetti, data analysis wasn't part of the routine.

Information wasn't easy to find and standards for relating data to its supply chain didn't exist.

Beginning with a single plant in Kentucky, GrayMatter, a GE Digital partner, recommended digitizing data connectivity

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The goal is to help Marzetti view its operations in new, compelling ways.

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among key floor assets and then contextualizing the data gathered so they could be used to accelerate the Marzetti Operational Excellence (MOE) initiative.

Organizationally, most of the decision-making was confined to a few key leaders at the company.

Marzetti sought GrayMatter's help because executives said they wanted to build on the company's success and

reputation around products including health-conscious salad dressings, dips, bread and products for restaurant chains such as Chick-fil-A and Olive Garden.

Empowering more employees to improve the business was among the major, early initiatives to emerge from Marzetti's partnership with GrayMatter.

For the first time, people at all levels of the company had the connected, data-driven tools to spot opportunities to improve efficiency that might have otherwise gone unnoticed.

Digital Roadmap

Key statistics from GrayMatter's analysis of Marzetti's plant in Horse Cave, Kentucky revealed major opportunities to eliminate waste and save money.

One involved overfill. For every 100 pounds of packaged product, about four pounds were being given away for free because packages were being overfilled.

Those tiny, excess amounts of sauces, dips and dressings were escaping as stowaways.

Over time, it added up to large quantities.

Based on data insights, the following recommendations came into focus:

- Reducing variability and identifying reasons for overfill to improve material utilization

- Improving coordination and understanding of upstream delays that impact packaging

- Eliminating manual data entry practices that produced a misleading perception of plant performance

Marzetti provided GrayMatter access to electronic data from its cryovacs, machines that seal food in airtight packaging; checkweighers, which weigh packaged products without needing to pause a conveyor belt carrying products; and kitchens.

GrayMatter created a digital model or twin of the flow of products through the plant including raw materials, batching and packaging.

Once the new system was configured, GrayMatter began having daily meetings with Marzetti employees onsite to track operations as the system monitored raw materials, batching in the kitchens, storage tank levels and packaging.

It also tracked activities including employee crew configurations and shift schedules, process orders, product runs, batches and production intervals, downtime and waste.

The system enables performance comparisons by product code, equipment, order, reason and other contexts. It automatically emails personnel when exceptions are detected.

Among other insights, the daily review helped reveal how overfills increase during restarts.

The system began comparing the accuracy of fills during the "restart" period to when the filling system was at "cruising speed."

GrayMatter provided GE Digital's MES (manufacturing execution system) solution featuring Proficy Plant Applications and Proficy Historian as well as the expertise to digitize their operational excellence program, and Marzetti made the necessary adjustments to take advantage of what the data revealed.

The Savings

Marzetti has saved millions of dollars a year at just one of its facilities and anticipates that the savings could grow three-to-four-fold when the improvement program is expanded to other facilities, which Marzetti plans to do.

The initial success has come from reducing the amount of product waste by 50 percent or more.

> *" Now we're trying to be more proactive with the planning – making data available across the supply chain is a big deal, and I think we're at the very beginning."*
>
> **— Jeff Woodard, T. Marzetti, VP of Operations**

A Note

From T. Marzetti

By Jeff Woodard,
VP of Operational Excellence, T. Marzetti

Marzetti continues to benefit from lighting up and digitizing their supply chains. Expanding visibility across our supply chain and making waste and losses more visible continues to add value to our bottom line.

Pilot project learnings that began a little over a year ago are being reapplied in numerous areas. The visibility of data is empowering our people to help us become the *Better Food Company.*

We're able to make better decisions every day.

Electronic log sheets with statistical tools are helping to create better problem-solving teams on the factory floor every day.

The integration of better tools with passionate leaders equipped with problem-solving skills, like our lean Six Sigma program black belts, are helping to grow our capability to incorporate continuous improvement as a natural expectation within our culture.

I'm not saying we are there. But I am saying seeds are being planted, and soil is being tilled.

Benefits from better weight control have enabled learnings for broader use of the tool while delivering savings to the bottom line well within the first year of deployment.

The cross-functional teams within Marzetti and strong partnership with GrayMatter have created strong project teams to engage aggressive deployment and reapplication schedules.

Cross-functional teams are highlighting duplicity of work between departments that can be consolidated and thus simplify the role of the associates by sharing electronic log sheets on work stations.

Building self-sufficient teams with great leaders and problem-solving tools is critical to our mission of becoming the Better Food Company.

I continue to be reminded that equipping and coaching our organization as a leader is a big part of my role to ensure the success of our company. Our people are hungry for coaching and development. Everyone wants to play with the belief and intent to win every day. It's our job to provide the environment and foundation for those daily wins.

Keurig Green Mountain Drives Operational Efficiency and Captures Downtime with Proficy

Keurig Dr Pepper Inc., formerly Keurig Green Mountain, is a leading beverage company in North America and the first to bring hot and cold beverages together at scale. Formed in 2018 with the merger of Keurig Green Mountain and Dr Pepper Snapple Group, Keurig Dr Pepper holds leadership positions in soft drinks, specialty coffee and tea, water, juice and juice drinks and mixers, and markets the #1 single serve coffee brewing system in the U.S. and Canada.

Driving efficiency

To boost operational effectiveness, this beverage leader started their digital journey with Proficy Plant Applications' Efficiency package and realized their return on invest quickly. They were able to pull information that was output from the machines and run reports in real time, allowing their teams to make actionable decisions. Keurig worked with GE Digital's partner AutomaTech to implement their MES solution.

Success with Data

Joel Trudeau, Automation Engineer, Green Mountain Coffee:

"We've had it out there now for about four years, so I think there's really a growing user community that appreciates the data and is doing well with it through mostly building a good infrastructure of reporting and having a good team of a couple of people that do maybe 75% of their job as to servicing customers and building these reports. A lot of what the initial intent was to get this OEE set up in a scorecard environment so that each of the plants knows how its performing and for the senior management to be able to evaluate how the plants are performing."

Partnerships

"We ended up choosing the GE solution and partnered with AutomaTech. I think we are really benefiting from having an established partnership where there is a lot more interaction and exchanging of ideas. In the second phase of our project now, it's much more complicated, more connected, more integrated, up through into the ERP system and down to the systems on the floor."

"We started off small, and we decided that the most important thing as far as what the focus was to sustain this growth was to go into our packaging lines and collect OEE and downtime, mainly the OEE was more of a scorecard for how each of the plants were doing or how different vendors equipment was doing across the enterprise and then the second piece was capturing downtime, which is directly related to OEE but was another source of a lot of information that we can get on how things were performing or where the issues were to maximize the use of all the equipment out there."

— Joel Trudeau, Automation Engineer, Keurig Green Mountain Coffee.

Christopher Carlins, Application Engineer, AutomaTech:

"Green Mountain selected GE software because of its capabilities. They saw that it provided the full solution for them. GE is a large company, they're going to be around for a long time, they are going to be able to support the global customers and so is AutomaTech. We are the right arm of GE in this region, and there is a large commitment by GE and the employees of AutomaTech to support those customers throughout their implementation and beyond."

"When we went to Green Mountain, we were able to tour the facility and see how the K-Cup® pods were being manufactured through the filling lines. It's a very high-speed system, very demanding as far as making sure that it's working properly. Using products like Plant Applications Efficiency, they were able to pull that information that was already being output from the machine and quite easily, provide the reports in real time to supervisors and operators, so that they can make actionable decisions."

Christopher Carlins, Application Engineer, AutomaTech

Results

- Boosting operational effectiveness by understanding OEE and downtime
- Empowering the teams with reports in real-time for actionable decisions
- Keurig Green Mountain gains insight in their equipment to make data-driven decisions

Products

- Proficy Plant Applications
- iFIX HMI/SCADA
- Proficy Historian
- Proficy Workflow

About AutomaTech

AutomaTech is a leading provider of industrial technology solutions focused on improving your operational performance. By harnessing the power of data, we enable significant gains, visibility across your entire organization, and increased profits for a competitive edge. Our product offering includes a flexible and scalable mix of hardware and software solutions to solve your toughest challenges while providing a roadmap for future improvements and growth.

Nestlé Uses iFIX and WIN-911 Mobile Alerts for Refrigeration Alarms

New system results in less production downtime

To expand their existing iFIX HMI/SCADA system, Nestle recently installed WIN-911 as the alarm notification software upgrade for their ice cream freezing facility. The food processing, nutrition, health, and wellness giant was seeking a simple solution to help lessen the time between the triggering of alarms and the response time of refrigeration technicians. Since installing WIN-911, their response time has been significantly reduced to less than ten minutes and production downtime has been virtually eliminated.

WIN-911 Easily Integrates with Existing iFIX HMI/SCADA

Nestlé's software distributor recommended WIN-911 as a suitable upgrade for their alarm response and distribution system. WIN-911 is the largest and most trusted provider of alarm notification software.

Their technology works well with Nestlé's existing HMI/SCADA, iFIX from GE Digital, part of the Proficy family. WIN-911 is compatible with iFIX, making it easy to install the software, import existing alarm tags, configure alarm escalation protocols, and begin implementation. WIN-911 offered guidance throughout the installation process, making the transition simple and non-disruptive.
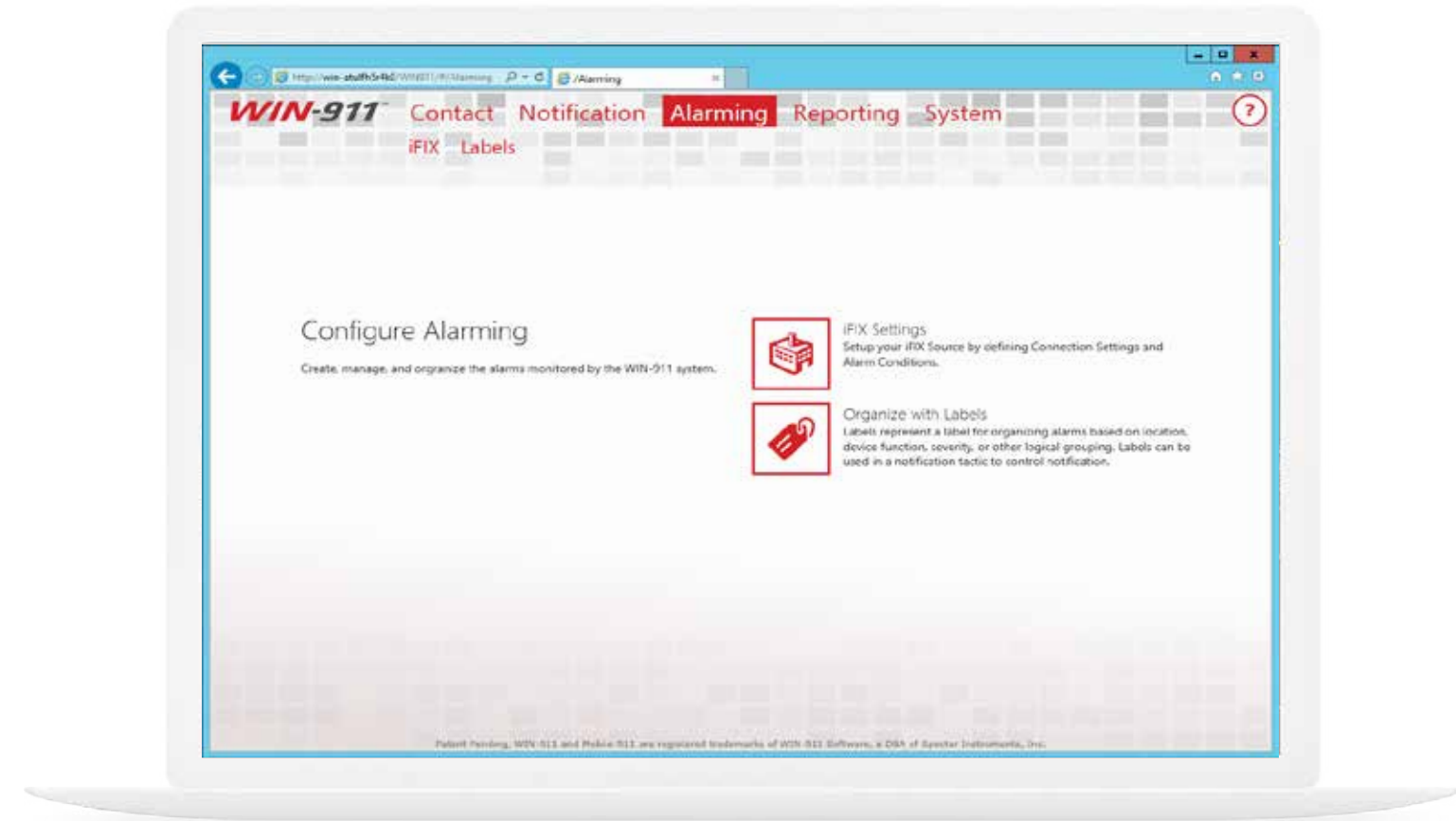
Organization
- Nestlé Dreyer's Ice Cream Company

Notification Methods
- Mobile; Text

Need
- Improve notification and response times for refrigeration techs

Solution
- WIN-911 software utilized to organize and deliver mobile notification

Mobile Alerts Decrease Tech Response Time and Minimize Downtime

The primary refrigeration system at Nestlé is monitored by a local programmable logic controller (PLC) that controls a general alarm and several minor alarm triggers. Temperature alarms measure the temperature output of multiple interconnected systems at various stages of production. Each of these systems—including the spiral freezer, hardening tunnels, and storage areas for raw ingredients and finished products—require their own specific temperature settings. The facility's ammonia refrigeration system is also monitored for temperature and ammonia levels to prevent critical failures, such as a malfunctioning compressor.

Before WIN-911, an alarm triggered at the ice cream freezing facility required manual acknowledgment at the onsite HMI console. No mobile communication options were in place. If a technician was busy in another part of the plant, or somewhere offsite, they would need to return to the console to acknowledge and address the alarm. Previously, all alarms received the same notification, which meant technicians would have to go through and individually assess the alarms at the console. This created

the risk of catastrophic product loss by way of unnoticed or unacknowledged failures.

Following implementation of WIN-911 alarm notifications via mobile text, average alarm response times were successfully reduced up to 60%; previous response times varied widely, however current alarm response times have been recorded averaging under 10 minutes. This decrease in response times has been attributed to the mobile delivery of alarms, as technicians are notified immediately when an alarm is triggered, and can assess and respond to the alarm in less time than it would take to physically travel to the HMI console from their previous task.

Promptly informing refrigeration technicians of an alarm was a big challenge. Some alarms are capable of shutting down the spiral freezers, hardening tunnels, or other equipment, so immediate response was crucial. In the worst-case scenario, an unacknowledged issue could cause the engine room to shut down, forcing the production line to halt. This would cause product loss of raw ingredients such as cream and egg yolks, variegates and particulates (the fudge swirls, chocolate chips, and other morsels that make Nestlé ice cream so delicious).

With WIN-911 successfully installed, refrigeration techs can now receive notice of an alarm as soon as it is triggered, even when they are offsite. WIN-911 is able to send alarm notifications via any mobile device, making it faster and easier to get in touch with the right personnel whenever an alarm is set off.

Gallo Glass Company Improves Quality, Safety, and Efficiency with iFIX from GE Digital

"The vision is one of an information-centric management culture—where every employee can combine trade craft and science in every bottle we make. Our process is complex with many interacting variables. This new technology has simplified the learning curve for new employees, making them more effective and proactive in their jobs. Ultimately we foresee use of the new technology fundamental in our journey toward Lean Six Sigma manufacturing."

John Gallo, Vice President, Gallo Glass Company

Benefits

- Saved $5 million annually through improved quality

- Increased production by 5%

- Reduced defects by 25%

- Reduced plant downtime by 25%

- Protected the environment by significantly lowering energy needs and reducing furnace emissions by 80%

- Decreased training time and helped to facilitate job changes and job sharing

A glass act

When it comes to making all of the bottles for one of the largest winemaking operations in the world, production processes need to be as clear as the glass itself. At Gallo Glass Company in Modesto, California, just-in-time delivery means the bottles are available when needed to help keep the wine flowing through the bottling and labeling operations, out to distribution, and into millions of homes each year.

Additionally, the glass plant has to contribute more than fast, reliable bottle production—the team at the plant also needs to support E. & J. Gallo Winery parent company's deep commitments to quality, consumer safety, and environmental protection. With one billion bottles being produced annually, a state-of-the-art production system, including monitoring and control software from GE Digital, helps Gallo Glass shine. And shining is exactly what Gallo is doing—after being named #1 in the prestigious InformationWeek Top 500.

A toast to high technology

The Gallo Glass plant manufactures to more than 100 different combinations of bottle shapes, sizes, and colors. As one of the world's largest glass container manufacturing sites, the plant provides bottles for:

- E. & J. Gallo Winery wines, including those that are Gallo branded as well as Turning Leaf, Ecco Domani, Carlo Rossi, and Frei Brothers Reserve

- Sparkling wines such Tott's, Indigo Hills, André, and Ballatore Spumante

- The winery's Bartles & Jaymes coolers

- Distilled spirits, including America's bestselling brandy—E. &. J. VS Brandy, Cognac, and the E&J Cask & Cream liqueurs

- External customers, including other wineries, apple juice companies, and makers of specialty beverages, such as espresso syrups

In addition to being unique for its size—E. & J. Gallo Winery is one of the largest wineries in California—it is also unique for having it own glass plant. Ernest and Julio Gallo built the plant in 1958 on the company's main campus in Modesto. By owning a glass plant, the company reduces freight costs for heavy glass but, most importantly, eliminates the possibility of production delays caused by outside bottle suppliers. And, that means a commitment to reliable production that Gallo Glass upholds every day.

"The primary goal of the glass plant is to maintain a steady, reliable, and high quality supply of bottles for the E. & J. Gallo Winery," explains George White, Information Systems Manager at Gallo Glass Company. "What we make at the glass plant today gets used tomorrow in bottling and labeling."

Automation plays a key role at the plant and blends together the art of glassmaking with the high technology needed to meet production, quality, consumer safety, and environmental protection goals. At the heart of the plant's automated Shop Floor Information System (SFIS) is iFIX from GE Digital. This integrated information system collects and presents data from all steps in bottle making—batch, furnace, forehearth, mold shop, forming, lehr, inspection, and packing. The system serves multiple users at Gallo Glass—from operators on the lines to maintenance managers to senior managers who need quick, graphical reports via the web. With the SFIS in place, the Gallo Glass plant has:

- Saved $5 million annually through improved quality

- Increased production by 5%

- Reduced defects by 25%

- Reduced plant downtime by 25%

- Protected the environment by significantly lowering energy needs and reducing furnace emissions by 80%

- Decreased training time and helped to facilitate job changes and job sharing

With these kinds of results, John Gallo, Vice President of the glass plant, has built upon his grandfather and great uncle's idea for a smoother supply chain. "The vision is one of an information-centric management culture," Gallo explains. "Where every employee can combine trade craft and science in every bottle we make. Our process is complex with many interacting variables. This new technology has simplified the learning curve for new employees, making them more effective and proactive in their jobs. Ultimately we foresee use of the new technology fundamental in our journey toward Lean Six Sigma manufacturing."

Eliminating production bottlenecks

The glass plant operates 24/7, utilizing 14 production lines. Each line starts with hot molten glass and ends with inspection, followed by packing. iFIX presents data collected from all devices on the lines, and the beginning and end of each line has an iFIX node. With an open architecture, the software connects to the plant's installed base of equipment, such as sensing and inspection devices, programmable logic controllers (PLCs), scales and timing systems, communicating over Ethernet TCP/IP. The plant uses a client-server database architecture for fast communication and lower costs, and operates on a server-based computing model, the iClientTS terminal server version of iFIX running on a CITRIX server farm, and dedicated Windows terminal devices as clients.

"Our automation started with sensing and inspection devices, and from there, we needed to have a way to collect production data to allow us to make more informed decisions," White says. "We reviewed many software packages before selecting iFIX as the single HMI/SCADA system for the whole plant. It was critical to implement one interface package and have everyone in the plant operating from the same page and sharing information."

Bruce Williams, Senior Production Manager at Gallo Glass, says, "SFIS has brought all of my production managers together onto the playing field."

Troy Wells, Director of Maintenance and Engineering at Gallo Glass, notes, "The Gallo SFIS system has transformed us from a make and inspect mentality to a make, measure, and improve mentality. This change continually drives us back to the manufacturing process for root cause analysis and correction. SFIS drives us to make it right the first time, and this system never ceases to amaze me with its ability to constantly receive and update information that is vital to the production process."

Wells continues, "Bottom line is that—what gets measured and improved. Gallo SFIS is the catalyst to make this happen. From a maintenance and engineering perspective, SFIS is the first thing I look at each morning; I monitor it throughout the day, and it is the last thing I check at day's end."

Conceptualized by Gallo, designed and implemented by integrator Saber Engineering with a team that included Brian Thomas, Dennis Hopkins, and Bob Sullivan, the iFIX system includes over 20 Human Machine Interface (HMI) screens and generates 30 reports for the glass plant production team. This easy-to-use web-based monitoring and control software works in conjunction with an Oracle database to consolidate the data from the plant's devices, then transform that real-time data into dynamic text, alarm, and graphic displays. Information is presented on the terminals located on the lines for a quick, easy-to-view snapshot of production. Operators and managers can view key performance indicators (KPIs) such as percent pack, which displays the number of bottles successfully produced for every 100 attempts, defects, losses, production quantities, and more. Essential to success, the system provides timely notification of defects so that operators can correct production and boost quality.

"The SFIS not only monitors and controls production, but also acts as a real-time factory floor dashboard," White says. "We are collecting so much data now that it would be impossible to manually analyze it. But, using the latest technology, we can manipulate the data and look at it from a bigger picture to make a real difference in our processes."

As an example, by analyzing the data from the plant floor processes, the team was able to redesign the glass molds to engineer out defects and decrease cracking. This change has reduced scrap and improved yield. Additionally, the team has perfected wall thickness and distribution—a long-term improvement that affects the amount of liquid that goes into the bottles—using wall thickness run charts.

"Using the system as an engineering and planning tool, we have been able to make major improvements that have saved the company money and helped increase the quality of our product to consumers," White notes.

Additionally, the team has made adjustments in batching and furnace operations through root cause analysis. A more efficient furnace design has helped the plant use less energy—decreasing costs and improving environmental friendliness. At the furnace level, Gallo Glass uses a special GAS-OXY firing process to burn pure oxygen and significantly reduce nitrous oxide output. The company is the first major user of the process and makes its own oxygen within its on-site cyrogenic oxygen plant. At the electrostatic precipitator or scrubber level, iFIX rungs on a desktop computer for further operational analysis. This Gallo commitment to the environment has helped the glass plant improve air quality and reduce emissions by 80%.

After the bottles are formed, automated bottle inspection has helped the plant become more agile if there is an error on a line. White estimates a 25% decrease in defects through timely net inspection. On the lines, video cameras take pictures of the moving bottles, and the system analyzes for variances in shape or pattern, and light and dark spots. A defect could be a piece of unmelted sand, or could take the form of a bubble or blister, seen as a dark spot.

Another machine inserts a plastic dowel into each bottle to check for free, open, and unobstructed bottle necks—known as choked necks. Inspection also includes checks for cracks or chips at the top of threaded bottles, known as checks. Another inspection is to ensure a clean sealing surface, which can result in leakage in the case of filled product.

Defects can make a bottle weak, which can lead to breaks, chips, or cracks. Gallo Glass follows the automated inspection of 100% of the bottles with automated random sampling inspection methods as well as manual inspection to achieve the highest quality—which ensures the safest possible bottles for consumers. When defects are found, the operator can use the system to adjust machines properly, check calibrations, or perform additional tests.

Between the production and inspection, Gallo Glass collects more than 2.5 million packets of data per day in the glass plant. The system provides an Internet portal dashboard with global visibility into the information. The Thin Client system works on dial up for remote connections, and users can also access via Virtual Private Network (VPN) and the Internet.

In addition to production improvements, the data helps the plant maintain its ISO certification and archive information as part of a HACCP plan under the FDA's Good Manufacturing Practices. Operators can document any issues by simply filling out an iFIX screen for a Hazard Analysis and Critical Control Point (HACCP). Susan Anders, Quality Manager in charge of HACCP, says, "We have automated the entire HACCP documentation process and can analyze cumulative trends and compliance easily and quickly."

Head of the glass

Recently, White presented the details of the system to the Independent Glass Producers Research Association and hopes that the company's commitment to innovation will help other manufacturers, customers, and communities.

"Gallo has helped set the standard for efficient, environmentally friendly glass production, and we are sharing this technology and knowledge," White explains. "This system is not just software—it is a powerful toolset closely coupled with a successful management methodology. The combination has helped us achieve major results and is attracting industry attention." GE Digital is interested in working with Gallo Glass to distribute this system to other manufacturers.

And, while the industry looks into Gallo Glass, the team at the glass plant continues to serve up the benefits using the Shop Floor Information System and iFIX software.

Integrated information system

Real-time components

- Forming operations—equipment management and downtime
- Automated inspection—rejects
- Automated sampling—measurement and trends
- Manual observations—defects
- Hot end-cold end communication

Historical archive components

- Forming operations—defects by sect or position
- Automated inspection
- Automated sampling
- Manual observation

Decision support system

- Team leader supervision tool
- Production meeting reports
- Quality management reports/ISO: 9000/specifications
- Plant communication system
- Upper management reports and performance metrics
- Problem solving, root cause analysis tool
- Job on and job off metrics
- Planning tool

Chewing Gum Manufacturer Unwraps Savings of $850,000 Per Year

Results

- 10% increase in production efficiency

- Documented $850,000 savings annually

- Significantly less waste and downtime

- Return-on-Investment (ROI) in less than three months

- Empowered key business initiatives and new business model

- Faster time-to-volume on New Product Introductions with improved manufacturing flexibility and scalability

- Increased operational visibility with real-time metrics and KPIs to drive OEE and other business improvements

- Less manual data collection - for greater time savings and accuracy

- Quicker response - with maintenance engineers automatically alerted via a text message

"We measured an increase in production efficiency of 10%, which represents $850,000 per year savings. With pay-back in three months, we have been delighted with the ability to monitor KPIs such as OEE using the GE production management software and drive our productivity improvements."

— Project Manager, Major Chewing Gum Manufacturer

Chewing Gum Manufacturer Increases Packaging OEE by 10% with GE Digital's Production Management Software

When this major chewing gum manufacturer decided several years ago to sell its famous chewing gum brands and instead manufacture products for other companies - which was a significant change in business model - the production and automation teams helped to drive the transformation. Manufacturing for business customers requires a greater degree of flexibility and efficiency to handle many different gum products and packaging. This transformation to a B2B focus demanded an accompanying change in production philosophy.

With a taste for innovation, the company's Automation Group focused on real-time visibility of Overall Equipment Effectiveness (OEE) to optimize production performance - and support the company's leadership in the B2B market for chewing gum. The company chose GE Digital's MES software to support its packaging line transformation. The resulting solution - featuring Proficy Plant Applications and Proficy Historian - has helped the gum manufacturer to access key metrics for improved decision-making, increase production efficiency by 10%, drive the flexibility and scalability needed to introduce new products quickly as well as new production equipment, and achieve payback in less than three months.

Fresh Ideas

More than 100 years old, this chewing gum manufacturer has always been known as an innovative company. It now has a world-class R&D center and an extensive and highly flexible annual production capacity of 35,000 tons—which

enables the company to react quickly to bring new products to production volumes and supply important customers among retail chains and owners of internationally known brands. The company's corporate vision is to lead within the development and production of innovative, private-label and private-brand chewing gum concepts. Packaging, the final step in the company's production, is extremely important to ensure customer product freshness, branding and commercial appeal. The company has expertise in a wide range of flexible packaging options. Additionally, the team can provide special, tailor-made packaging to meet customer specifications.

Today, this manufacturer packages over 100 chewing gum variants with a very high number of different product-package combinations on a number of different lines. To meet customer needs - which regularly vary in type and quantity - careful planning and efficient procedures are vital. The packaging team operates on three shifts per day, five days per week, and each shift can have several changes in product and packaging per shift, with one run carrying over from one shift to the next. With the large number of lines, individual machines, product changeovers, operators and change of shifts, the company required a means to automatically monitor the packaging process at a detailed level and analyze the operations information to significantly improve efficiency.

Bubbling with Innovation

The company's Automation Group decided to first work on a performance measuring system for the packaging lines to support the new company model - beginning with a small-scale implementation.

"We set up a pilot project with the aim of making a significant optimization increase but without getting into too much detail in the first stage," explained the Project Leader at the company. "We defined what our OEE criteria would be, how we could reliably put a new system into practice, and how we would provide clear and meaningful visualization for those on the floor and in management. It was very important to work with the operators who would be using the system, explain the benefits it would bring to them, and seek their input.

And, finally, we needed a way to validate the results and measure clear financial gains."

Each packaging line is almost fully automated and involves several machines. At the start of the project, the information and capabilities requirements included:

• Current machine status,

• Length of line downtime,

• Quantity of Loss of product by station,

• Production total by line, and

• Ability to produce reports and carry out analyses based on historical and 'per shift' data.

The project team chose a clearly under performing packaging line that offered high-volume throughput with a mix of manual and automated procedures - and began a process to review Production Management suppliers and products. The team wanted to ensure that the selected software was easy to configure and could scale up to include additional lines. They did not want to invest in a lengthy customized programming cycle, which would then leave them with challenges for long-term maintenance.

"We evaluated Production Management solutions and suppliers in terms of ease of development and implementation, price and long-term support," the project manager elaborated. "It was very important to us that the software would be well supported by the manufacturer, and that it was 'open,' so

it would integrate easily into our existing software and hardware infrastructure. Furthermore, we wanted to provide enterprise access to the metrics, so 'Web-enabled' was also a key feature.

"At that time, we were not using any GE software or hardware, and the Efficiency module of Proficy Plant Applications scored highly in all respects," he continued. "After detailed review, we selected GE's Proficy Plant Applications and Proficy Historian as the basis for the pilot project. Proficy Plant Applications is a Production Management solution that meets all our requirements."

Local distributor, Novotek, supplied the GE software, and the company called in a local system integrator. First, the team connected the islands of machines on the pilot line - creating a network to a new front-end PLC, which caused no disruption to ongoing production. Next, an Ethernet link from the front-end PLC to the existing OPC Server

provided a data route to Proficy Historian. Proficy Plant Applications accesses the data in the historian and delivers a 'Scoreboard' to a 42" plasma screen on the line. The team found the GE MES software easy to use with exceptional out-of-the-box functionality.

"Proficy Plant Applications and Proficy Historian proved to be straightforward to configure and install," the chewing gum manufacturer's project manager noted. "Additionally, being object oriented meant that it would be easy to roll out to other packaging lines after we had proven the first."

In the pilot - and today - the Scoreboard charts the shift productivity curve and displays key information such as the current productivity, the line stoppage time, total production per minute and wastage. The software also produces reports showing the productivity curve and stoppage times.
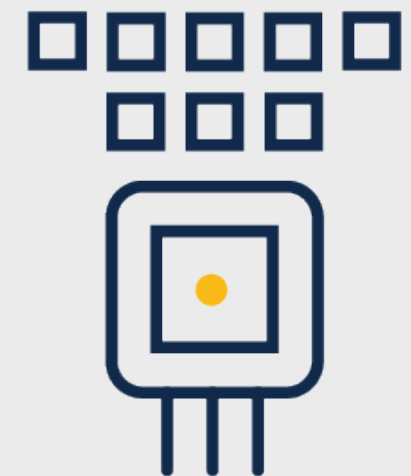
Results that Stick

As a result of the pilot project, the team was able to show that OEE could be measured - and significantly improved. The Scoreboard and reports helped to demonstrate overall improvements on the line.

"We obtained return from the pilot project that justified investment in additional new hardware and software across eight other lines," he explained. "Production line leaders used the software to determine key areas to intervene and raise productivity. Operators are also pleased to have recorded documentation to explain their actions and point out ways of improving production."

A second generation of the pilot Scoreboard now features an efficiency bar - which changes color as line efficiency moves in and out of target ranges. When the rate falls below a certain percentage, the GE MES software automatically alerts maintenance engineers via a text message to attend immediately to the particular packaging line. The Scoreboard also provides visualization for:

- Overall shift production efficiency
- Current efficiency
- Shift downtime
- Production
- Shift efficiency history

While local visualization is extremely valuable, enterprise-wide availability of Key Performance Indicators (KPIs) has been critical to success of the project. Production leaders and other management personnel can now access KPIs over the web to monitor each packaging line in real time and call up the same Scoreboard that appears at the individual lines. Managers can also drill down into specific historical points on the OEE graph to discover more detail about causes for decreases in efficiency. Furthermore, the company's Automation Group has developed plant-wide visualization for management that immediately shows each production element and its current OEE - complete with real-time drill down capabilities.

Sweet Success

After completing nine packaging lines, the company assessed the full effect of the OEE project. "When comparing before and after introduction of the Scoreboards, production efficiency has increased by 10%," the project manager noted. "With this increase in OEE, we achieved return on the investment in less than three months."

With the success of the pilot and expansion to eight additional lines, the team is now expanding to seven more lines in its continuing initiative to improve OEE. The team has a goal to increase OEE further and close the efficiency gap by 50%, understanding that some packaging line stoppages to accommodate changes in product and package are necessary. The company will continue to modify working practices and improve the effectiveness of individual machines and lines, based on input from the GE MES software. Reporting will convert from statistics based on individual shifts to product batches. The team will also increase the ability of operators to enter fault-reporting data through Operator Interfaces on every line. And, the team will integrate the data from the GE MES software solution into the company's ERP system to enable enterprise-wide communication for transformational results across the business.

Just as this chewing gum manufacturer turned to GE as its first choice for MES software, the company's customers can stick with this successful manufacturer as their first choice for development and production of innovative private-label and private-brand chewing gum concepts - with the efficient, fast and flexible manufacturing to exceed their needs.

Proficy Plant Applications - Efficiency Module

The Proficy Plant Applications Efficiency module allows the gum manufacturer to better utilize plant assets by providing a comprehensive view of overall equipment efficiency. With drill-down capabilities to identify and monitor areas for improvement, Efficiency is the ideal solution for managers trying to increase production throughput without adding equipment, people and material costs.

Proficy Plant Applications Efficiency can:

Identify and improve areas that are causing operational inefficiencies.

- Minimize scheduled and unscheduled downtime events
- Reduce waste and rework
- Improve machine run-time effectiveness

Perform root cause analyses to make data-driven decisions

- Gain insight into production operations by shift, equipment and products

- Evaluate operations over any period of time — from real-time to annual summaries

- Link capital expenditures to expected plant profitability improvements

Manage production operations in real time through comprehensive reporting

- Track uptime, downtime and overall plant and machine efficiencies through web-based KPIs

- Schedule reports for all decision-makers - from operators to plant managers

- Notify on exceptions to desired operations to make real- time changes

Zilor Energy and Foods

Continuous Innovation = Continuous Improvement

The Zilor Energy and Foods company, a global sugar, ethanol, renewable electric power, and natural ingredients manufacturer headquartered in Brazil, has experienced a step-wise journey as a Digital Transformation leader, investing and continuously improving its operations for 20+ years, making data-driven decisions, and benchmarking against peer manufacturers.

Partnering with GE Digital and regional representative Aquarius Software, Zilor Group started with CIMPLICITY HMI/SCADA, IGS, and Proficy Historian. Their next implementations included Proficy Plant Applications, Proficy Batch Execution, and Proficy Workflow.

In 2021, Zilor's natural ingredients division - Biorigin unit implemented self-serve analytics with quality engineers and technicians, using Proficy CSense for AI and data from Proficy Historian resulting in an increasing to 7% in their fermentation area after five months from project start.

Challenges

- Diverse production operations – including sugar, ethanol, electric power, and natural ingredients

- Plant locations in multiple countries

- Continuous improvement: quality, throughput capacity, yield, efficiency, etc.

Results

- 7% increase in fermentation area

- Greater throughput and productivity

- Better quality control

- Ability to track product genealogy

Browar Warka Increases Bottling Line Efficiency with GE Digital

Results

- The total number of mechanical and electrical downtime events decreased by 39%
- Access to accurate information on breakdowns and stoppages
- Potential for elimination of losses and stoppages
- Support of the TPM (Total Productive Management) system
- Increased the availability of machines, equipment, and workers
- Optimized the beer bottling process
- Web access to a variety of reports
- Elimination of time-consuming paper recording
- Ease of use

"What is of greatest significance is that we now know what is wrong with the line. Thanks to automatic registration of stoppages, we know their causes and how much time they actually consume."

Krzysztof Żyrek
Production Director, Browar Warka

Companies operating in the food industry face stiff competition and customer satisfaction is of the utmost importance, creating a need for constant improvement in production techniques. To be able to remain ahead of their competitors, companies have to shorten both the launch time of new products onto the market and the time for processing orders. This requires increased production line efficiency.

Grupa Żywiec SA - Browar Warka, the second biggest brewery in the Żywiec Group in Poland, sells more than 2.7 million hectolitres of beer per annum.

"Increased effectiveness of bottling lines is one of the priorities for our brewery," explained Krzysztof Żyrek, Production Director at Browar Warka. "In order to attain this goal, we must be able to accurately describe all events that cause stoppages and slow-downs in line production. Thanks to the automatic online monitoring of our machines, our new manufacturing execution system (MES) is able to collect detailed data about the time and reason for each breakdown as well as to provide up to date information on line productivity to the management plus the line operators. It also enables analyses to be carried out later, which help to eliminate causes of the stoppages and aid engineers in their every day work."

Proficy Plant Applications from GE Digital provides information in real time about the bottling lines, enabling a quick reaction to potential problems. Supplied and developed by the local systems integrator, Bonair, the MES software solution used for the KHS (KHS AG, Dortmund, an international manufacturer of filling and packaging systems for the beverage, food, and non-food industries) bottling lines has improved its effectiveness, helping to eliminate stoppages and losses in the bottling process.

Prior to the implementation of Proficy Plant Applications, data on bottling line stoppages was entered manually into the Microsoft databases by operators. "The system was less accurate than the current one, and it did not register 'micro-breakdowns,' i.e. those under five minutes," continued Żyrek. "It also took a lot of the line operators' time."

Proficy Plant Applications includes modules such as Fault Analysis, Shift Analysis, and Location Analysis

Measurement and analysis

The Proficy Plant Applications Efficiency module measures and analyzes parameters of efficiency and the degree of use of production resources—tools, machines, and people. Targets are set in production plans on how many thousands of bottles should be filled during an hour and over the entire eight-hour shift. In the event of the targets not being met, the Efficiency module shows the reason for the lower productivity of the line. Using analysis of micro-stoppages and breakdowns on production lines, the module reveals if the problem was caused by planned stoppages, machine breakdowns or defects in containers or caps. It could also be caused by a given personnel's inefficient handling of the line or slow reaction to machine jams or stoppages, or that certain label types cause the machines to jam more frequently.

The Efficiency module's ongoing monitoring of the production line enables up to date verification of whether a shift of employees have met their target, if the realization of the monthly pans are on track, and if any of the parameters are threatened.

Implementation on time and within budget

At the beginning of the implementation process, technical infrastructure was installed and configured. Connections were made to interfaces at automation controllers on production lines, mainly the necessary devices for data collection. The data comes from sensors on the bottling line machines. It is recorded by Proficy Historian from GE Digital data collectors in real-time. The next stage of the implementation was the configuration and analysis of the data in Historian.

The bottling lines include a range of machines used, for example, for washing bottles, verifying their cleanliness, pasteurisation, filling, verification of the amount of beer poured into each bottle, capping, labeling, and unpacking and packing of crates. A key task was modeling all these machines together with a description of every state they could be in. A corresponding electrical signal in Proficy Historian was linked to each such description (stoppage, shortage, lowering/raising of forklift, etc.).

The software can then determine if a machine has stopped, released a faulty product, performed its operation incorrectly, or transferred to another machine a set number of items.

"The biggest challenge was to link the new MES to the original control system on the bottling line and this aim was fully achieved," added Żyrek. "We wanted an application that would be able to pinpoint the culprit machine from amongst a series of machines stopped at the same time. It was also important for us to enable operators to comment on given breakdowns and add planned stoppages—such as breaks, refittings and overhauls."

In order to meet the client's expectations, Bonair altered the concept during the implementation phase and created an additional application enabling machine operators to add more data on production line events. When stoppages occur now, operators can choose the appropriate reason from a list shown on the operator's touch-screen panel.

"Despite all these modifications, Bonair was still able to meet all the objectives and carried out the full implementation within the specified time," emphasised Żyrek.

Automated reporting

It was determined at the modeling stage what type and form of reports the system was to generate. This request was facilitated by a GE Digital web-based solution that provides reports in real time. This capability provides a ready package of over 20 out-of-the box reports, which in effect reduces the cost of implementation and also subsequent maintenance and development of the MES.

Browar Warka management has ongoing access to overall weekly and monthly statistics. On the basis of reports and
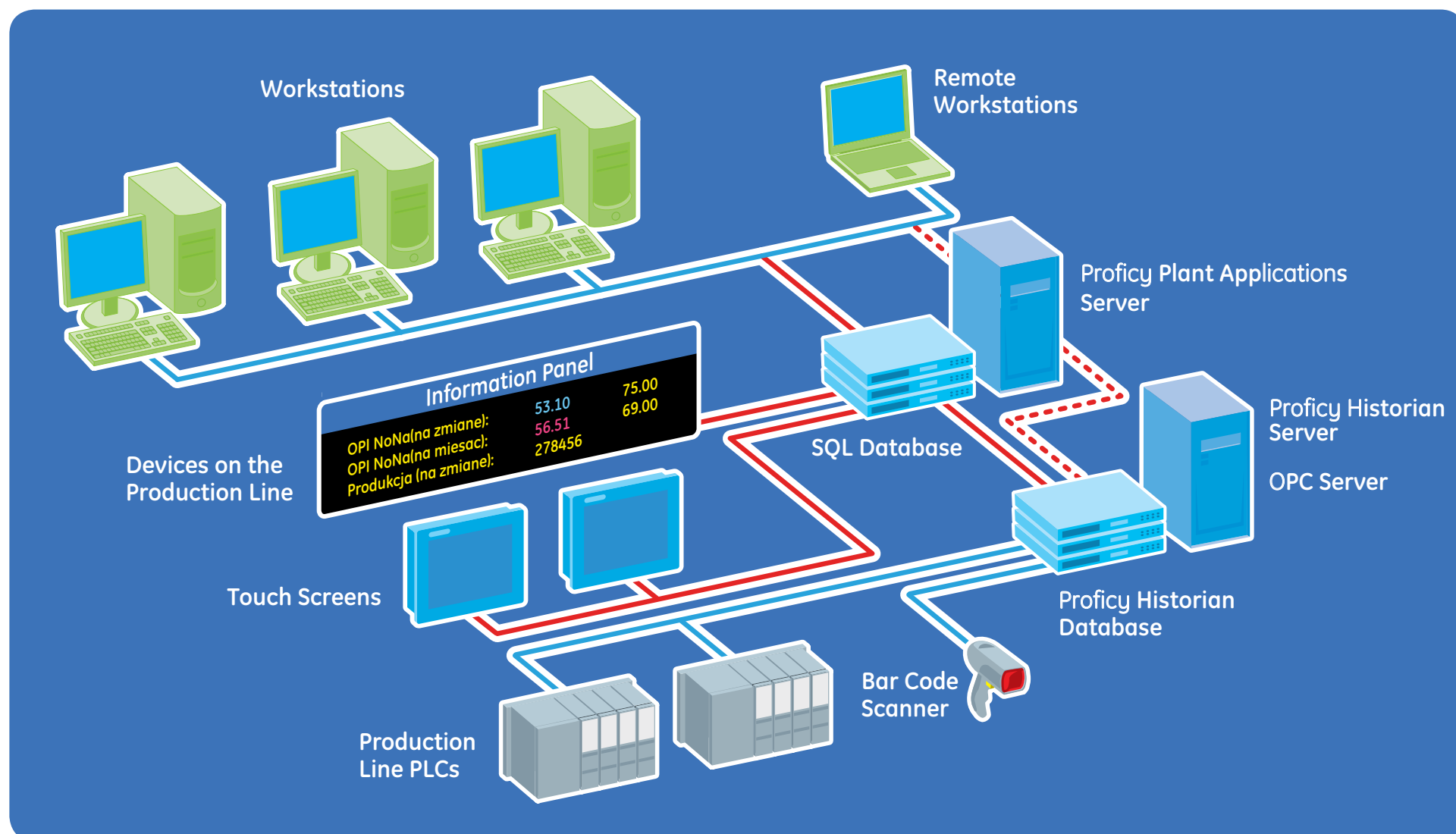
analyses, they are able to check each shift's productivity, pinpoint machines where stoppages occur, and verify the duration and causes of the stoppages. Production line employees also benefit from automatically generated reports.

"Previously, employees monitored machine productivity by manually recording data on stoppages," explained Żyrek. "Now they are able to obtain this data automatically. Basic percentage parameters, such as the set plan for each shift and the current state of the plan's realisation,

are all shown on a big screen located in the plant."

Experience decisive in system choice

At the competitive bid stage, the decisive factors in the ultimate selection of the solution were the wide functionality and open architecture of Proficy Plant Applications, and the experience and customer-friendly implementation approach of the local integrator. "Bonair has adapted the solution to the needs of our brewery," emphasised Żyrek.

Żyrek also pointed out other advantages such as the easy to use touch-screen panels on production lines, which enable operators to enter comments for each breakdown, convenient access to detailed reports that can be viewed on any computer by using an internet browser, plus the system's flexibility, enabling analysis of the collected data not just in the application created for this purpose but also in Microsoft Excel, for example.

What's next?

The system can point out bottlenecks but it cannot remove them. Żyrek continued, "What is of greatest significance is that we now know what is wrong with the line. Thanks to automatic registration of stoppages, we know their causes and how much time they actually consume."

Increased productivity is only the beginning. Browar Warka is considering implementing other modules of Proficy Plant Applications, including the Quality and SPC (Statistical Process Control) modules. "We know which direction we are heading in. We know that we have to focus on more automatic and precise control of the production process," added Żyrek.
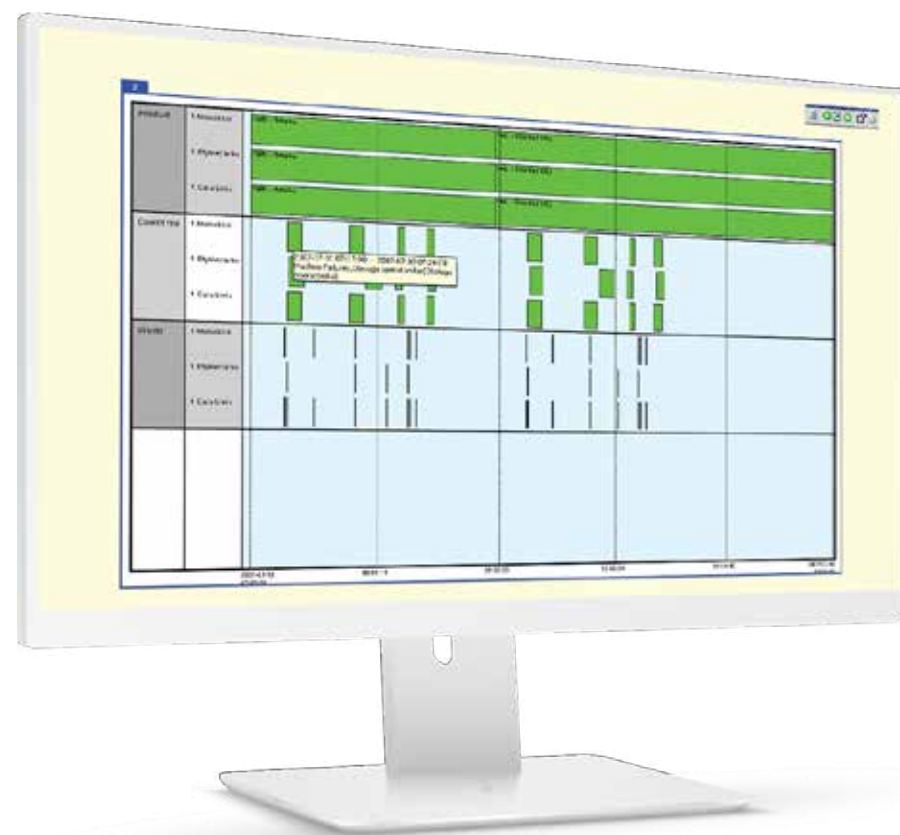
Production, downtime and waste events timelines provide flexibility through clickable events displaying more information.
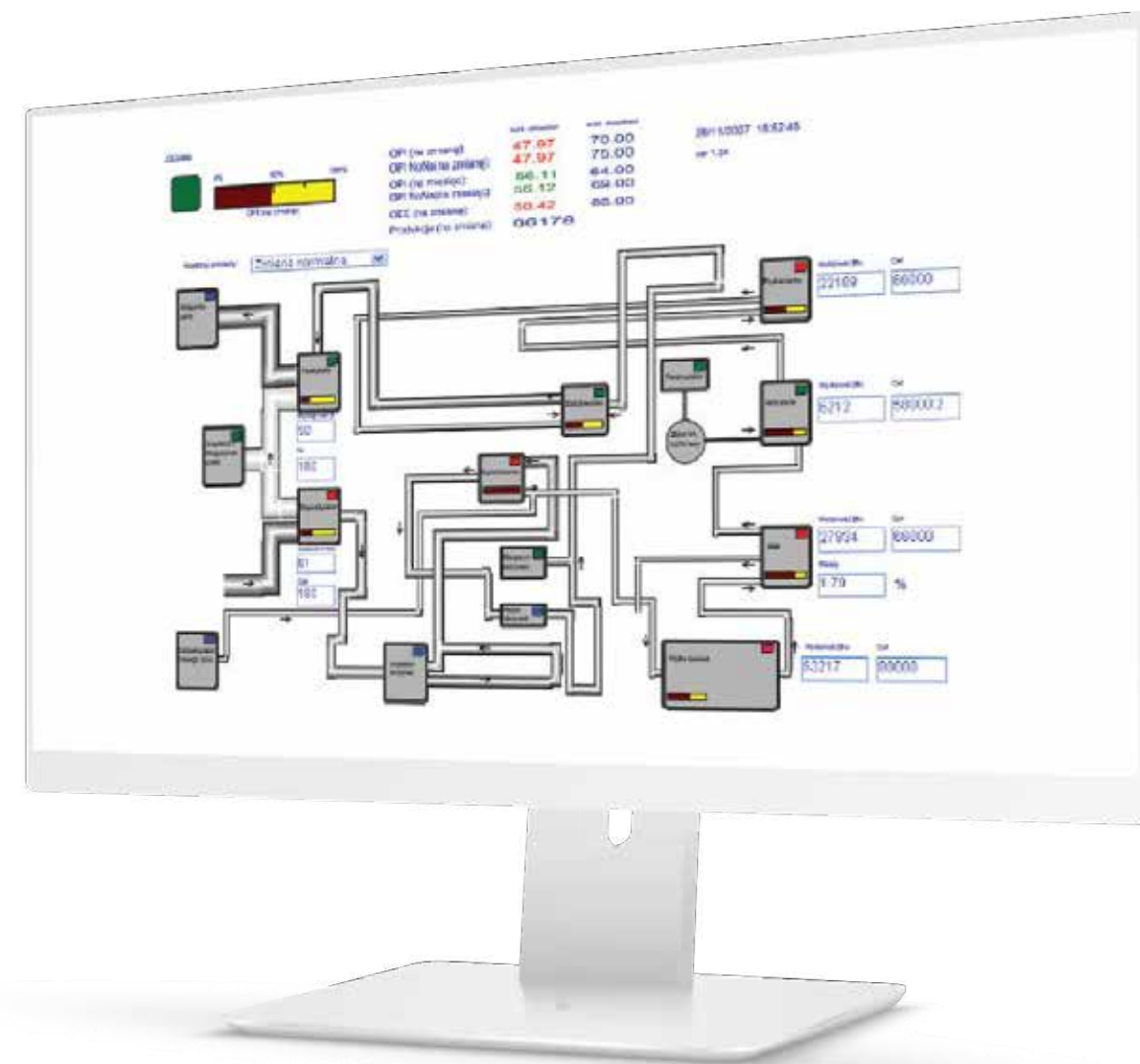
The software reports the actual state and efficiency parameters for every machine.

Ocean Spray Increases Efficiency and Productivity with Proficy

Introduction

Ocean Spray is an agricultural cooperative owned by more than 700 cranberry farmers in the United States, Canada and Chile. Founded in 1930, Ocean Spray is now one of the world's leading producers of cranberry juices and dried cranberries.

Ocean Spray was looking for a solution for their 600,000 sq ft processing facility that could help them visualize and analyze performance metrics and could be easily maintained and managed.

Bryan Graham, Senior Control Engineer at Ocean Spray, has been working closely with AutomaTech for over 10 years to make sure they are applying best practices for their facility with their GE Digital solution.

WATCH VIDEO

"The GE product suite has been very important to our plant, basically giving us the tools to customize and build the application to what our business needs are. It offers a lot of flexibility, a lot of opportunity for recording and communicating data and information."

Bryan Graham - Senior Control Engineer, Ocean Spray

GE Digital's iFIX HMI/SCADA system monitors their operation, so they can make better business decisions from the data and provides them with opportunities for continuous improvement. The team is consistently querying their Proficy Historian industrial data management system, looking at trends and building relationships between variables. The software helps get the right information to the right people in their facility.

Products

- iFIX HMI/SCADA
- Proficy Plant Applications
- Proficy Historian
- Proficy Batch Execution
- Proficy Operations Hub
- Proficy Webspace

Results

- Ability to use data for performance improvement
- Plant visualization and analysis
- Increased efficiency and productivity

About AutomaTech

AutomaTech is a leading provider of industrial technology solutions focused on improving your operational performance. By harnessing the power of data, we enable significant gains, visibility across your entire organization, and increased profits for a competitive edge. Our product offering includes a flexible and scalable mix of hardware and software solutions to solve your toughest challenges while providing a roadmap for future improvements and growth.

"I would definitely recommend GE platforms to other users. It's been a very reliable platform for us. The software can definitely make a difference in manufacturing, your efficiency, your effectiveness, in whatever product you're making."

— Bryan Graham - Senior Control Engineer, Ocean Spray
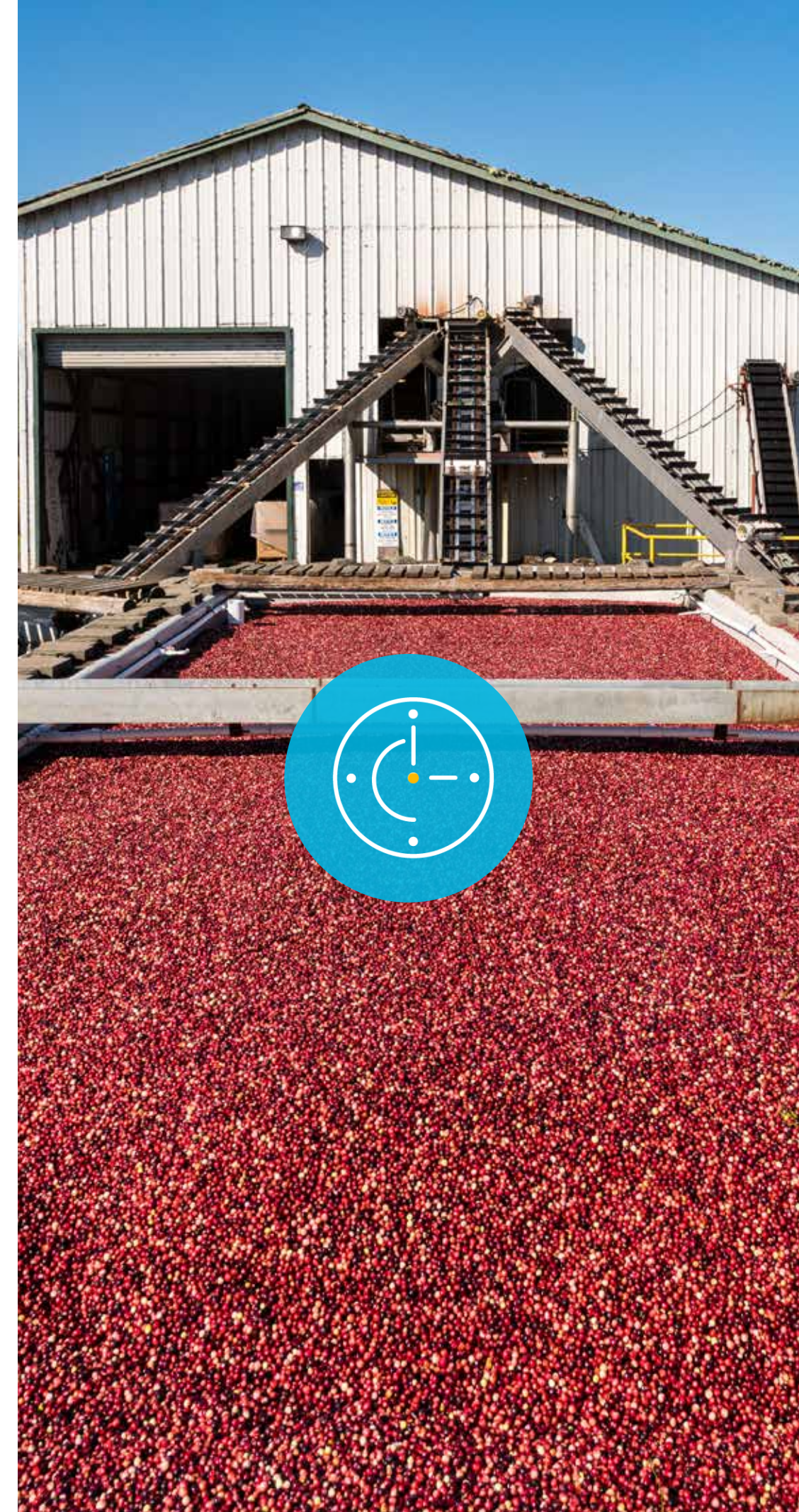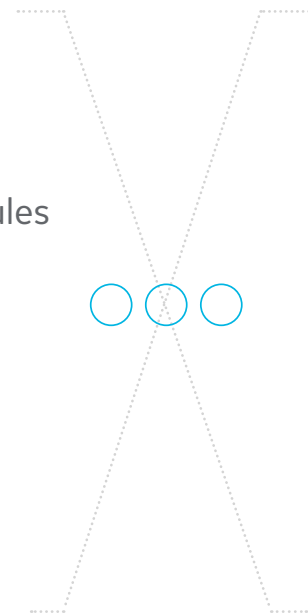
Snack Producer Bags Productivity Gain

Challenge

- Difficulty maintaining delivery schedules
- Poor understanding of line efficiency
- Inconsistent holds management
- Excess costs due to batch loss

Results

- Reduced waste up to 90%
- Significant capacity recovery
- Reduced labor in production and supporting activities for reassigning to higher value tasks

Rich Data for Downtime and Waste Analysis

GE's Proficy Plant Applications Efficiency module provided a non-intrusive way to interpret machine data related to downtime and waste. Seamlessly integrated with existing control and HMI solutions, Proficy Plant Applications provides the firm's continuous improvement teams with rich data that guides loss analysis and equipment troubleshooting.

Products

- Proficy Plant Applications – Efficiency Management and Batch Analysis modules
- iFIX HMI/SCADA
- Proficy Historian
- IGS

Success Brings Global Rollout

The ability to easily expose relationships between machine performance, material performance, and quality enabled this producer to "engineer out" many causes of loss. Because of the outstanding financial and operational results achieved, this firm is now expanding its usage of Proficy to cover batch operations and will roll out a standardized solution to all of its facilities.

Soft drink bottler improves OEE and reduces costs

Visibility into performance helps improve capacity and inventory management.

Challenges

- Maintain delivery schedules even as brands/SKUs multiply
- Reduce impact of downtime on profits and delivery
- Support improved capital planning with accurate profile of capacity and quality performance

Improving OEE across 20+ Plants

This bottler implemented a complete Line Information System using GE's Proficy software suite including iFIX HMI/SCADA, Proficy Historian, Proficy Plant Applications, and IGS. This approach ensured a design that supports operators in managing their regular work as well as off-line stakeholders concerned with continuous improvement and troubleshooting.

Value Delivered

By focusing on delivering a solution that supports line operators with visibility into performance as well as data and functions needed to manage a growing number of products, this bottler has sustained world-class efficiency ratings. Beyond reducing costs through improved capacity usage, this level of performance allows inventories to be maintained at low levels, as production is predictable and dependable.

Results

- **Increased capacity leading to average paybacks of less than 10 months**
- **Sustained OEE ratings above 85%**
- **Single platform across 20+ plants provides common metrics, ability to share learnings and best practices**

Products

- iFIX HMI/SCADA
- Proficy Historian
- Proficy Plant Applications
- IGS

Global brewer increases capacity while reducing costs

Challenges:

- Downtime and waste

- Losses and cycle inefficiencies

- Inability to monitor and analyze variations between brew streams

Results

- *10%-15% improved OEE*

- *3%-5% increased yield at seven breweries due to reduced process variations*

- *Automated identification and analysis of top reasons for downtime*

Proficy improves process consistency and uptime across lines and plants.

Products

- Proficy Plant Applications

- iFIX HMI/SCADA

- Proficy Historian

- Proficy Workflow

- IGS

ASM Foods leverages integrated control system for strong production increase

ASM Foods develops and makes industrial chocolate for ice cream producers and bakeries. The company has a production capacity of around 15 000 tons annually and is the market leader in the Scandinavian bakery sector.

In the dairy sector, ASM has developed from a national to an international company in a decade. In spite of constant improvements, the company's production unit in Mjölby had real capacity problems years ago.

The beginning of collaboration between the rapidly growing ASM company and GE Digital's partner Novotek started some time ago while building the Mjölby factory. By doing planning and construction simultaneously, time was saved and the object-oriented electrical and automation solutions provided a dynamic facility that could handle many production changes and increases over the years. What at that time was a modern system consisted of a PLC control system with operator panels and decentralized I/O connection points. This was supplemented with recipe storage and traceability in separate PC computers. However, after a while the system could not keep pace with the increasing production.

"Simply put, we couldn't keep up with it. There was always panic," explains Anders Lindroth at the ASM Foods Factory in Mjölby.

Holistic View Provided Many Advantages

The MES or Manufacturing Execution System concept was not yet developed when ASM's original production system was installed. Today's systems provide completely different possibilities for production planning, batch handling and traceability.

"We gained a holistic view when we installed MES. It is a system that can handle all functions in an integrated manner," says Christer Mars, Business Development Manager for Automation at Novotek.

Production planning, raw materials handling, batch handling, production statistics, traceability and reports are all integrated via a single operator interface. The operator sees no difference between his/her operating system and MES. Everything is presented in GE Digital's iFIX process pictures on the operator's display. The production planner also works with the same graphical interface.

Facts

Company
ASM Foods production unit in Mjölby

Solutions
- Automation
- Production planning
- Production monitoring
- Production control

Benefits
- Increased production
- Flexible solutions with expansion possibilities
- Integrated holistic solution
- Secure -by-design service and support on a 24-hour basis

Integrated System Resulted in a Production Increase

The integrated system offered a significant rationalization. The working procedures are changed and the personnel have more time for planning and other activities. This led to a 20 – 30 % production growth. Thus the investment in a production system resulted in a tangible profit for ASM.

100% Involvement From Both Sides

"The installation was quick and rather painless. One of the changes was to replace our controller communications interface with a standardized Profibus. This also provided us with a more open and future proof production facility," continues Christer Mars.

"There was a one-week overrun on the planned three-week implementation, but that was quick enough," explains Anders Lindroth. "After the installation, we had a learning period during the spring. There were a number of recipes that couldn't be tested during the short installation period. Smaller adjustments have also been done as we progressed. We had personnel who were 100 % involved in the project and could talk with and update the operators in a combined training and feedback process. Novotek was also quick and effective."

Service Availability within 24 Hours

Speed and reliability is obviously vital. Previously all service meant trips and downtime. Today Novotek is directly linked to the ASM facility via a secure Internet connection, enabling them to diagnose, correct problems and make adjustments on a 24-hour, 7- day a week schedule. "Our turnover in chocolate alone is 200 million SEK, but we still cannot have all expertise in-house and therefore outsource automation. But this requires constant service preparedness and sufficient knowhow at the supplier end. We have asked this of Novotek and we get it," concludes Anders Lindroth.

"And they have even challenged several of our customers to set the same goal," says Christer Mars. "We have understood the need and today offer 24-hour service to our customers."
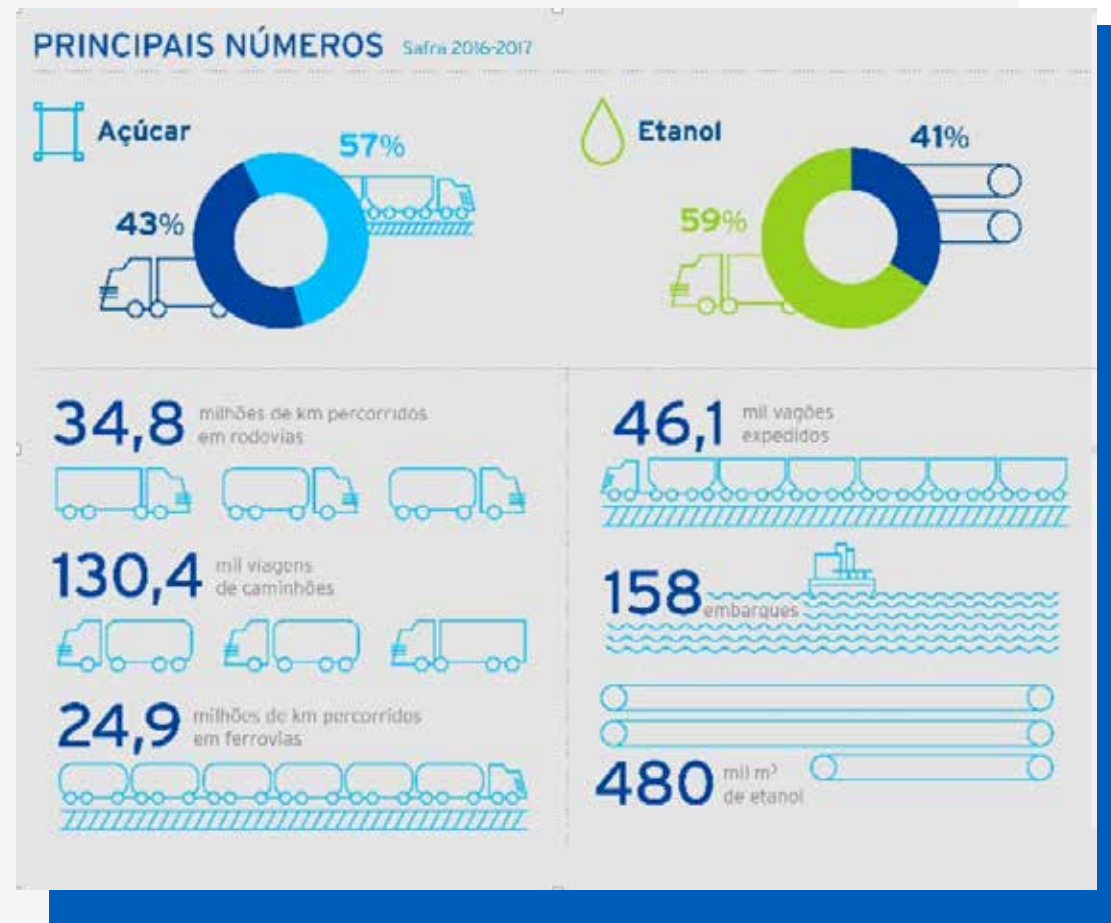
Digital Transformation at Copersucar

360° view of a Port Logistics Operation

Copersucar is redesigning their processes, reformulating their operation and facilitating decision-making, to place the company in the map of Industry 4.0.

PRINCIPAIS NÚMEROS Safra 2016-2017

Açúcar 57% 43%

Etanol 41% 59%

34,8 milhões de km percorridos em rodovias

130,4 mil viagens de caminhões

24,9 milhões de km percorridos em ferrovias

46,1 mil vagões expedidos

158 embarques

480 mil m³ de etanol

Working within the sugar cane supply chain and uniting field and industry, Copersucar is the largest Brazilian exporter of sugar and ethanol with integrated logistics throughout the business value chain.

With a unique business model in this sector, Copersucar doesn't count with production assets, but with sugar and ethanol acquisition contracts, supplied mainly by the member plants.

From the joint venture with Cargill, Alvean was created, which has accelerated the global expansion of the company.

Copersucar's strategy for sugar is based on the investment in multimodal terminals for the storage and transport of sugar, like in Ribeirão Preto and São José do Rio Preto, and at the Sugar cane Terminal Copersucar, located at Porto de Santos (SP), with a capacity of movement of 10 million tons of product per year.

Crop of 5.3 million tons of sugar and 4.2 billion liters of ethanol are commercialized with a $254 million of consolidated liquid profit, at the end of the crop year. Copersucar owns the largest capacity of sugar and ethanol storage in Brazil.

For the products to reach their customers in tens of countries, it is necessary to have a complex logistics infrastructure, integrated by their own and contracted transshipment terminals and storage, in addition to an extensive outsourced road, rain and sea transport network.

COPERSUCAR

Challenge

When a major fire struck the warehouses of the company, Copersucar had the need to update the entire operation.

In the area of Industrial Automation, an audit was conducted to identify the improvement opportunities through upgrades, new technologies and new processes. The Santos terminal was operating with some level of industrial automation, but the possibility to reduce contingencies and making operation and maintenance more predictable was identified. Additionally, it was not possible to quantify the losses related to performance and efficiency problems in a detailed manner and with identification of causes.

It was in this period that Copersucar brought in Marcelo Latrova to assume the Maintenance and Engineering Management, with a mission to redesign the processes and place Copersucar in the Industry 4.0 map, through the adoption of systems with an elevated level of integration, a consensus among the different approaches that exist today for digital transformation. Soon after, he had the arrival of the Industrial Automation Specialist Eduardo Pateis to supervise and implement the new project.
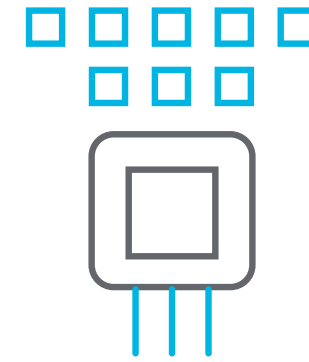
One of the priorities was to identify and address aspects of the process that could compromise the safety of the operation and impact daily production, due to possible unplanned downtime and complications.

With the new Industrial Automation project underway, Copersucar operates its regular activities at the same time as it manages the necessary changes, aiming at its modernization and increased efficiency as goals. This transition process is the most challenging point for the entire team of managers and operators.

Aiming for greater effectiveness, the team made the decision to restart and redesign processes and bring new technological solutions to overcome the challenges presented. It took nearly seven months within the Operational Control Center (CCO) to configure the systems.

The Engineering and Maintenance team is fully aligned with the corporate initiative, with the conviction that the project will increase Copersucar's competitive advantage. The current scenario is changing dramatically, however, with significant improvements at each stage.

Solution

Aquarius Software was the chosen partner for this project, acting as supplier of the systems and assisting Copersucar in the solution design, software training and support for the implementation of each system.

The overall idea of the solution includes the technological upgrade of the supervisory system with revision of the architecture used, upgrade of GE Digital's iFIX HMI/SCADA system, configuration of Hot / Stand-by redundancy, server virtualization and flexible access to client interfaces, operation via Terminal Services, with access management via ACP ThinManager. Proficy Webspace allows viewing of the HMI/SCADA screens anywhere, any time through a web browser.

In addition, increased operational safety, change management and automated backup in automation applications (PLC and SCADA programs) will be delivered by AuVersy's VersionDog software.
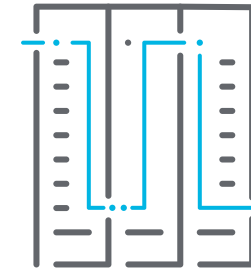
Finally, through the implementation of the PIMS and MES suite, also from GE Digital, it will be possible to have the entire shipment process digitized, through the ERP (SAP) connection to obtain the information on what is stored and what to ship in each ship, following the execution of the loading and returning consolidated information on each operation.

"This project once again proved that it is possible to employ new software and services on existing technological bases, resulting in extraordinary results such as increased operational safety and greater integration between automation and corporate systems, with continuity of operation and investment greatly reduced."

— Diogo Gomes, Aquarius Software

Critical Points

Within the scope of automation, PLCs were already interconnected in a control network, but there was no digital storage of process history. The records were made on paper. It was necessary to adapt the PLCs' ladder to the norms and to create new supervision system screens, processes that are in final phase of implementation.

The VersionDog deployment - has brought improvements in the dynamic of changes and access control of these programs. "Now it is possible to follow the changes / revisions in ladder diagrams, to know who performed them, when they were performed and, through the analysis of the data, to correct all the flaws and deviations," explains Pateis.

The solution will be completed with the implementation of the PIMS and MES systems, consisting of GE Digital's Proficy Historian, Proficy Plant Applications and Proficy Workflow software, which will allow the reading and analysis of the history and efficiency of the process, as well as integration with other Copersucar systems.

The PIMS and MES systems will also be instrumental in bringing relevant information to operational decision making. Latrova points out that from the implementation of these systems it will be possible to detect with more clarity and objectivity the causes of various types of outages and improve the process in general, including those related to the definition of specific training for operators.

"Protect processes. This is one of the essential roles of Automation."

—Marcelo Latrova
Maintenance and Engineering Management, Copersucar

Project Highlights

- Implementation of a modern CCO, with digitalized and centralized process information, available in real time through intelligent and reliable systems, allowing the decision making with greater speed and assertiveness;

- Implementation of MES / MOM project (GE Digital's Proficy Plant Applications and Proficy Workflow software), enabling the control of ship loading efficiency and integration of process data with the ERP (SAP) system;

- Installation of change management system in automation and automatic backup systems (Auvesy VersionDog software);

- Virtualization of Automation Technology systems in IT (Information Technology) servers to increase the availability and robustness of the applications;

- Improved security and reliability of the system, with the implementation of a physical network backbone with intelligent redundancy and ring topology;

- Investment in the Lean Manufacturing methodology to make the whole operation more efficient, making the correct integration of Industrial Automation with each person involved in the operation of the terminal.

This new control philosophy also brought the need to create an Operational Manual that is in the process of being elaborated and a final training for the operators.

Figure 1. Operational Control Center of the Copersucar Sugar Terminal (TAC)
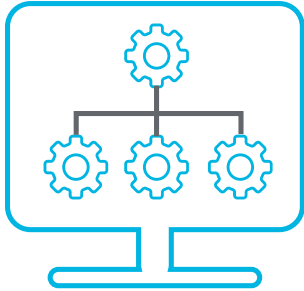
Technology employed	Main function
iFIX HMI/SCADA	Supervision and Control (SCADA)
Proficy Webspace	Viewing iFIX through a Web browser, anywhere, any time
Proficy Historian	Process Historian (PIMS)
Proficy Workflow	System Integration (Including SAP), eSOP and process automation
Proficy Plant Applications	Efficiency management of the operation (MES/MOM)
VersionDog	Automatic change management, SCADA backup and PLC programs
Thin Manager	Remote access management via remote desktop (thin clients)

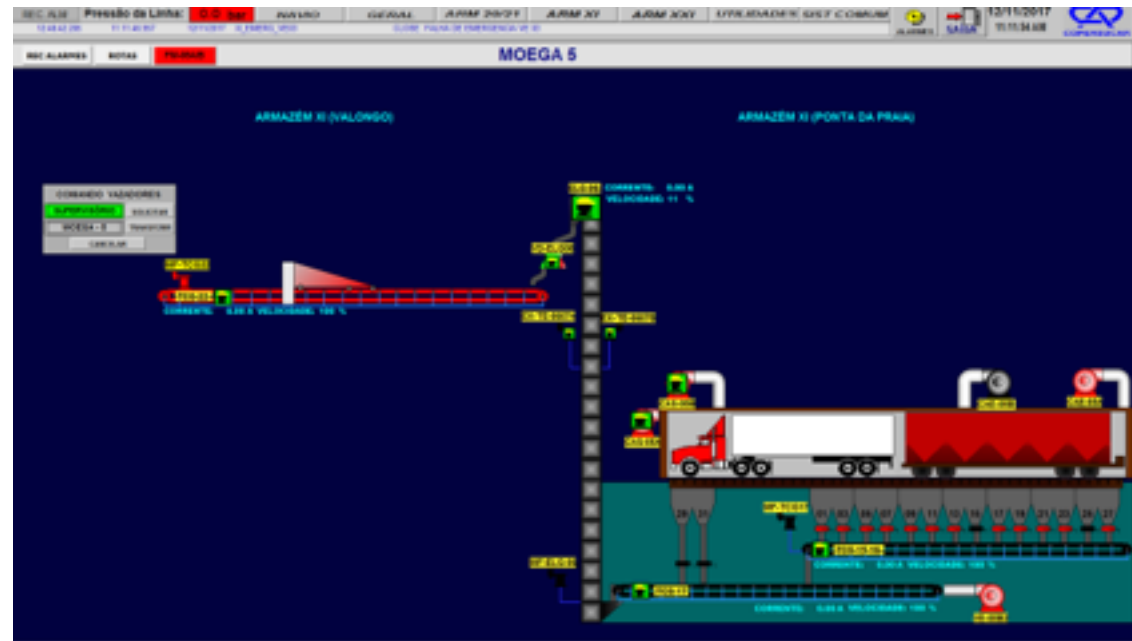# GE Digital iFIX Customized Screens

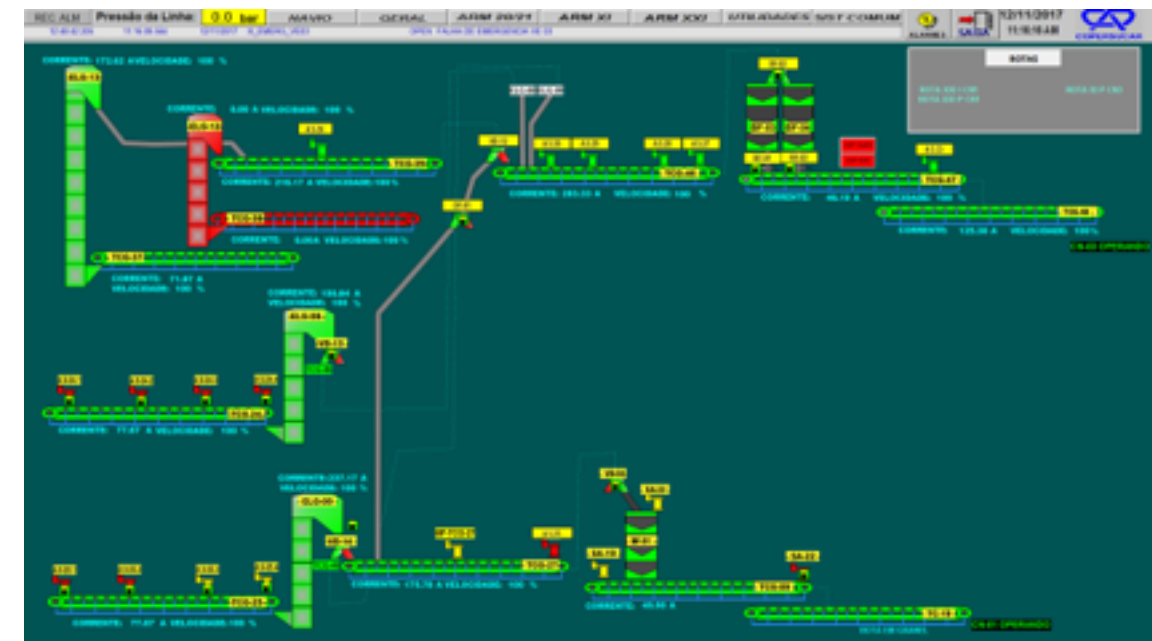Figure 2: Hopper 05 - Optimization of Routes

Figure 4: General Shipping Screen - All Optimized Routes
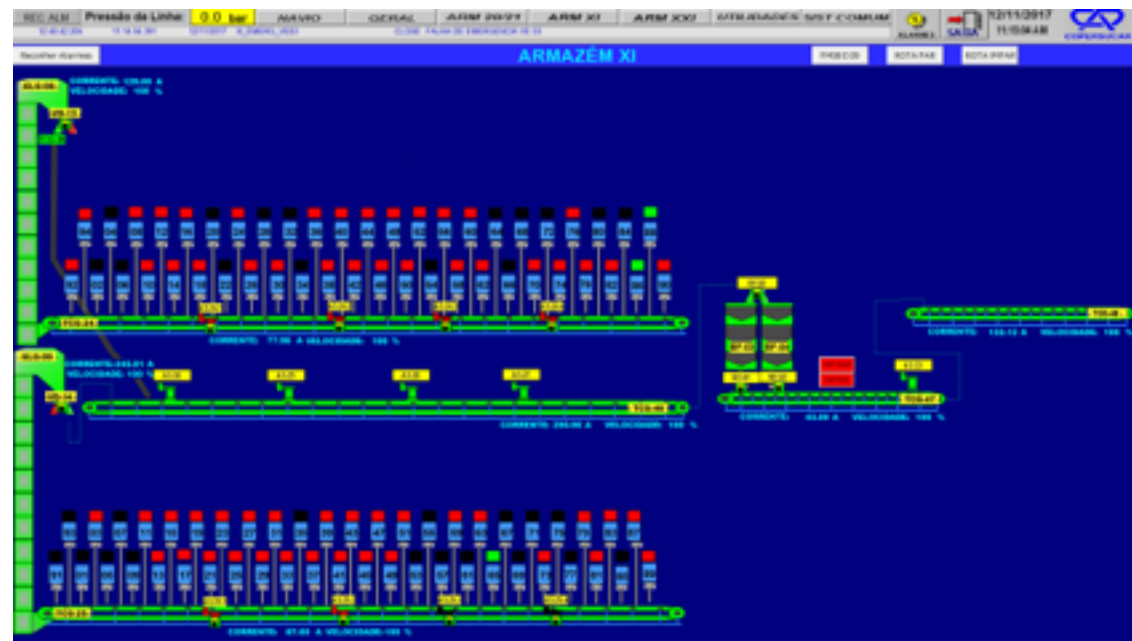
Figure 3: Warehouse XI - Shipping Line - Optimization of Routes

Figure 5: Electrical Quantities - Optimized on a Single Screen

Results

At the current stage, some major results have been obtained:

- With the advances in the implementation, it is notable that the number of overtime necessary has been reduced drastically, which is reflected in a higher quality of life for all those involved in the operation and in economics for the company;

- Several reports that help make decisions are now available. These reports are critical for process adjustments, as well as assist in the planning of activities, resulting in higher productivity;

- An automatic collection of historical data and the integration of the systems made the teams use their time in a more efficient way, since, with the direct and assertive visualization of the processes, the terminal operators could focus on the guarantee of operational efficiency, instead of spending their time collecting and analyzing manual data as previously required;

- Operators now work in much more organized and logical physical and operational environment. This also increases productivity and quality of life at work, in addition to increasing operational safety.

"If you solve your problems faster and more definitively, you gain operational agility. This is critical for our business.""

— Marcelo Latrova

Maintenance and Engineering Management, Copersucar

Next Steps

One of the next steps is the standardization of the operating interface. There will be similarity of processes and screens of the Supervisory System. This means that the operator working in one position may work in another, or in different shifts, with parity of procedures.

Another clear perspective is the continuous integration and collaboration between the Industrial Automation and IT teams. At Copersucar there is a reconciliation of the goals of continuous improvement of the two teams. This creates an extremely positive scenario for the company to follow its Digital Transformation journey and obtain solid results, in line with Industry 4.0's propositions.

Partnership with Aquarius Software

Copersucar had been a long-time user of the SCADA system distributed by Aquarius, GE Digital's iFIX, and planned the version upgrade when it entered the search process for partners for its new Industrial Automation projects. Analyzing the Aquarius portfolio, he was surprised to realize that he could solve all his challenges through a single partner, in an objective and integrated way.

Aquarius offered support beyond expectations, including expert advice for project management. One of the highlights was support in integration with IT, a subject dominated by the Aquarius team, with experience in other projects.
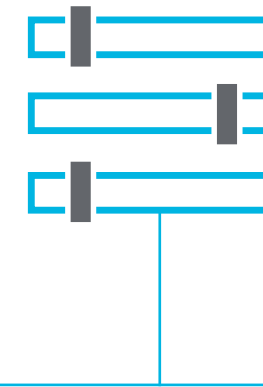
" *My practical view of Industry 4.0 is to reduce costs and search for operational efficiency through IIoT and the use of advanced technologies. I also see the autonomous systems, tracing routes and performing autocorrections."*

" *The experience and dedication of Aquarius' team of professionals generated a relationship of trust between companies. Our teams worked together throughout the project."*

— Eduardo Pateis

Industrial Automation Specialist, Copersucar

Global Pet Food Processor Improves Quality and Yield

Challenges

- Multi-plant manufacturer with lack of tools to understand what was happening on the plant floor

- Quality data entered on spreadsheets and operator logs leading to information gaps and errors

- Opportunity to improve system quality and efficiency

Results

- *Operators able to make decisions based on real-time data and input information at the point of production*

- *Increased uptime, reliability and productivity*

- *Visibility to quality data by SKU enabled formula adjustments that resulted in cost savings of $0.01 per case on one SKU*

- *The ability to make data driven process adjustments resulted in a cost reduction of more than **$200,000 per year on one SKU in one plant***

Products

- iFIX HMI/SCADA

- Proficy Historian

- Proficy Plant Applications

- Proficy Webspace

- IGS

- GE Digital's Professional Services

Leading juice manufacturer increases production efficiency

Background

- Leading juice manufacturer with 100+ year history

- Private label, shelf-stable beverages

- Processing and bottling in plants across the US

- 100+ blends of juices

- Private-label products in major grocery, warehouse, drug stores and more

Proficy improves running efficiency, quality and production flexibility.

Challenges

- Packaging materials direct losses of 1%

- Raw material direct losses of 1% and process variance-driven raw losses of 4%

- Labor losses and downtime

- Lack of insight into line stoppages, defects and waste

Products

- Proficy Plant Applications

- iFIX HMI/SCADA

- Proficy Webspace

Results

- 3.1 % higher average plant line efficiency in first five months

- 157% internal rate of return (IRR) for pilot

- Increased line efficiency and optimization

- Reduced downtime and waste

- Improved production flexibility

Why this Juice Manufacturer Chose Proficy Plant Applications

- Compatible with our Networking, PLCs, ERP, Security, Support

- Easily Expanded - SPC, Lot Traceability, Maintenance

- Easily Scaled Up to Plant and Enterprise Levels

- Vendor Program fit our Change Philosophy

- Attractive Licensing Model

- Low Risk, Incremental Implementation

- Performance Pilot Implemented Quickly, Delivered Immediate Results, Did Not Limit System Growth

Spomlek Improves Manufacturing Line Operations

Efficiency

Increased packaging line efficiency

Scheduling

Increased accuracy in scheduling employees' shifts

Less Downtime

Better predict potential downtime

Introduction

Founded more than 100 years ago, Spomlek Dairy Cooperative is one of Poland's largest manufacturers of hard cheese, specializing in premium cheese and manufacturing nearly 21,000 tons of Dutch and Swiss-type cheese per year. The cooperative also processes more than 300 million liters of cow's milk annually. Spomlek has four production branches located in Radzyń Podlaski, Parczew, Młynary (Elbląg Branch), and Chojnice. Radamer. The company is the first dairy in Poland to manufacture mature, long-ripened cheese and is one of the few dairies to use traditional methods to produce the "dry rind" cheese.

Challenges

Spomlek was looking to optimize its manufacturing operations by increasing packaging line efficiency, accurately scheduling employees' shifts, and monitoring its manufacturing equipment in real-time to better predict potential downtime.

Solutions

Spomlek leveraged GE Digital's Manufacturing Solutions to implement a flexible, scalable, and custom MES system across all lines at its main plant, Radzyń Podlaski.

Products

- Proficy Plant Applications
- iFIX HMI/SCADA

Results

- **10% increase in efficiency**
- **Paperless system greatly accelerated and facilitated work**
- **Intuitive operation**
- **Easy integration and configuration**

WATCH VIDEO

North American Brewer sees millions in energy cost savings with Proficy

Visibility into consumption details drives energy conservation processes and culture

Challenges

- Rising utility costs and common energy utilization metrics

- Delivery of timely energy information

- 5-year energy target of $10 million cost reduction

Results

- *Surpassed energy target and achieved 10-15% improvements year over year*

- *Significantly improved energy conservation*

- *Multi-level reporting by utility (Electricity, gas/oil, water, steam, ammonia, CO_2, etc.)*

Products

- Proficy Plant Applications

- iFIX HMI/SCADA

- Proficy Historian

- IGS

Bolletje Drives Quality Improvements and Visibility

Challenges

- Batch-to-batch quality variations
- Inconsistent process execution
- Need for better inventory line of sight
- Training for new operators without productivity loss

Results

- *Improved materials planning*
- *Enhanced inventory accuracy*
- *Reduced waste and costs*
- *Faster, more efficient training*

Enhanced End-to-End Traceability

Bolletje, a major Dutch baked goods manufacturer, turned to GE's Proficy software solution, an integrated platform for Batch execution, MES, automation and visualization. The solution provides enhanced end-to-end traceability of ingredients, processing conditions and quality data—all linked to each production lot—enabling better control into manufacturing processes.

Improving Quality, Visibility into Inventory, and Planning

Proficy has helped the food manufacturer improve quality, gain better line of sight into inventory, and leverage traceability of its products from the bakery to the store. The solution also provides more visibility into the actual use of raw materials to improve materials planning, and deeper understanding of material costs for each product line for better planning and execution.

Products

- iFIX HMI/SCADA
- Proficy Historian
- Proficy Plant Applications
- Proficy Batch Execution
- IGS

Fast installation. Sweet results.

GB Glace implements a new production system for 45 million liters of ice cream

About GB Glace

GB Glace, part of the Unilever Group, makes 45 million liters of ice cream per year. GB Glace is Sweden's single largest ice cream manufacturer. All production takes place in the company's factory in Flen where the production system for monitoring the mixing of ice cream batches are installed.

"Novotek gave us a modern, flexible system that results in higher productivity, can communicate with our business system and allows complete traceability."

—Karleric Idegren, GB Glace-fabrik in Flen

The computer system that monitors the batch-based mixing process has been in dire need of an update for some time. The system was based on an older platform and used an outdated recipe handling system, both in terms of hardware and software. The situation was bordering on impossible.

High precision and faster lead times provided better operation accuracy and increased productivity.
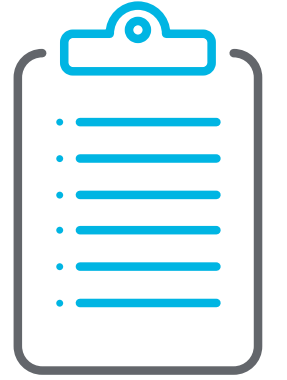
We began with a long list of requirements

Comprised of more than 4,000 I/O connection points, the system was huge. Yet one of the foremost requirements was a quick installation since GB Glace is Unilever's only ice cream factory in the Nordic region and operates 24/7. The only window of opportunity was a two week break during the New Year holidays.

The list of requirements included greater flexibility and user friendliness. The old system was complicated to operate and only a few people had the necessary skills. Furthermore, it was essential that the production system could be integrated with a new SAP business system.

GB Glace had other functions on its list of items to improve, including traceability, batch handling in line with the S.88 industry standard, logs and reports for quality and control parameters, as well as significantly better analysis and reporting functions throughout the entire mixing process.

Last but not least was the requirement for easier update and support in the future.

Advantages of a smaller supplier

Since GB Glace is a part of the Unilever Group, the company normally works with preferred suppliers. GB Glace came in contact with Novotek during the selection process.

"Novotek was the only company that could present a viable solution to the problem of the enormous amount of I/O modules that had to be replaced within a very tight time-frame. And of course, there was also the difference in price in relation to the other suppliers," comments Karleric Idegren. "I believe that in choosing a smaller supplier, we received more dedication. The project was large and important to both Novotek and us. And they could provide references from similar assignments they had successfully completed."

By selecting Novotek who is the distributor and partner with GE Digital they got the flexibility of a "smaller" company basing their solution on world class products.
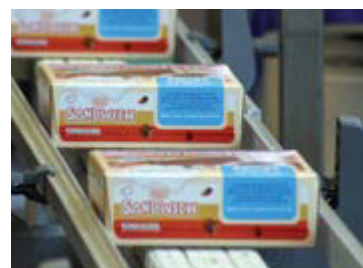
Quick installation

By working with prefabricated and pretested modules to directly re-place the existing I/O modules, Novotek's installation team was spared the time-consuming task of laying new cables. Six minutes was all it took to switch a module. This was a must for completing the assignment over the short Christmas holiday available for the project.

"Tempo and chaos, that's the only way to describe it. But we got it done, even if we did have a delay of a few days since our facility was not up to the standard we thought it was," says Idegren. "We had a very open dialogue and were able to make speedy progress."

Well functioning, future proof solution

GB Glace now has a system for batch handling based on Proficy from GE Digital that gives considerably more exact dosages than the earlier system. An iFIX operator interface secures high reliability, scalability and future compatibility. Proficy Plant Applications web-based reporting enables the quality department to make e.g. traceability reports. The connection to the SAP business system will minimize time consuming manual data input.

"In addition to considerably higher dosage precision and quicker program cycles, we now have a system that more employees can handle. Just a few people were previously able to operate the old system," says Karleric Idegren. "Novotek is also training staff at their office in Eskilstuna so they have the necessary skills to deal with our factory in Flen.

*"We have a modern, flexible system that results in higher productivity, can communicate with our business system and allows complete traceability. Simply put, we have future proofed our production," says Idegren in closing.*
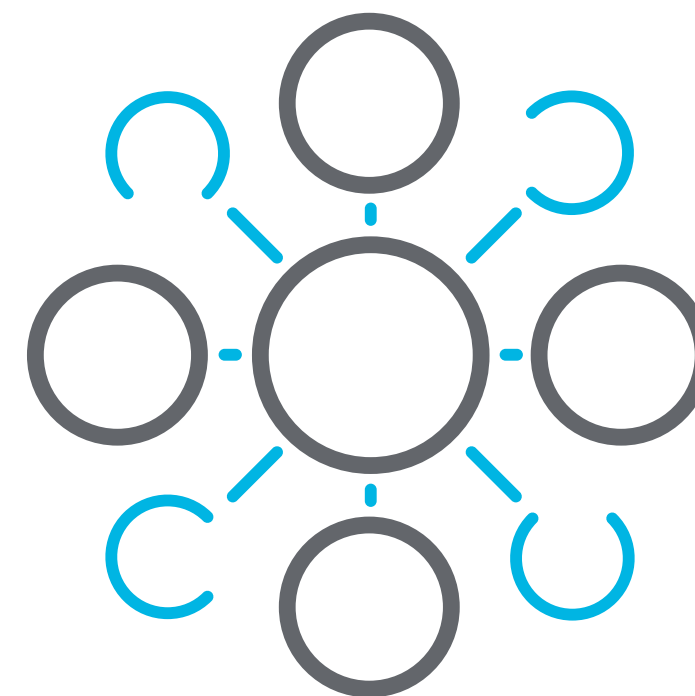
Facts

COMPANY

Unilever Sweden GB Glace, production unit in Flen

SOLUTIONS

- Production management
- Automation solution
- Batch system

PRODUCTS

- GE Digital iFIX HMI/SCADA
- GE Digital Proficy Batch Execution
- GE Digital Proficy Plant Applications traceability and reports

ADVANTAGES

- Faster system with high precision
- Conforms to S.88 standard
- High reliability and scalability
- Excellent future compatibility
- Integration with SAP
- Reporting
- Traceability
- Quick installation and start-up of operations during stand-still period

European brewery improves production and packaging processes

Challenges

- *Production efficiency and downtime*
- *Manual measurement system, compromised data*
- *Variable packaging demands*

Results

- *9% increased production efficiency*
- *11% decreased downtime*
- *Improved data integrity, operational insight, and scheduling accuracy*

Better insight helps increase productivity without capital expenditures on new lines.

Products

- Proficy Plant Applications
- iFIX HMI/SCADA
- Proficy Historian
- IGS

De Danske Gaerfabrikker "the Danish Yeast Factories" increased production capacity by 15-20% with ROB-EX

About De Danske Gaerfabrikker

DDG is a subsidiary in the Lallemand Group. Lallemand Group specialises in yeast production and products for the bacteriological production industries. Worldwide, the group has 4.000 employees distributed in 70 production plants across the globe. De Danske Gaerfabrikker is located in Grenaa, Denmark, and has 100 employees. Gert Fogh has been the Head of Logistics at DDG for 10 years. Production scheduling has been carried out in Excel spreadsheets up until the implementation of ROB-EX.

The system automatically collects data from the many process tanks and storage tanks. This data is uploaded to ROB-EX. The company has installed about 25 physical view/access "stations" with ROB-EX across the entire factory. There are both process "stations" and operations "stations," distributed so that all employees are able to log on to the system wherever they are.

De Danske Gaerfabrikker

"Our ROI as regards ROB-EX has been only three months. We used to be under a great deal of strain to keep up, but in only three months we have increased productivity, and are now getting everything done in time, and with ease. We are talking about an increase in capacity of 15-20 %, all due to the introduction of ROB-EX," says Gert Fogh, Head of Logistics at De Danske Gaerfabrikker (DDG).

He continues: "We have increased capacity and improved efficiency significantly by implementing ROB-EX — and we expect to continue to do so. I would like to commend ROB-EX for the way that the system pinpoints the areas in production that have capacity to yield more output. We operate with total transparency, and we are able to see the timeframe for each process — something that we were not able to do before ROB-EX. If a machine breaks down, we are able to get back up and running much sooner than we used to, and we are simply able to increase our production volume, just by introducing ROB-EX."

ROB-EX Scheduler shows the extra capacity that is already available

"DDG is fully based on process manufacturing. This means that our various production plant factors are interdependent from start to finish."

Gert Fogh elaborates: "It really makes a huge difference that we are able to view the interdependencies between machines — we are able to spot areas with idle capacity and we are able to get an immediate overview of production conditions. The overview makes it easy to answer inquiries for new orders — we have a full overview, and customers get reliable information about when we are able to produce their order. Prioritisation is much simpler with ROB-EX. ROB-EX generates viewable

interdependencies, so that we are able to see the holes in the cheese. We are able to see gaps in capacity that we are not fully utilising — we were not able to do this in our old Excel plans."

A flexible solution for complex production

With about 200 product recipes, production at DDG is highly complex. ROB-EX includes features that automatically schedule and control the many processes involved in yeast production. Yeast undergoes enormous growth during the production process, from one tiny seeding specimen on a glass medium to 30 tonnes of yeast in a tank. By setting up rules in ROB-EX, the scheduling tools include limitations, possibilities and rules for the various tanks and pipe connections so that the many yeast products do not mix or otherwise affect each other.

"We schedule the entire process in ROB-EX, all the way through to the finished and packaged product, which will be some form of dry yeast or a yeast extract that is ready for shipping. Some of the processes take 4-5 days and others take up to 6 weeks. The long scheduling scope was a deciding factor in the decision to implement ROB-EX. The ROB-EX solution is a 100% match to our plant and our production," says Gert Fogh.

Viewable scheduling results in reliable delivery times and optimal stock management

DDG has a large number of internal customers, i.e. sister companies, that are highly dependent on DDG's yeast products. With ROB-EX, Gert Fogh is able to provide customers with reliable delivery dates and is able to make accurate estimates for when raw materials and additives are needed. This creates a much more balanced workday all round.

"If one of our suppliers wishes to deliver ahead of time, we are able to say whether or not this is possible — or if delivery is delayed, we are able to see the consequences of the new situation immediately. We have a much better overview and

are able to manage our stocks more efficiently, and we are able to make very accurate estimates of when we need various raw materials, packaging materials, enzymes and other additives for our production."

Reduction of overall costs through reduced number of faults and errors and reduced down-time on equipment DDG runs a 24/7 production. This means that operators are often on their own if something goes wrong. Before ROB-EX, operators would simply cease working and do nothing, or they would stop production altogether. They were unable to assess the consequences of the situation and this in turn resulted in mistakes and production faults and desperate late-night calls to Gert Fogh.

"Such situations had enormous consequences, both financially and in relation to capacity. If we produced faulty products, or if we ended up with insufficient storage capacity it was extremely costly for us!"

Today operators have a visual overview of production lines via the Gantt chart in the ROB-EX Scheduler, and they are able to see the precise consequences of any changes that they make in the plan. Operators have access to making adjustments and moving operations in the plan, and this gives them more responsibility and influence as regards the planning of their workday. In turn, this results in much more motivated employees." Gert Fogh continues: "We must dare to utilise our operators' competences and allocate responsibility for scheduling to them. After all, they are the ones who know and understand the intricacies of the machines the best. Another benefit from allocating scheduling responsibilities to operators concerns our young employees. They enjoy being able to optimise production lines, and they are not shy about running simulations and testing ideas to get the best results. We find that this is a major 'sales point' in our recruiting of new employees."

Leading American Dairy

50% decrease in the time taken for quality control audits

# Reducing time taken for quality control audits by half

Challenge

This leading American dairy produces and distributes cheese, yogurt and other products. It faced lengthy processes to ensure high-quality food production and a lack of data-driven visibility.

The customer needed to reduce quality control process time and streamline ERP systems. Strict quality control standards enforced by FDA drove the customer to spend significant time testing food safety. The company needed to accelerate these quality control processes. Furthermore, the company also needed to gain visibility into root causes of unplanned downtime.

Action

- Implemented GE's Proficy Plant Applications to get connected, drive a modern manufacturing execution system (MES) across its enterprise, and launch a digital transformation journey

- Streamlined ERP systems and automated quality reporting on production floor

- Enabled incisive, root cause analyses of unplanned downtime
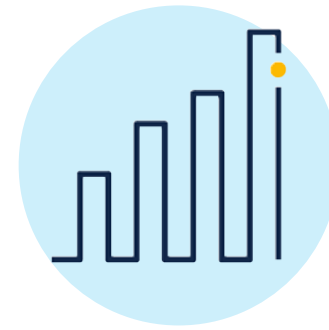
Working with GE Digital, the company deployed Proficy Plant Applications, initiating a Smart Factory digital transformation journey. For the customer, this technology enables automated quality control reporting on the production floor and messages with the company's ERP systems. The Proficy MES solution also enables root cause analyses of unplanned downtime. Once explanatory variables of unplanned downtime are identified, they can be isolated, and processes can be put in place to ensure that type of downtime doesn't recur.

Results

- 50% decrease in the time taken for quality control audits

- Ability to disseminate root cause analysis of unplanned downtime to plant and operations leadership.

- Ability to record and track process improvements

- Culture change driven by digital transformation

The company underwent a culture change as it took full advantage of the MES technology and digital transformation journey. The customer engaged plant personnel with the digital technology enhancements, and the operations teams are now inspired to fully leverage the gains realized by harnessing data.

Westfälische Fleischwarenfabrik Stockmeyer GmbH

Central production control despite numerous machine interfaces

Central control and process data visualization despite a multitude of the most diverse interfaces.

Due to strict statutory regulations, the food processing industry places high demands on reliability, traceability and the quality of manufacturing processes.

Therefore, the industry is mostly skeptical of changes. Its rule of thumb is: Never touch a running system. However, whoever strives to keep up with today's economic demands, requires both the highest level of quality as well as optimized production processes. In order to achieve this, modern automated solutions are virtually indispensable. When used practically, such solutions not only allow you to improve production processes, but they also save energy and therefore help reduce production costs.

The Stockmeyer Group has been producing traditional meat and sausage products since 1913. Back in the 1960s, the company was one of the front-runners for self-service counters in the sausage sector as it first introduced pre-packed sausage products into the German market. Anton Riedl Spezialitäten GmbH and the Polish manufacturer Balcerzak, along with Westfälische Fleischwaren fabrik Stockmeyer GmbH constitute the Stockmeyer group which represents the meat processing business segment of heristo ag.

Its meat products plant in Füchtorf, located in Westphalia, Germany, has played a decisive role in keeping the company at the front of the pack. The plant's production of cooked, raw and boiled sausage is supported by the latest automated technology.

"With the GE Proficy software, I can create data diagrams in the most diverse formats at the touch of a button, and I immediately notice when anything gets out of control and can react immediately."

— Uwe Rosenski, Head of the Electrical Engineering Department Stockmeyer GmbH

The Results

- Increase in data quality by approximately 70%
- Flexible display of process data in daily, weekly or annual diagrams
- Additional security through OPC collectors which temporarily save process data in a decentralized, redundant database
- Products comply with 21 CFR Part 11
- No programming efforts due to parameterization
- Thanks to flexibility and scalability, gradual changeover is possible with no downtimes
- Allows future vertical integration into ERP system
- Process data can be used as control variables for the ERP system
- Solution allows energy management and can be implemented company-wide
- Straightforward costs

Variety presents challenges

Nearly 100 different types of cooked, raw and boiled sausage are produced in a one-shift operation and packed in a two-shift operation at the Westphalian plant. Approximately 4,000 tons of sausage are produced monthly. In the process, the multitude of processes place extreme challenges for its automated technology. There are different recipes for the contents and manufacturing processes, such as filling, cooking, autoclaving or ripening for nearly every type of sausage.

Previously, the most diverse machines operated independently of one another as stand-alone solutions and were equipped with a wide range of PLC controllers. These were being used for the individual production stages. In order to optimize the manufacturing processes and to facilitate the required traceability, the stand-alone solutions had to be gradually changed over to a complete, networked automated solution. In doing so, the goal was not only to link together the individual system components at the field level, but also to create, for example, the requirements for vertical integration into the ERP system.

Gradual changeover

With nearly 300 machines and systems used in the production process, it is obvious that a changeover could not be performed overnight. The team at the Westphalia plant therefore searched for a flexible and scalable solution that could be gradually expanded and at the same time, supported the wide range of existing interfaces, as well as allowed integration into an ERP system further down the road. The decision was made to use MES and process control components from GE. The process control software and
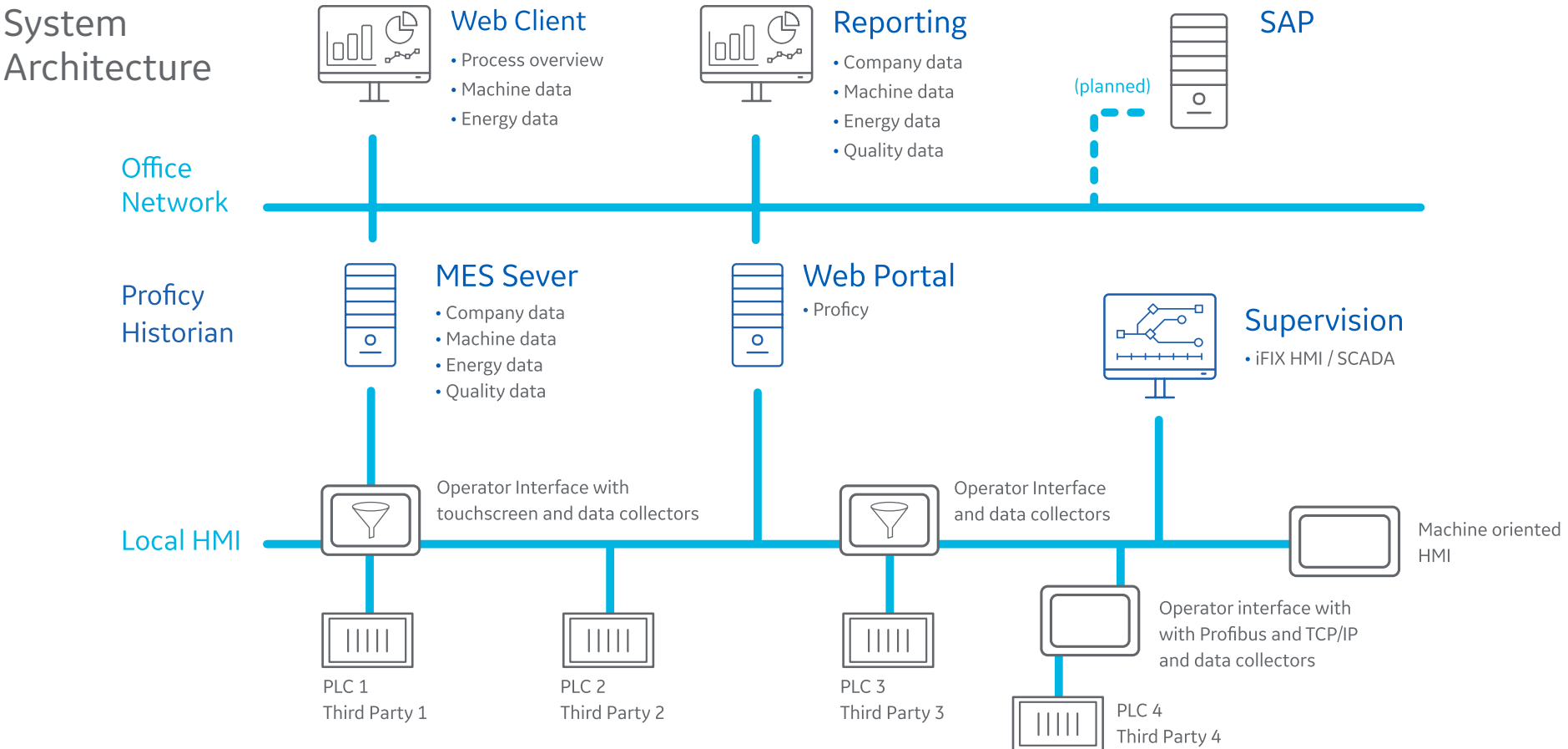
controller experts from the NFT Automatisierungs-systeme GmbH implemented the on-site system integration.

With the new automated solution, the Proficy Historian server saves all process data, such as temperatures, moistures or PH and guide values into a database that is optimally matched to the industrial requirements. A Proficy dashboard relies on and allows access to all historical and current data from anywhere using the company intranet thanks to its web-based construction. iFIX HMI/SCADA, also part of the Proficy family, carries out the visualization of the individual production processes, such as filling systems, cooking systems or smoking and ripening systems. Access is password-protected and different processing levels can also be created. Finally, approximately 20 Operator Panels currently allow the visualization and control functions to be carried out directly on the individual system components.

"Although many different controllers from a broad range of manufacturers were being used at Stockmeyer, all process production data along with infrastructure data needed to be archived at one common location. In this case, GE products are highly suitable, since their software provides numerous possibilities to accommodate the most diverse data. At the same time, the products meet the requirements stipulated for the food processing industry in the important logging directive 21 CFR Part 11."

— Dipl.-Ing Klaus Lühn, Managing Director at the system integrator NFT.

System Architecture

Web Client
- Process overview
- Machine data
- Energy data

Reporting
- Company data
- Machine data
- Energy data
- Quality data

SAP
(planned)

Office Network

Proficy Historian

MES Sever
- Company data
- Machine data
- Energy data
- Quality data

Web Portal
- Proficy

Supervision
- iFIX HMI / SCADA

Local HMI

Operator Interface with touchscreen and data collectors

Operator Interface and data collectors

Machine oriented HMI

Operator interface with with Profibus and TCP/IP and data collectors

PLC 1
Third Party 1

PLC 2
Third Party 2

PLC 3
Third Party 3

PLC 4
Third Party 4

The new solution was constructed in parallel to the old system components. The old system was dismantled and the changeover was first implemented after the new system was fully functional. Therefore, all data was available during the changeover process.

"Everything began with the concept planning. The implementation then started. Initially there were 100 process nodes connected, and then little by little, we continually added more. In the meantime, we have connected more than 3,600 data points. That means we have converted 50% of the old systems. Of course, newly-acquired systems are immediately integrated into the new process control system."

— Uwe Rosenski, Head of the Electrical Engineering Department Stockmeyer GmbH

Standardization creates flexibility

Linking the various machines with a wide range of different interfaces presented a challenge. *"That was certainly one of the most important reasons why GE was chosen,"* says GE's product leader for MES systems. *"In this specific project, we were dealing with approximately 30 different interfaces. There were also machines that were more than 10 years old and whose interfaces are no longer used at all today. Since we have more than 300 different drivers in our standard program, we could easily solve this problem and were able to process various data formats or time stamps, for example."*

The actual system integration was carried out by the NFT Automatisierungssysteme GmbH. *"We have been working with NFT for many years"*, reports Stockmeyer's Rosenski. *"Their staff had also already programmed our machine controllers in the past. We notice again and again how good it is that they not only understand MES and process control systems, but that they are also well versed with the actual field levels and processes."*

Thanks to past experience, the team at the Westphalia plant emphasized the importance of standards when implementing the automated solution: the manufacturers of new machines are now required to provide a standardized data record interface based on OPC. Furthermore, it was important to them that the new system did not require programming, but could be set using parameters. That brings numerous advantages: no expert who commands a specific programming language is required. At the same time, the entire system is considerably less error-prone and the maintenance is also significantly simplified. If you rely on standards, you can also act independently of the system integrator and are therefore more flexible.

Security through redundancy

The Operator Interfaces from GE perform the visualization and control the individual system components. In addition, using the integrated data collectors, they also record process, operating and quality data as well as alarms over an extended time period. The data generated in this manner can either be forwarded directly or following a delay (depending on the network connection) to the central data server. This decentralized redundancy creates additional data security. If the server actually fails once, the data is temporarily saved on the collectors until the server is running again. That could also be over a period of several days. Once the server has been restarted, the data is automatically synchronized.

At first, Uwe Rosenski was very skeptical as to whether this could actually work. *"But early on, a server actually failed on the weekend. As we restarted the system on Monday, the synchronization with the OPC collectors also started automatically. And we did not lose any data at all – neither the quality data along with the time stamp, nor was the process data lost."*
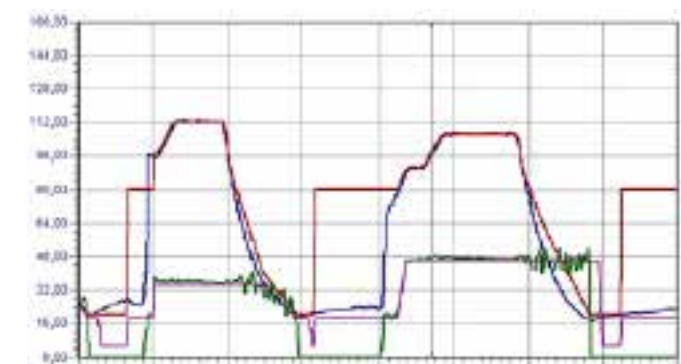
Data that is recorded at one-second intervals can, for example, be displayed in hourly, daily or weekly diagrams. (Stockmeyer image)

Creating information from data

The decisive factor for a company's productivity is the ability to create meaningful information from the large quantity of existing data.

To successfully manage the flood of data, many systems consolidate the calculated data from the very start. In doing so, however, information is inevitably lost.

The Proficy Historian server takes another path: the calculated data is compressed and requires considerably less space.

"We have all the process data on the server that we have recorded for years and have no storage space problems at all," reports Rosenski.

All the same, the iFIX HMI/SCADA visualization offers a broad range of possibilities on how the data can be displayed. Data that is recorded at one second intervals can, for example, be displayed in hourly, daily or weekly diagrams.

Compared to the past when data was still manually assessed, this method provides a major advantage in the shortened reaction times.

In addition, various alarms also immediately indicate if a system fault occurs: for instance, if a valve does not open or the temperature in a cold storage is not correct. At the same time, in compliance with the statutory directives, all production data is available in its original state even years later. Not only can the data of the individual systems be viewed, but all process data involved in a batch can be comparatively displayed. Therefore, the entire production process can be tracked at all times; as a result, the required traceability poses no problem.

Process data closes the control cycle

The new automated solution provides more functionality than process data monitoring. In addition, the new solution allows Stockmeyer to operate a practical energy management system and monitor the central building control system. An energy management system, for example, allows management to avoid expensive peak demands. If the current energy consumption is permanently monitored and if the process is well-known, regulatory measures can be initiated and, for example, a cold storage can be switched off for a specific period as long as the inside temperature remains below the prescribed value. Therefore, the process data can be used as control variables for the energy management system. At the same time, using the system allows energy to be posted to cost centers and also allows unnecessary "power guzzlers" to be detected.

The data from the process is also scheduled to be integrated in the company's ERP system over the medium-term. In this manner, the plan is to determine the future Overall Equipment Effectiveness (OEE) figures for efficiency, quality and energy with which the control cycle in the MES can be automatically closed.

"From the very beginning, we were hoping to subsequently incorporate the vertical integration of the process data into the ERP as we chose the new system," says Rosenski. *"The system has grown from the bottom upward. Everything started with the machine visualization and we have now also implemented the process control technology. The next step is to implement a meaningful MES concept,"* says Uwe Rosensk.

"Up until now, it often took us one to two working days to create such diagrams", says Rosenski. *"Using the GE Proficy software, I can now create data diagrams in the most diverse formats at the touch of a button and I immediately notice when anything gets out of control and can react immediately."*

— Uwe Rosenski, engineer responsible for the automation at Stockmeyer

Major Dairy System Upgrade Increases OEE by 15%

Customer Challenges

- Recover capacity from existing line

- Need for increased flexibility of production assets

- Process variations (waste, rework)

Results

- *15% improved OEE through visibility that provides information*

- *12% higher efficiencies for increased yield*

- *Reduced time to adapt products and processes as a result of flexible recipe management*

- *17% reduced waste and 6% reduced rework due to predictive SPC trends that provide process visibility*

Modernizing for Increased Visibility

A modern production and process data management solution, built on GE's CIMPLICITY HMI/SCADA, provided a unique combination of process control and process insight. The solution integrates control with CIMPLICITY and Proficy Historian, easily exposing key event and process data for analysis. The system collects data from a variety of old controls, including AB and Siemens. The resulting solution provides full visibility across lines including flexible manufacturing where several OEMs have equipment.

Products

- CIMPLICITY HMI/SCADA

- Proficy Historian

Higher Throughput & Quality

The producer realized value on several fronts. The prebuilt application components allowed recipe authoring to be simplified, so changes in products and processes take less time to deploy and test. Additionally, the ability to expose rich information for machine and process analysis has enabled significant capacity and yield improvements.

Cabinplant coordinates all project plan and production schedules in ROB-EX Scheduler

About Cabinplant A/S

Cabinplant A/S was founded in 1969 and employs several hundred employees. They have subsidiaries in Germany, Spain, England, and Poland. Cabinplant is a market leader within the manufacturing of complete production plants for the food industry and delivers turnkey installations worldwide.

Cabinplant

A scheduling tool for the entire company

A single order for a customer can consist of more than 100 different processing machines and transporters, etc. In the past each department had its own Excel sheet to plan their work in, and since most orders consist of complete production plants for the food industry, all departments are usually involved in solving the tasks. This meant that a lot of time and energy were spent on coordinating and updating the individual spreadsheets for each department to keep track of production and deliveries.

This task had become so demanding that Cabinplant decided to try to find a scheduling tool which could solve the overall scheduling task in one single schedule for the whole company, and which could include all production and project tasks in all departments. ROB-EX Scheduler had the features that Cabinplant demanded for their scheduling challenge.

An ambitious project

The Cabinplant team was aware that they had started a very ambitious project if they were to meet their own objectives and gather project and production schedules for all departments into a single schedule. Therefore, Cabinplant decided to have consultants from ROB-EX A/S, a GE Digital partner, on the project as advisor and project manager throughout the entire implementation process. It would ensure the best possible start and that all departments' needs were meet best possible within the standard system framework.

Cabinplant put together a project team with participants from all departments, and together with a consultant from

ROB-EX A/S they built a template model to use every time a new project is created. The model was tested on a number of selected projects, and this way the template was adjusted to match the "real" world at Cabinplant.

Therefore, when Cabinplant chose to go into operation with ROB-EX they were confident that it would work as intended, and all stakeholders had a successful experience. When you put such a comprehensive system into operation it is important that the employees who provide input to the solution also get a result at the other end, which gives relief in their daily work, e.g. in the form of updated reports and overviews they can count on and steer by.

A good follow-up tool

When the sales department submits a new order to the technical department, it is created in ROB-EX using a template project which is quickly adjusted to the current project. When the project is described in detail, the project manager from each department makes sure to get the need resources and the estimated time registered in the project schedule. Also supply agreements with suppliers are managed in the project schedule in ROB-EX.

Every employee has an overview of what tasks they are assigned on various projects that run simultaneously, and if the total workload sums up to more hours than the resource is rated for, an alarm will show in the schedule in ROB-EX.

All employees who are assigned projects regularly reports their time consumption via the time registration system in Dynamics, and the project schedule in ROB-EX are regularly updated with the actual time consumption. This way the

project managers and heads of departments can follow the progress in on-going projects. And it gives them a very good follow-up tool.

The project schedule in ROB-EX can be seen at a very general level, but it can also be folded out to multiple levels and for each level the schedule becomes more and more detailed. Cabinplant can do with one project schedule that meets all stakeholders' needs for information, ranging from the need for the big picture of the overall project to the employee who works with a single machine part in a project.

Challenges

To get an overview of all activities related to deliveries of complete process lines and a continuous and action-oriented follow-up throughout the project cycles

Solutions

- ROB-EX Planner
- ROB-EX Plus
- ROB-EX Project
- ROB-EX Integration
- ROB-EX Multi-user

Benefits

- Control of time consumption and costs throughout customer project cycles
- Projects and production gathered into one schedule

Australian brewery improves scheduling accuracy and inventory tracking

Challenges

- Difficulty adhering to scheduled quantities, over-runs and under-runs of orders in packaging

- Inventory and material consumption inaccuracies

- Coordination of changeovers and material waste

Results

- **35% reduction in product waste**

- **5% increase in packaging productivity**

- **90% decrease in finished goods holds and packaging waste**

- **Tighter schedule adherence**

By linking plant and business systems, Proficy enables more precise coordination and control.

Products
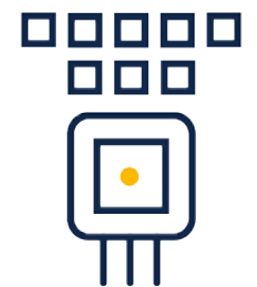
- Proficy Plant Applications

- iFIX HMI/SCADA

- Proficy Historian

- IGS

Toray Plastics (America), Inc. Optimizes Manufacturing Operational Performance with Big Data Analytics

Background

If you've ever indulged in a bag of chips or munched on a breakfast cereal bar, then you're probably more familiar with Toray Industries than you think. Toray Industries, Inc. is behind the manufacturing of many of the shiny metallized packages that protect a variety of food products, from snack food to cookies, prepared meals, candy, crackers, and granola bars. Toray Industries—headquartered in Tokyo, Japan—is the world leader in high-performance films, synthetic fibers and textiles, carbon fibers, plastics, chemicals, and pharmaceuticals. Today, the organization operates 254 facilities in 26 countries with more than 45,000 employees—with annual sales exceeding $19 billion.

Toray Plastics (America), Inc., an American based subsidiary of Toray Industries, is responsible for manufacturing the Torayfan Polypropylene Film, Lumirror Polyester Film, and Toraypef Olefin Foams across its Rhode Island and Virginia facilities. Within its facilities, Toray Plastics operates through a bi-modal approach—a combination of standard operations mixed with agile and cutting-edge techniques—that is fueled by technology. With a keen focus on lean activities, the company's strategy goes beyond the standard "mode one" of keeping a business up and running. Instead, Toray Plastics consistently strives to integrate innovation, creativity, and experimentation into all of its processes.

Keeping it fresh

The diversification of today's "food-on-demand" culture has led to an increasing need for keeping food products safe and fresh for extended periods of time—all while preserving its original flavor. Consumers expect their food products to maintain a relatively long shelf life without compromising quality. And as a result of this growing demand, Toray Plastics was faced with producing better food packaging film than ever before.

Food packaging film is composed of very unique components for protecting against oxygen and water, and producing these films is no easy task. It requires very tight production processes that are examined with the utmost scrutiny to ensure the highest quality. So, in order for Toray Plastics to meet its vision to remove waste across the organization and remain competitive, the company implemented a new integrated system that allowed it to monitor its film manufacturing much more closely to ensure exact quality standards in every unit.

Undergoing a digital transformation

Don M. Cormier, Vice President of U.S. Information Systems and Quality Assurance for Toray Plastics, knew that the company needed to change its processes in order to remain an industry leader. By embracing its bi-modal approach, Cormier geared up to accelerate innovative "mode two" through digitization. He sat down with his fellow executives to establish a holistic vision for Toray Plastics. The vision was simple—to drive extreme efficiencies out of its assets by becoming standardized, simplified, integrated, and secure. In order to make this vision possible, Cormier teamed up with various business groups within the company to conduct a robust discovery. This discovery phase was intended to reveal current hurdles each business group was facing, and to identify the gaps in information or operational siloes that caused these problems to exist.

Once these problems were identified, the hunt for the right data-driven solution began. Cormier and his team developed a criteria list to evaluate various commercial off-the-shelf MES solutions. And after performing various in-depth assessments amongst 20 vendors, GE Digital and AutomaTech, a GE partner, were chosen as the right organizations to meet Toray Plastics' needs—with Manveco providing support and implementation services during this transition.

We found that as the years went on, we were collecting more and more big data. And we were able to utilize a lot of tools from GE Digital to analyze that data and turn ourselves into an algorithmic-type organization.

Don M. Cormier, Vice President, U.S. Information Systems and Quality

Don M. Cormier, Vice President, U.S. Information Systems and Quality Assurance

Data-driven operations

Keeping high-quality film production at the heart of its operations, Toray Plastics started leveraging Proficy Plant Applications from GE Digital, part of the MES suite. As an on-premises solution, Plan Applications allowed Toray Plastics to collect real-time data directly from edge devices and assets for critical key performance indicators, as well as perform batch analyses to optimize operations. Proficy Plant Applications enabled operators to oversee manufacturing on a more granular level and reduce the production of defective film (first pass quality), which improved overall equipment effectiveness, quality, and reduced material waste, thus helping to increase efficiencies and decrease costs.

Toray Plastics also tightly integrated Proficy Plant Applications with its SAP software, which made it extremely cost effective and scalable globally. The two systems continuously pass about 30,000 pieces of information a day between one another—covering everything from inventory status to bill of materials, customer specifications, and production order status. This alignment between GE Digital and SAP allowed both systems to utilize the same number of assets and labor while significantly increasing productivity.

In addition, Toray Plastics began managing production with a "by-the-numbers" philosophy. This philosophy focuses on having accurate and visible measurements across operations to mitigate issues and allow better decision-making.

By implementing other edge solutions—such as iFIX from GE Digital and Proficy Workflow from GE Digital, Toray Plastics utilized data-driven information to gain visibility into potential production interruptions and downtime. Toray Plastics also leveraged Proficy Historian from GE Digital to optimize asset performance through its data archive and reporting capabilities. The company further developed its by-the-numbers approach by creating a downtime dashboard—which tracked each line by shift, downtime percentage, and cost of downtime—to better align plant floor metrics to executive level goals.

And it paid off. Toray Plastics yielded some big results, such as significant savings in film recovery, increase in film productivity, and improving uptime. Toray Plastics also drove significant quality improvements by decreasing the amount of time for product traceability as well as lowering film defective rate.

> "We further developed our by-the-numbers approach by creating a downtime dashboard—which tracks each line by shift, downtime percentage, and cost of downtime—to create friendly competition amongst factory operators and encourage production efficiency improvements"
>
> **Don M. Cormier, Vice President, U.S. Information Systems and Quality Assurance**

Results:

- Reduced lead time for product traceability
- Savings in film recovery
- Increased film productivity
- Improved line efficiency
- Increased uptime
- Decreased film defective rate

Moving to the next level

So, what's ahead for Toray Plastics? Chris Roy, Senior Vice President and General Manager of Toray Plastic's Torayfan Division, continues to play an instrumental role in accelerating Toray Plastic's digital transformation. He believes that continuing the momentum for improving efficiency, effectiveness, and responsiveness will help sustain the company's competitive edge in the market.

Being a digital industrial company that prides itself on innovation, Toray Plastics is looking to continue its digitization journey by leveraging artificial intelligence (AI) to transform its continuous processing operations. This will enable the company to generate more predictive analytics through placing sensors on machine assets to forecast process failures.

The company is also continuing to work with GE Digital's Advisory Services to uncover which business outcomes will be the most critical to their Industrial Internet of Things (IIoT) initiatives.

By utilizing an edge-to-cloud solution with GE's Predix, the operating system for the Industrial Internet, Toray Plastics will be able to collect condition, material, quality, and machine processing data in real-time. Capturing this data will create a high probability for correlating asset, process, and product information through machine learning and algorithms—and successful execution could reap significantly more per year to the Torayfan division's bottom line.

Proficy Plant Applications from GE Digital, part of the MES suite, has allowed Toray Plastics to maintain its high-quality control standard and keep each machine running smoothly.

"By implementing GE Digital's iFIX HMI/SCADA and Workflow products, we were able to utilize data-driven information to gain visibility into potential production interruptions and downtime. This improved visibility allowed us to identify problems and their causes quickly, and prevent mistakes from happening, which ultimately led to reduced downtime and increased productivity. GE Digital's HMI/SCADA software products provided a strong foundation for our digital transformation journey"

Don M. Cormier, Vice President, U.S. Information Systems and Quality Assurance

Toray Plastics drives production efficiencies through edge solutions within GE Digital's Proficy suite:

- iFIX provides operational visibility to enable better decision making

- Proficy Workflow drives more consistent operations with dynamic electronic formats

- Proficy Plant Applications optimizes operations and ensures product quality with real-time data

- Proficy Historian helps improve asset performance and production through data collection and aggregation

Fipros gets more through their production because they spend less time on machine setup and changes

About Fipros A/S

Fipros A/S is a subcontractor of food products. The production is highly automated and mechanized with emphasis on food safety and high quality. Fipros' primary customers are Danish food producers as well as export to Scandinavia and Germany.

Fipros A/S

Safe supplier

As a subcontractor, flexibility and reliability of supply are crucial to meet the customers' needs and wishes. Therefore, Fipros wants to be able to deliver every order at the time the customer wants — no matter how short the deadline is. Customers must be able to rely on Fipros as a reliable and safe supplier.

Fipros is ISO 22000 certified within food safety for the following product and service areas: drying, mixing, grinding, and packing of food ingredients.

Opportunity to optimize resources

Orders are created in Dynamics NAV, and when an order has been approved it is automatically exchanged with ROB-EX Scheduler, including prescription and production route. The order is displayed with the status "new" in ROB-EX, and it is scheduled immediately, most often "forward from today with limited capacity." If the order is scheduled to be ready for delivery within the customer's requested delivery date, everything is fine and nothing further is done.

On the other hand, if ROB-EX shows that the order will be done after the customer's requested delivery date, the planner immediately starts examining the possibility of optimizing resources. First, the planner explores whether they can move one or more orders in the production process to other resources not as overloaded as the first choice.

At the same time, they can see in ROB-EX how large the workload is on each resource and resource group. The objective is to handle productions within two shifts (18 hours) on weekdays. If it is not possible to optimize within this objective, they must include weekends or a third shift in order to live up to the promise of delivery to the requested time.

Great help from ROB-EX

Fipros optimizes setup and changeover times by placing production runs with the same route one after another. By doing this they can get even more through the production facilities. At the same time, they assess which production runs require minimal cleaning. This can save a lot of time, e.g. if two productions that contain the same ingredients can be run right after each other. Through tools in ROB-EX, Fipros gets help to assess all these considerations. The greatest help from ROB-EX is when a customer wants to push an order through production in a period that is already full, and all capacity is booked for other orders.

Easy to simulate consequences

When using ROB-EX Fipros can easily simulate the consequences of pushing a new order into the production schedule. Maybe the consequence will be that one or more orders cannot be finished on time. Sometimes it is possible to agree on another delivery date with a customer, and if this is not possible, they can increase capacity with more hours for human power and machines, ensuring that the order will be finished on time. "Without ROB-EX it will be completely confusing to start moving orders around without losing track. We have used ROB-EX for many years, and I cannot imagine how I would solve my job as a planner without it," says Poul Pedersen, Production Planner at Fipros.

Challenges

As subcontractor it is necessary for Fipros to be able to undertake orders when the customers want the orders produced and delivered. This demands 100% control of resources and overview of all tasks at once.

Solutions

- ROB-EX Planner
- ROB-EX Plus
- ROB-EX Integration

Benefits

- Delivery at the requested time
- Constant overview of the production

Novozymes has reduced lead times by 30% and achieved a considerable increase in productivity

About Novozymes A/S

Novozymes A/S is global market leader within the field of biotech. The division in the Danish town Kalundborg produces enzymes and microorganisms and has more than 700 different products. The site in Kalundborg is one of the world's largest and most advanced enzyme production facilities.

Novozymes

Enzymes everywhere

Enzymes for industrial utilization are found in e.g. detergent, animal feed, the production processes of bread, wine, beer and juice, and also in the treatment processes of textiles and leather. Enzymes replace traditional chemicals or additives, and make possible a reduction of water and energy consumption in many production processes. Enzymes are found inherently in all living organisms: plants and animals including human beings.

The production process

The production process where micro organisms are grown to biochemical products is in general called fermentation. The fermentation process is a biological process created by microorganisms such as yeast or bacteria, for example yeast cells that transform sugar into alcohol. After fermentation, the material undergoes a very complicated cleansing and purifying process that is divided into several steps, which are carried out in a separate purification facility. The material is liquid and undergoes a process involving between five and 12 steps with a lead time up to 170 hours. The production process varies considerably. The material consists of living yeast cells, and consequently no two batches will be identical.

Ambitions of better scheduling

Novozymes wanted to improve the scheduling of the purification processes. In general the objective was to carry out the scheduling assignments locally and to improve predictability of the process. The meant raising the level of detail. Previously only the first step in the planning process was scheduled, and therefore it was difficult to see and handle bottlenecks. The aim for Novozymes was to schedule all processes, including intermediate storage in tanks, and have a quick implementation of the solution.

The solution

Novozymes chose ROB-EX Scheduler because of these features:

- Graphic display and editing of Gantt schedule
- Linkages between process steps
- Definition of resources including capacity and allowing for flexible definitions of one or more physical plants as a scheduling resource
- Alternative production routes
- Setup and changeover time, transportation, and overlap for operations
- Feedback of start/stop directly to the schedule with visualization of consequences if operations are delayed
- Re-scheduling on the basis of new situation
- Bottleneck sorting

The orders are detail scheduled on app. 40 resources and the current schedule is distributed electronically via a ROB-EX viewer for operators in the control room.

Integration to SAP

At Novozymes ROB-EX gathers data for detail scheduling from the ERP system SAP. The exchange from SAP to ROB-EX includes order data (batch no., product no., amount, and planned start/stop), resources, and production routes (prescription). This saves double data entries and minimizes errors in data.

Improvements that are easy to spot

The biggest gain has been achieved through improvements in lead times. This has also led to better compliance with delivery times to internal customers, a reduction of work in progress, and capacity on existing equipment has been freed. Now the operators can see immediately what a delay somewhere in the process means for the rest of the production process, and how it affects the orders that are in progress — not to mention what alternatives there are to choose from when adjusting the schedule. Decisions are made faster and on a qualified basis, and employees are happy with the visual overview and clarity in the complex production.

Challenges

Establish a local detailed scheduling that could increase predictability

Solutions

- ROB-EX Planner
- ROB-EX Viewer
- ROB-EX Plus
- ROB-EX Shop Floor
- ROB-EX Integration

Benefits

- Improved lead times
- Reduced work in progress
- Freed up capacity
- Visual overview and clarity

Frozen Meat and Fish Packaging Materials Manufacturer

Building a Lean production environment with Proficy Operations Hub for visualization

Challenge: *To modernize production and information technology, including ERP, MES and scheduling*

Action

- Implement Proficy Plant Applications and ROB-EX Scheduler
- Deploy Proficy Operations Hub for centralized visualization

Result

- Lean production environment
- Modern visualization across multiple plants
- Thin client for improved performance
- Mobility for readily available information – operator and managers
- Ability to mine data for trending and analysis for Continuous Improvement and optimization
- A foundation for growth and agility with a scalable solution

Products

- Proficy Plant Applications
- Proficy Operations Hub
- Proficy Historian
- ROB-EX Scheduler

Palsgaard has a better visual overview and can plan according to capacity and constraints on equipment
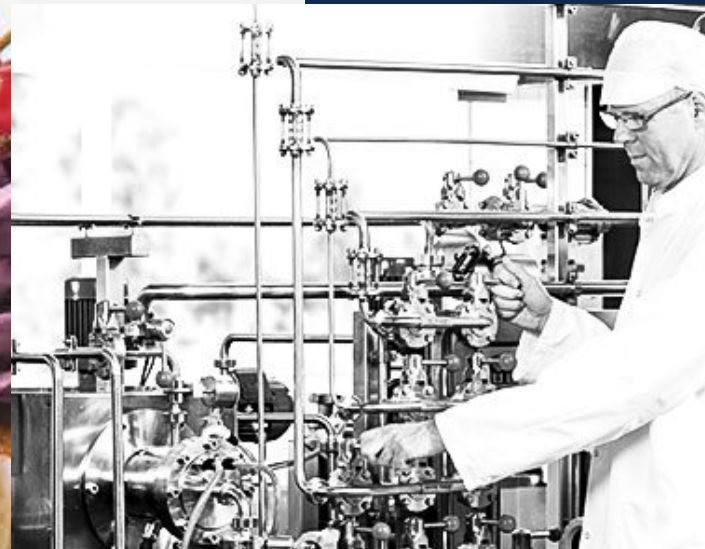
About Palsgaard A/S

Palsgaard A/S develops and produces emulsifiers and stabilizers for a wide range of food manufacturers worldwide. The company is specialized within products for bakery, confectionery, dairy, ice cream, margarine, and dressings. Additionally, they produce emulsifiers for the polymer production and cosmetics industry.

Palsgaard

Ingredient producing company with overview

Food manufacturer Palsgaard A/S with headquarters and manufacturing in Juelsminde, Denmark, is a growing company. It has 12 subsidiaries and manufacturing in the Netherlands, Mexico, and Malaysia.

Palsgaard is a healthy, growing company. The company's growth very much looks set to continue, and therefore Palsgaard needed a planning and scheduling system that provides overview and transparency. With the implementation of the planning system ROB-EX Scheduler, the production has been optimized. Among other things, it has meant a much better overview of the production processes.

Visual overview

The transition to ROB-EX Scheduler has resulted in much less use of printouts. Information and knowledge sharing are done through ROB-EX Scheduler, which is used along with the company's ERP management system.

"Today we have a much better visual overview of the plants. We can see the production in context. In the past, we operated with detached Word documents to each production unit. Now we have a complete picture on one screen," says Torben Dahl-Hansen, Supply Chain Manager at Palsgaard.

ROB-EX Scheduler has given Palsgaard a visual overview of capacities on the individual facilities. Because of this, they are able to optimize the order flow.

"Our production planners have a good overview of what each new order means for the other deliveries," says Torben Dahl-Hansen.

Shared knowledge

The enhanced sharing of information and knowledge is a major advantage of ROB-EX Scheduler, according to Toben Dahl-Hansen — also when new employees start in the company.

"Everything is organized and managed in one system with a single screen. Everyone has access to knowledge about the entire production. In this way, everyone can contribute even better to the development and improvement of processes," says Torben Dahl-Hansen.

On-going development

At Palsgaard it is crucial that they can keep developing and refining the scheduling system to match new requirements and new needs.

"It is important that we can develop the system continually. Right now, we are testing a new feature in the scheduling program, which clearly show shelf life on the products, and thereby when they need to proceed to get fewer stops in production and reduce waste," he emphasizes.

Challenges

Create a better overview of production, and obtain better information and better knowledge sharing.

Solutions

- ROB-EX Planner
- ROB-EX Viewer
- ROB-EX Plus
- ROB-EX Material
- ROB-EX Macro
- ROB-EX Series & Groups
- ROB-EX Multi-user

Benefits

- Visual overview of all facilities
- Reduced waste
- Shorter buffer time
- Better overview of delivery dates
- Adjust the individual orders to the facility's capacity and constraints

Production Scheduling in food manufacturing

Production scheduling in the food manufacturing industries entails a wide array of very specific challenges for the planner.

Manufacturers of food, medical products, chemicals etc. often operate with batches. There will be aspects of both production to order and production to stock — and food manufacturers often operate with process manufacturing. Process manufacturing demands scheduling tools that are specifically designed for this type of production. Other typical challenges facing food manufacturing companies include: production lines with many variants on each line, CIP, physical limitations in production, fluctuating demand, load balancing, and handling of possible allergens.

Food manufacturers face new and ever stricter regulations, and scheduling must take these into account.

Overview is key for Palsgaard A/S

Supply Chain Coordinator, Christina Elstrøm Jensen, at Palsgaard A/S tells us that the company has used ROB-EX for 5 years now. She highlights the overview provided and the immediate visual presentation of the consequences of all scheduled activities, as some of the greatest benefits that can be obtained by food manufacturing companies, such as Palsgaard. She continues:

"The overview provided by ROB-EX enables us to be more precise in the offering of delivery times to customers — we also save time, and as we all know, time is money. Production is much more flexible today, and we are able very quickly to determine e.g. whether we have capacity to take in rush orders or not. ROB-EX makes it much easier for us to manage

our many semi-manufactured products. We receive a lot of raw materials on trucks, and we package finished goods of a variety of shapes and forms, e.g. pellets, blocks / cakes, powder or liquids that are shipped in plastic jerrycans, drums or road tankers."

Palsgaard A/S emulsifiers and stabilisers are developed and produced for e.g. food manufacturers, bakeries, dairies and for products such as salad dressing, cosmetics etc. Palsgaards A/S has 5 planners and a total of 420 employees (of which 285 are employed in Juelsminde, Denmark).

Key challenges: shelf life, storage and allergens

Product shelf life is the primary concern in some of the production areas.

"We have deadlines that must be kept to a tee, and products that must progress through production within fixed time frames. We have restrictions relating to shelf life and storage capacity. We have storage volumes of up to 130 tonnes. With such large volumes, it is critical that we meet deadlines — should we fail to do so, the consequences are enormous," Christina Elstrøm Jensen says.

In other areas of production, the main issue is allergens. One production plant operates with as much as 6 allergenic groups that must be processed in a fixed sequence, to avoid carry-over. ROB-EX provides a full overview of the allergens — it is easy to determine which products that belong in a given allergenic group.

"Products are processed in segregated stages, and today production has a full overview of when they need to move the product from one group to the next — and when they

need to carry out extra cleaning cycles. There will always be residue left in the machines — we cannot get around this fact by simply introducing fixed sequencing. However, the consequences of carry-over are carefully monitored and controlled," Christian Elstrøm Jensen explains.

Multiple product variants and product lines

Christina Elstrøm Jensen says: "Palsgaard operates with multiple product lines, and ROB-EX makes the connections between them visible. We transport products from one production area to another, and if we fall behind schedule, we are immediately able to see the consequences of the delay for the second area. This makes it possible to make qualified decisions about how we can mitigate any delays. Some products must leave the production area within 8 hours — this makes it absolutely necessary to have a clear overview of the consequences all way round.

"We try to pre-empt problems. ROB-EX helps us predict a lot of the potential problems so that we are able to avoid downtime, changeovers and extra cleaning. It really is important to be able to predict potential problems, and to act promptly by initiating pre-emptive measures."

Christina Elstrøm Jensen further explains: "ROB-EX makes it possible to see the consequences of various scenarios, so that we can schedule activities optimally. If we predict delays, we are able to handle these more efficiently. We are also able to reallocate the employees affected by the delay. We are simply much better prepared now. Scheduling is like a jigsaw puzzle — you constantly pull the bits apart and reorganise them, in order to make them fit more neatly together."

A viewable plan: access for all relevant areas in the company

"Every morning, purchasers, planners and production have look at the plan together, to see if the scheduled activities are on track. They quickly get a full and diagrammatic overview of the status in production — and all relevant people in the company have access to the monitor.

"In production they are able to view the scheduled orders and to keep updated on changes in the plan. Our production staff are very happy with their Viewer access — now they are always fully updated on the products that are scheduled for production, and they are able to have more of a say as regards their daily work. The contributions from our production staff result in more efficient scheduling. They are able to use their experience and know-how to make suggestions for the practical execution of orders, e.g. by suggesting a change in the sequencing of operations that may save us a cleaning cycle," Christina Elstrøm Jensen says.

ROB-EX continues to feature new development, and Christina Elstrøm Jensen looks forward to utilising new features.

"The new feature 'Campaigns' makes it possible to operate with groupings of groups of products, lock the period and then finish the campaign. This means that we are able to skip a cleaning cycle, e.g. when we run products for ice cream. Finding ways of reducing the required number of cleaning cycles is a big deal in a company such as ours," Christina Elstrøm Jensen concludes.

Australian Sugar Mill Speeds Cane Processing with Faster Production Through CIMPLICITY

With its sugar cane crop size growing nearly 4X over the last 10 years and being the sole sugar cane processing factory in the area, it was crucial that this sugar mill looked for a solution to increase processing rates. To achieve this, the Australia-based mill needed to implement a new automation platform in its factory areas.

As the mill's requirements for the control tasks ranged from simple to complex, GE's CIMPLICITY HMI/SCADA solution was chosen for its ability to support various configuration techniques and processors while monitoring I/O hardware. GE was also called upon to provide required technical training and support.

Innovation That Leverages Existing Infrastructure

GE's CIMPLICITY solution provides the mill with the tools to design, implement and maintain process automation – using advanced strategies and utilities associated with distributed systems. The software provides the user interface to the control platforms and allows communication with third-party controllers, which are used for the mill's steam production, controlling all four boilers and equipment. The availability of common engineering tools and up-to-date documentation assists mill employees in providing solutions to problems.

This Australian mill intends to extend CIMPLICITY throughout its factory, further providing plant-wide optimization. This will ultimately provide faster and easier access to information from anywhere within their process.

In addition, CIMPLICITY software's open architecture enables the mill to integrate future control solutions, embracing the new technology yet providing compatibility with existing older technology. The CIMPLICITY solution, which eliminates potential problems associated with inflexible, custom applications, provides a low-cost, easy-to-use solution for the mill's incremental system growth.

Results

- *Faster production with modern automation*

- *Ability to meet significantly growing operations*

- *Phased approach drives incremental successes*

- *Easy configuration speeds implementation*

- *Flexible open architecture allows scalability as well as connectivity with legacy control systems*

- *Faster and easier access to information from anywhere*

Products

- CIMPLICITY HMI/SCADA
- Proficy Historian
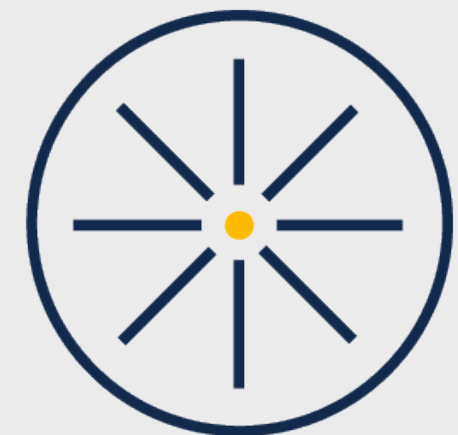
Packaged Foods Manufacturer Increases Production Capacity

Visibility into Efficiency

This packaged foods manufacturer implemented GE Digital's Proficy Historian software to collect data and provide visibility into efficiency. It also implemented Proficy Plant Applications to enable increased OEE with root-cause analysis into waste and downtime—measuring KPIs by product run and incorporating quality tests.

Value Delivered

GE's solution helped this manufacturer identify opportunities for additional capacity and understand its KPIs for increased visibility into performance. The automated solution eliminates the inefficiencies of manual processes, and the business has been able to take corrective actions against the causes of downtime and waste—significantly improving OEE and reducing costs.

Challenges

- Lack of visibility into operations

- Manual and paper-based data collection

- Difficult to analyze information

- Need to minimize downtime and waste

Results

- Increased capacity and OEE

- Reduced variances on line rates

- Higher product quality

- Cost savings without capital expenditures

Products

- Proficy Plant Applications

- iFIX HMI/SCADA

- Proficy Historian

- IGS

UK Brewery Automates Beer Production

Overview

For 150+ years, this major brewery has been producing some of the UK's best known traditional beers. The brewery upgraded their plant with a new automation solution from GE, featuring CIMPLICITY HMI/SCADA for its supervisory control system complete with touch screen control.

The system has resulted in many benefits including higher productivity, easier upgrading to meet changing production requirements, higher reliability with improved diagnostics and improved management reporting.

Modernizing Brewery Operations

This UK brewer decided to replace an older system developed over many years to control post-brewing processes such as Cleaning-in-Place, chilling, pasteurization, storage holding, bottling, filling large metal kegs and deliveries by road tanker to customers. The old system was increasingly difficult to support and upgrade to meet new production requirements.

Also, specialist support was required to maintain the system. Therefore, the company set about looking for a modern solution that would be well supported by a worldwide company both now and well into the future, easy to configure, and capable of upgrading to meet future requirements.

To find a solution, the company approached GE whose integration partner proposed a new integrated solution meeting all requirements. The resulting system allows data

integration with business systems for management reports and production schedules. The system can be switched to full manual control whenever required.

As a supervisory solution, the CIMPLICITY system monitors and controls all the valves and pumps as well as tank levels and the temperature of the holding tanks, the pasteurising and filtering processes plus final transfer to tanker loading or keg/casking processes. GE's CIMPLICITY HMI/SCADA, paired with touch screen operator interfaces, was found to be the best way to provide user-friendly control. Operators can use the CIMPLICITY touch control screen or conventional keyboard to quickly see the status of all parts of the plant and make changes to the procedures. CIMPLICITY also provided an ideal way to link the company's plant floor system into its management information system.

The status of every part of the process is displayed on a large mimic display in the control room giving a continuous update of progress. Alarms programmed into the system warn of any problems while all actions are recorded.

Following the success of the system, the brewer has already decided to extend to include existing flow and temperature measuring systems for accurate and cost-effective flow rate and temperature monitoring.

"With the GE system, we now have a very versatile system based on industry standard SCADA software from a global automation leader, so support and upgrading is no longer a problem,"

—explained the brewery's Chief Engineer

Products

• CIMPLICITY HMI/SCADA

• Proficy Historian

• IGS

Global Food and Beverage Processing and Packaging Company

AI reduces waste and downtime through insight into paper breaks

Overview

This company is a leader in food and beverage processing and packaging. With products used by millions of people, the company's mission focuses on high quality and sustainability.

Challenges

Paper breaks in production causing:

- Downtime
- Waste
- Lost production

Results

- Ability to determine root causes of paper breaks
- Digital Twin technology for analytics and continuous improvement
- More predictive and preventive operations
- Real-time monitoring and optimization
- Confidence to apply analytics and drive improvementsy

Challenge: Reducing Waste and Downtime

Always on a mission to reduce waste and drive sustainability and decarbonization, the operations team recently took their automation to the next level by learning how to employ the latest AI and machine learning technology.

The quality management leader explained that the company's web presses run a continuous roll of paper. Every time the team has a paper break, operators have to stop the machine and reload. This causes waste, downtime and lost production. They wanted to understand more about this issue with a goal of getting to zero downtime losses from it.

The team has been experiencing paper breaks about three times a week with each break averaging an hour of downtime – impacting many KPIs. They were already performing a number of Quality Control steps and monitoring parameters but didn't have a way to correlate data with sophisticated analysis.

A quality analyst on the team noted: "Production carries out simple analysis every day on problems, but every day it seemed like we were finding a different root cause. We needed a way to perform deeper, statistical analysis. This would help us find the problems in a predictive and preventive way, so we could eradicate the problem completely."

Solution: Creating a Digital Twin

The company worked with GE Digital to perform an AI evaluation of the data, using Proficy CSense and taking advantage of six hours of free analytics consulting to jumpstart the continuous improvement.

First, the team created a Digital Twin or fingerprint using data from order batches without breaks – this was the team's "good" data. Then, they compared the fingerprint against data from order batches with web breaks. They used this analysis to view the contributions of different variables during production. The team analyzed the peaks that were in the bad orders and those in the good order to understand which variables have the most effect.

The tools in Proficy CSense provided a platform for the model and analysis. The team used the plots to create a threshold and enter in Proficy CSense moving alarms and rules. Bar charts provided a way to easily visualize the variables that were having the most impact. Principal Component Analysis (PCA) simulation views showed the distance to the model for the variable data points, helping the team to see when they were getting far from the model.

Proficy CSense also provided different kinds of trend visualization – tiling view, scatter plot vs trend plot, and more, so the company could see what was going on at a particular step in the process. The consulting also covered batch statistics and techniques such as how to export brushed and non-brushed data.

Results: An AI Foundation for Improvement

The team gained insight into potential causes of paper breaks and possible solutions to help avoid paper breaks.

The quality group worked with GE Digital to analyze the parameters to understand them more and predict which ones have a greater impact on the issue.

In just six hours, the project included:

1. **Analyze:** The team constructed a Digital Twin model using data from a GOOD production run, creating a "fingerprint of good machine behavior." They then used this model to analyze the BAD production run that resulted in a paper break. Proficy CSense identified abnormal variation early in the BAD run which may have contributed to the paper break.

2. **Monitor:** It was then shown how Proficy CSense can be configured to monitor machine operations in real time to alert the operator early when abnormal variation is detected, allowing time for the operator to slow the machine down and avoid potential paper breaks and associated downtime.

The company sees a lot of potential in the analytics software. According to the quality management leader, they've seen great help and support from the GE Digital team and can now apply the software in different conditions.

Next steps include using tools such as Proficy CSense's Decision Trees, leveraging the AI networks and classifications to solve problems in live production, and creating alarms to trigger preventive action.

In six hours, the company has all of the knowledge and possibility to be independent, according to the quality analyst. They can take over the project now with confidence, continuing to deliver lower downtime and waste, which helps the company and their customers achieve greater sustainability.
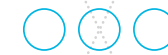
Americas Sugar and Ethanol Producer Improves Quality and Throughput

Customer Challenges:

- Increase throughput capacity and alcohol yield
- Improve existing asset efficiencies
- Improve batch efficiency and consistency
- Address increasing demand for fuel alternative

Results:

- Greater throughput and productivity
- Increased alcohol yields
- Better quality control
- Tracking of product genealogy

Products

- Proficy Plant Applications
- Proficy Historian

Monitoring and Controlling OEE

To turn sugar into ethanol, the manufacturer implemented Proficy Plant Applications software, enhancing automation with a comprehensive view of operations and managing recipes in the S88 format to protect intellectual property. The solution helped the manufacturer closely monitor and tightly control overall equipment effectiveness (OEE) of its ethanol production.

Meeting Growing Customer Demands

The solution helped improve quality control and batch consistency, linking production parameters with quality measurements. As a result, the manufacturer has been able to improve efficiency and effectiveness to meet growing customer demands for fuel alternatives, and ultimately, increase profitability.

Major Frozen Food Manufacturer

Increasing quality with visibility into manufacturing operations

Proficy Operations Hub
provides modern, mobile thin client visualization with Proficy Plant Applications and Proficy Historian.

- This major frozen food manufacturer is using Proficy Operations Hub in conjunction with its existing, enterprise-wide standard MES solution featuring Proficy Plant Applications and Proficy Historian.

- With Proficy Operations Hub installed at a pilot plant, the company is now improving the consistency of its production lines – across multiple food components that build to the final frozen product.

- The team can do on-demand analysis using Proficy Historian data, identify trends, and determine the root of any problems. Rapid Application Development tools allowed an integrator partner to quickly build new widgets.

- Following the successful pilot, this major food manufacturer is rolling Proficy Operations Hub through all of its plants.

Products

- Proficy Plant Applications
- iFIX HMI/SCADA
- Proficy Operations Hub
- Proficy Historian
- Proficy Workflow

Food packaging manufacturer complies with the general food law with Proficy software

This food packaging manufacturer in Europe is an innovative producer of foamed plastic trays. Its extensive breadth of products offers a broad range of possibilities for the individual presentation of fresh foods like meat, poultry, fish, cheese, vegetables and fruit.

The Challenge

The General Food Law enforces producers and suppliers of food to put a system in place that enables the traceability of ingredients. As a main supplier to the food industry, this company started searching for a system that could help them with this regulation and facilitated other manufacturing requirements at the same time. Better visibility into the production process by automatic capturing of progress and quality indicators were the main drivers to start searching for a manufacturing execution system. From a shortlist of four suppliers, Proficy Plant Applications was chosen for the unique concept of separating raw historian data from interpreted information.

Recording based on events

With a large installed base of GE Digital's CIMPLICITY HMI/SCADA interfaces at the production lines, this manufacturer wanted to extend this layer rather than replacing or having to restructure it. By placing local CIMPLICITY data collectors at the SCADA nodes, it was fairly easy to capture all relevant production data into one centralized Historian database. From this historian database, events were defined that indicated the start of a production order, or the downtime of a piece of equipment. At these events, the Proficy Plant Applications system is triggered to transform data into valuable information.

Synchronizing Product Specifications

At this manufacturer, SAP is used to generate the master planning and assign a bill of materials (BOM) to individual production orders. After a detailed scheduling process, these orders are downloaded to Proficy Plant Applications. Within Plant Applications the orders are assigned to the available production lines from where the queues can be monitored within the schedule overview. These queues are pushed forward to the CIMPLICITY HMI/SCADA screens, from where the orders can be started.

Integrated User Interface

The main reason the system was accepted quite rapidly by operators was that the user interface was fully integrated into the existing HMI screens at the production lines. From there, operators can select a production order, view the required bill of materials, start the order, book the usage of materials, get the recipe parameters and monitor production progress. In the background Proficy Plant Applications is recording the necessary information for traceability, quality and efficiency. This information is then used for reporting and automated bookings back to SAP.

Automated OEE Measurements

By recording the machine downtime, speed and quality, the calculation of the Overall Equipment Effectiveness (OEE) could also be fully automated. The performance is measured against a budget indicator which can be product or even equipment dependent. Management has chosen to force operators to fill in the reason for a downtime or waste event, before being able to restart the line. With predefined categories of reasons, the downtime or waste reasons can quickly be selected from the screen. The OEE is continuously calculated per production order, showing potential differences between product type, recipe settings or shifts.

A detailed analysis of the reasons can be executed from the web-based reporting portal by any authorized personnel.

Increasing Inventory Accuracy

The installation of Proficy Plant Applications allows this food packaging manufacturer to search for materials consumed instantly for reasons of traceability as defined by the General Food Law by recording the quantities consumed. Also the inventory can be adjusted automatically. The consumption of materials used to be recorded in SAP by method of back flushing, often resulting in inventory. With automatic reporting back of material consumption, the accuracy of inventory listing will go up significantly.

Platform for Continuous Improvement

The company has chosen to implement the system by themselves, which meant they had to follow a learning curve, but at the end, internal knowledge and expertise was built up to maintain and support the system. With the ease of creating new reports now, a platform has been created that can and will be used in the future for continuous improvement of the production process.

Summary

Company

Foam plastic trays manufacturer

Solutions

- Production Management

- Tracking & Tracing

- Efficiency Monitoring

- Quality Data Collection

- HMI/SCADA for operator interface and supervisory control

Products

- Proficy Plant Applications

- Proficy Historian

- CIMPLICITY HMI/SCADA

Results

- Compliance to General Food Law

- More accurate inventory listing

- Improved quality

- Improved Overall Equipment Efficiency

- Paperless production environment

Corn Syrup Producer Enjoys Sweet Rewards

CIMPLICITY HMI/SCADA Provides Plant-Wide Visualization, Diagnostics, and Analysis

They do things big in Texas.

This Lone Star State producer of corn syrup is no exception. After enjoying more than 15 years of reliable PLC performance, the company decided to take a big next step and implement a modern manufacturing solution, upgrading its automation systems—including new PLCs and a high performance SCADA—in order to reduce labor and downtime costs, reduce troubleshooting, and improve performance.

With the help of integration firm Brandon & Clark, the company implemented a plant-wide SCADA system and upgraded its network to speed up communications—without interrupting production. As a result, the company has cut equipment downtime and control-room labor costs.

The Ears Have It

While most of us think of corn syrup as the staple sweetener in our soft drinks and other sugary goodies, the experts know it can be one sticky business.

Today, the plant's process begins in the millhouse, where the corn is separated into starch and other lesser components. After soaking or steeping the corn to remove the soluble

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"In the areas we've upgraded so far, we've virtually eliminated troubleshooting. If a piece of equipment shuts down, a quick glance at one of our CIMPLICITY screens tells us exactly where to go to get things moving again."

— **Maintenance and Engineering Manager
Major Corn Syrup Manufacturer**

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portion, the corn is processed through a series of mills, screens, separators, and dryers to remove any remaining by-products that are generally used for cattle feed. Once separated, the corn starch portion is pumped into two refineries for 42% and 55% high fructose syrup production.

The 42 Refinery treats the starch slurry with enzymes that reduce the starch to dextrose, a bland sugar. The dextrose is then converted into the sweeter fructose, which is comparable in taste to the sugar produced from beets or cane. Using the 42% syrup, the 55 Refinery increases the

concentration using ion-exclusion technology. Finally, both products are pumped into rail cars and shipped for use by soft-drink, fruit-drink, and soup companies, as well as bakeries and creameries.

The Results:

- Decreased labor and downtime costs
- Greater productivity
- Less maintenance with faster troubleshooting
- Easy upgrade program for substantially reduced costs
- Centralized control room plus mobility for plant-wide system management

Pouring on the Power

Before the current upgrade, the plant controlled three of its four processing areas from separate control rooms, which placed an ever-increasing burden on personnel with regard to troubleshooting, information sharing, and communication in general.

While the plant could have upgraded its PLCs without consolidating their control rooms, plant operators would have continued to struggle with communications.

Currently monitoring approximately 6,100 I/O points, the CIMPLICITY HMI/SCADA software extends the functionality of the new PLCs and I/O blocks by providing a graphical interface with real-time monitoring and control capabilities, including database tools that log information and compile reports for all of the plant's process equipment, such as boilers, furnaces, storage tanks, and air compressors. The software's manufacturing control features also allow operators to make equipment adjustments like starting and stopping motors and conveyors and opening and closing valves. And, because of the software's object-oriented approach, the team can create screens to handle any number of operating parameters, ranging in complexity from simple status screens and alarm reports to more complex screens displaying diagnostics and analysis of the starch as it progresses through the conversion process.

Operators can also use the software interface to visually track capacity and temperature in tanks and rail cars, promptly handle any irregularities in distribution, and equalize load levels. For example, when the syrup is pumped from storage tanks into rail cars, the I/O reports all information regarding the load-out process to the PLCs, which send the data to CIMPLICITY. To date, the plant has built 25 graphical interface screens into the system with plans to add about 25 more.

The plant's new centrally located control room comprises five CIMPLICITY work-stations. Two more will be added as the project progresses, with one dedicated to the 42 Refinery and one dedicated to the load-out area. Once complete, the team anticipates the control room will reduce labor costs by consolidating supervisory tasks. Whereas, the previous multiple control room layout required ten operators per shift, one control room will only require eight, which will allow the plant to focus the additional personnel on other productivity-boosting functions.

In addition to process monitor and control functions, the team has also begun implementing the CIMPLICITY software's trending tool, which will further enhance maintenance and troubleshooting by analyzing the historical data of equipment and predicting maintenance needs and performance issues. A new Quality Control room will be built next to the new control room, providing convenient data entry and access to the information.

"Adding GE Digital CIMPLICITY automation software was a perfect fit for our data-collection and analysis needs. With all the power the upgraded PLCs offer in terms of speed and I/O communications, it was only natural for us to take that power and apply it to a broader control and networking solution. We also knew the network would give us the speed and reliability we sought, as well as the option to expand into higher level systems in the future."

— Plant's maintenance and engineering manager.

Troubleshooting down, productivity up

As the plant continues to upgrade its systems, early results are promising. *"In the areas we've upgraded so far, we've virtually eliminated troubleshooting,"* explains the maintenance and engineering manager. *"If a piece of equipment shuts down, a quick glance at one of our CIMPLICITY screens tells us exactly where to go to get things moving again."*

"Each component of the new system is incredibly easy to program," adds the electrical maintenance supervisor. *"Our programmers were able to handle the system—the PLC, I/O blocks, and CIMPLICITY software—after only three days of training. It's just that easy."*

What's more, upgrading and implementing the new SCADA system positions the plant for another ten years of productivity gains and labor and downtime cost savings, while providing a technology platform for easier upgrades and enhancements for plant expansions in the future.

# Chinese Dairy Increases Quality and Yield

Challenges

- Need to maximize yields through liquid milk processing operations

- Equipment issues that affect quality, food safety and yield

- Incomplete quality records, lacking genealogy and process data

Results

- *Reduced downtime*

- *Automated quality & genealogy reporting*

- *Reporting to validate proper execution of cleaning and sanitation procedures*
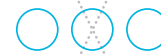
GE Digital's Solution

GE's Proficy software suite delivered comprehensive quality management alongside capabilities to identify causes of yield losses and production inefficiency. The tight integration between GE Digital's HMI/SCADA, Proficy Historian, and Proficy Plant Applications supports real-time operations management while collecting data needed to serve regulators and customers as well as internal improvement teams

Products

- CIMPLICITY HMI/SCADA

- Proficy Historian

- Proficy Plant Applications

- IGS

Value Delivered

With increased scrutiny from both consumers and government agencies, this producer is able to provide a clear quality record for the milk it receives and then extend that record with details about processing conditions, handling, etc. That same base of data has been combined with downtime and machine analytics to improve the dairy's understanding of issues that affect milk yields, allowing them to reduce solids losses – and improve profits.

Sugar Producer in Europe Maximizes Efficiency with CIMPLICITY HMI/SCADA

Next time you add sugar to your cereal or coffee, spare a thought for this large sugar producer. The company produces more than 700,000 tons of sugar. However, the sugar season is only four months long, and the company's entire output must be produced in this very short but hectic period.

This major sugar producer in Europe has more than 10 plants. During the production season, the plants work flat-out 24 hours a day, non-stop for about four months. The company's main need during this busy production period is for maximum production efficiency which means detecting and solving any production problems as quickly and efficiently as possible. The solution was a centralized control and monitoring system with distributed control that allows a small team of only four people to maintain maximum production efficiency for 10+ remote plants without traveling.

Enterprise-Wide Connectivity

The manager responsible for automation chose an existing plant as the headquarters for all maintenance services. Because in most of the plants all the automation systems are already connected to supervisory systems via a LAN, the natural evolution has been to extend the existing LAN on a geographic level. So they installed a WAN (wide area network) with this plant as the main node. As a result, all data acquired by supervisory systems as well as functional or diagnostic data from the control system is available to the maintenance personnel at the centralized location, so they can verify and know in advance the status of each plant, without the need to physically travel to each site.

Enabling Centralized Motoring and Control

All the plants are connected via the network to the main plant's control center. In each plant, the existing systems are connected to this network. The PLCs at each plant are equipped with Ethernet, and the supervisory system, based on CIMPLICITY HMI/SCADA, exchanges data with the PLCs using standard protocols. All this data is available at the control center. The use of standard technologies together with CIMPLICITY HMI/SCADA's client/server structure resulted in a distributed and fully integrated architecture without the need for any customized software development. Equally important was that this important goal was achieved directly by the company technicians without any external support.

Time Savings and Higher Efficiency

In the two years since the beginning of this project, the benefits resulting from this centralized approach are well proven, and the same philosophy is being applied to all new or revamped plants within the company. Maintenance technicians can view all screens originating from different plants using CIMPLICITY HMI/SCADA, and development tools allow them to modify both screens and configurations on every CIMPLICITY server from the main center.

Most importantly, this high level of control and monitoring has been achieved without the need to travel to plants and in real time. The overall result is a substantial time saving and an even better use of human resources. The company's 10+ plants can be maintained by only four people - thanks to the CIMPLICITY HMI/SCADA and the distributed solution.
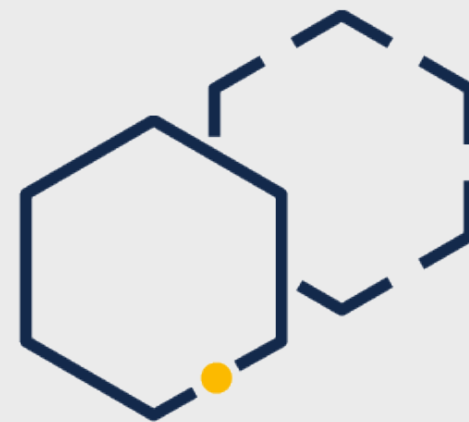
International Rice Producer Supports Global Environmental Agreements and Reduces Downtime

By-products from this international rice manufacturer's food processing is put to good use in their energy plant in Europe rather than adding further waste into the local environment. Instead the biomass is turned into useful electrical energy which is exported into the national grid system. CIMPLICITY HMI/SCADA provides the vital role of monitoring and controlling the plant, which effectively contributes to the European Community's commitment to global environmental agreements.

This company is a major international producer and supplier of rice products. It produces a wide range of rice for risottos, soups, sauces, puddings, and biscuits. It uses rice which is grown extensively across an area of Europe. The company also imports rice from Asiatic countries such as India, Pakistan and Thailand. The combined heat and power station constructed by the company is an important example of how it is possible to produce energy from alternative sources which often would be lost in other processes.

Biomass Fuel Reduces CO_2 Emissions

At the rice manufacturer's energy plant, the "fuel" comes from biomass (a term which refers to any kind of material of organic, mainly vegetable, origin) rather than traditional sources such as coal, petroleum, and natural gas. The generation of energy from the combustion of biomass, unlike the generation of energy from the combustion of fossil fuels, releases significantly less carbon dioxide into the atmosphere, and thus contributes to the global environmental agreements to reduce CO_2 emissions. The biomass used by the company is mainly derived from the waste from agricultural and food processes, such as rice husks, but also uses recovered wood, such as dead branches or industrial waste from the local wood and furniture sector.

Control and Monitoring System

The whole energy producing plant is monitored and controlled from a central control room. Three operators can view all areas of the plant using the visualization capabilities offered by CIMPLICITY HMI/SCADA. The operators use PCs in the control room, one of which acts as the main server while the other two are viewers. The PCs are connected via the network to PLCs which provide the local plant control. The system controls the grate, exhaust, boiler, water demineralization, condenser/phosphates, turbine, and more.

Thanks to the remote connection capabilities of CIMPLICITY, the plant processes can also be easily viewed away from the control room.

The plant is capable of producing electrical energy with a maximum output of approximately 6 MW. It comprises the following subsystems, overseen with monitoring and control by CIMPLICITY HMI/SCADA:

- Fuel dosing and stage system
- Steam generating boiler
- Exhaust gas treatment
- Condensation steam turbine
- Generator, transformer room and connection to the national grid
- Boiler water system demineralization system

The biomass is introduced into the furnace and completely burned. The furnace is fitted with a specially designed grate. This ensures that the slag that is produced is kept to a minimum. Also, the pollutant waste gases produced are minimized. The heat from the combustion process turns the water in the boiler into steam. This in turn is used to generate electrical energy in the turbine-generator system. The generator output voltage is 6kV. This is then converted to 15kV in the transformer room before its carefully controlled introduction to the national grid.

Plant Downtime Greatly Reduced

The managing director of the plant said, "Thanks to GE technology, our renewable and alternative-fuel power plant is able to meet the energy requirements of several thousand families, while completely respecting the environment.

"Since the GE technology has been introduced the plant downtime has been greatly reduced, and the necessary information supplied to us is available in real time thanks to CIMPLICITY."

Results

- Ability to support global environmental agreements

- Decreased downtime

- Real-time information available for better decision-making

- Remote monitoring and control for faster response

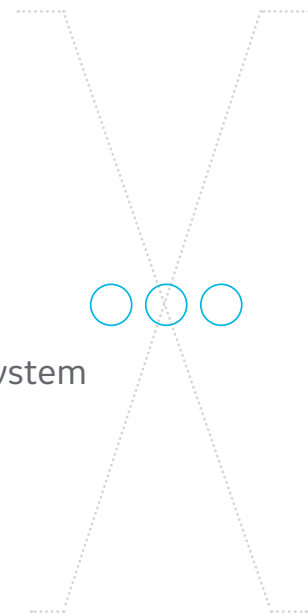- Proven plant-wide supervisory control and data acquisition

African Dairy Producer Increases Profitability

Challenges

- Milk loss and raw material costs
- Inefficient quality monitoring
- Lack of milk balancing and tracking system
- Partial process data visibility

Results

- *Reduced costs*
- *Increased margins*
- *Reliable traceability data*
- *Real-time information about quality and consumption*
- *Lower costs by leveraging existing automation infrastructure*

High Availability Solution

The producer implemented a high availability quality management and loss control system built on GE Digital's Proficy Plant Applications software. It spans across multiple production areas and leverages the existing third-party automation infrastructure to provide real-time information about milk quality and consumption.

Products

- Proficy Plant Applications
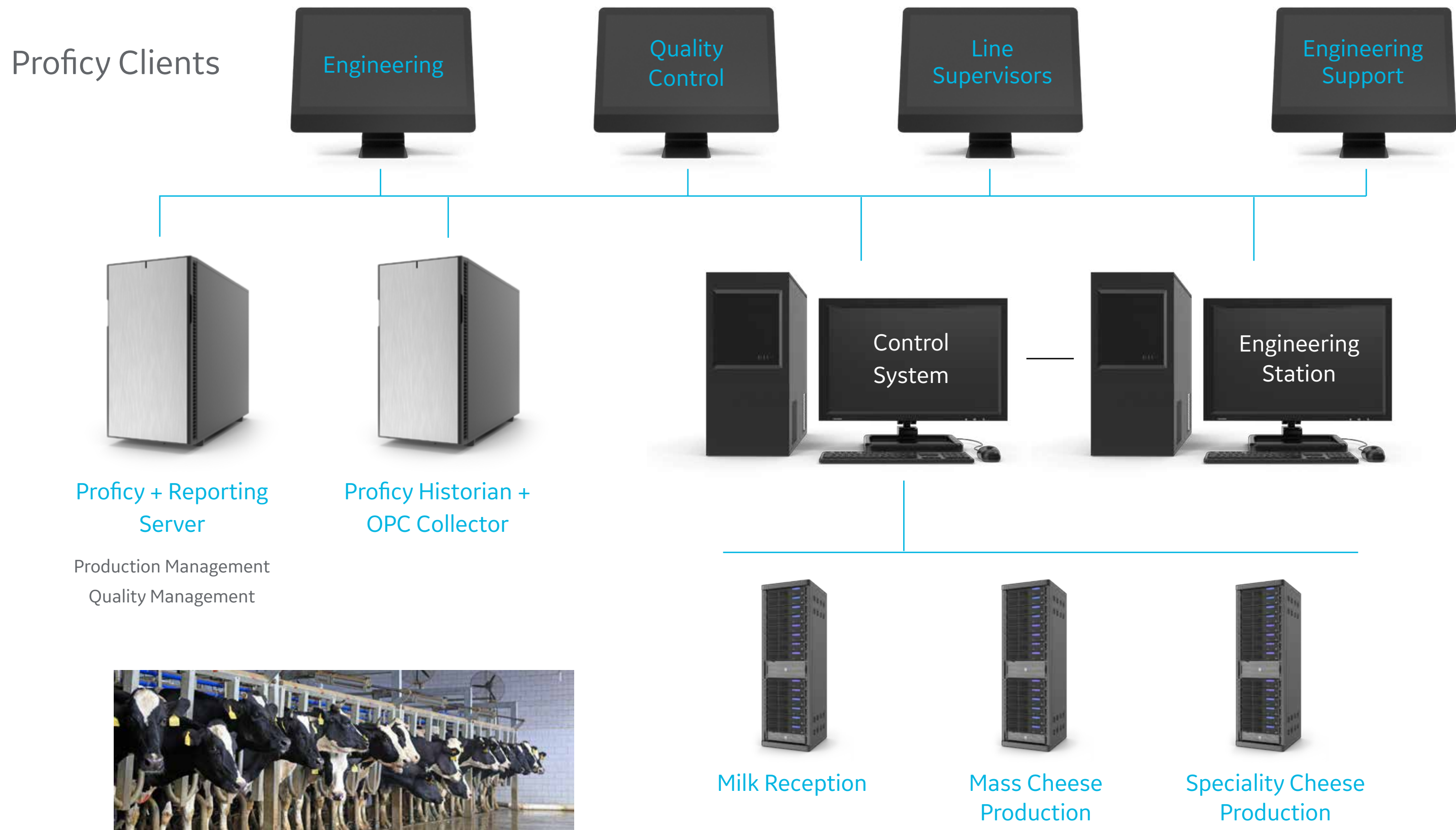- Proficy Historian

Delivering Higher Throughput and Quality

The Proficy Plant Applications software tracks milk—from delivery right through the cheese-making process—and provides the capability to develop a full mass balance of the process. With increased tracking and visibility, operators can better identify and control milk loss, thereby reducing cost and increasing margins.

African Dairy Producer

Proficy Clients

Engineering

Quality Control

Line Supervisors

Engineering Support

Proficy + Reporting Server

Proficy Historian + OPC Collector

Production Management

Quality Management

Control System

Engineering Station

Milk Reception

Mass Cheese Production

Speciality Cheese Production

European Fruit Concentrate Manufacturer increased productivity with CIMPLICITY

In its plant in Europe, this company produces concentrates and other fruit products for customers all over the world. The hygienic and top-quality processing of up to 1,000 tonnes of fruit per day requires ingenious logistics as well as a largely automated production process.

This global fruit concentrate manufacturer has grown significantly over recent years. In just a few years, from 5,000 tons of processed fruit, the yearly volume has increased steadily to reach 30,000 tons. The production capacity is expected to keep growing to more than 40,000 tons. This is as a result of a modernization project to renew the entire production plant. Rebuilding and new extensions have been completed.

World Class IT Infrastructure

As part of the new IT infrastructure, a totally new network was installed. Four DP departments, Production/ Concentrates, Production/ Fruit Processing, Laboratory and Administration, are now integrated. The system comprises 70+ workstations and monitoring stations and six servers. Process control is carried out by PLCs, and the company chose GE's CIMPLICITY HMI/SCADA software for control and monitoring.

The DP manager explained, "We have put into place a fail-safe solution. All information is gathered by the PLCs and then forwarded. CIMPLICITY HMI/SCADA is run on these servers. The level of safety is 99.5 percent." Production is maintained 24 hours a day in three shifts, so any failure of the control system would create serious problems. This alone justifies the investment in redundancy.

Optimized Monitoring and Control

During production, CIMPLICITY is used to control and monitor pasteurizing and drying processes. It is also used to monitor the water conditioning, the power generation and the water purification plant. Under the modernization project, a double boiling plant with CIMPLICITY has increased capacity. The DP manager continued,

"Above all, using and programming the system has proved much easier than with previous systems. Processes are shown 'live' and can be directly influenced or viewed by way of a touch screen. The excellent visualization allows us to use all the data effectively and eventually also to benefit from savings and improvements."

The following advantages distinguished CIMPLICITY from other control and monitoring solutions for this manufacturer:

- Comprehensive process backtracking (e.g. for special customer requirements)

- Precise batch documentation for improved cost accounting and quality assurance. Each process step can be precisely assigned to the corresponding cost center

- All data coming from the PLCs can be forwarded with very easy selection and configuration

- Easy configuration option saves (external) costs and increases flexibility

- Forwarding of alarm messages and warnings

- Process visualization is possible on any screen, not just on one. In case of a screen failure, work can be resumed immediately using the next one.

Success and Expansion

Bringing together and efficiently integrating process data, visualization, databases, redundant servers and the upgraded network was a big challenge for everyone involved, given the complexity of the project. The plant is now working to everybody's satisfaction. During production, the automatic process control and visualization is currently used for food processing only. CIMPLICITY will again be used in the next step - to automate fruit concentration.

Results

- Higher productivity with modern automation

- Redundancy supports 24/7 production for greater productivity

- Historical data for process backtracking

- Easy configuration saves time

- Faster response with alarms and warnings

- Information available where and when needed

Products

- CIMPLICITY HMI/SCADA

- Proficy Historian

Multi-Plant Beverage Manufacturer

High quality and consistency at greenfield site

Beverage manufacturer selects Proficy Operations Hub for centralized visualization for MES solution at new greenfield site and three other plants.

This North American beverage manufacturer scaled up production of its branded and private-labeled products with a new greenfield site. With quality and consistency as its primary goals, the company selected GE Digital's Proficy Plant Applications in combination with Proficy Operations Hub and Proficy Historian.

Proficy Operations Hub offered a light front-end visualization tool as a window into the company's production lines. Accessible data improves decision making – both for operators and managers – and speeds the right actions.

Additionally, GE Digital's Proficy solution gives this beverage manufacturer the foundation to scale as their growth continues and business model further evolves.

Following success at the greenfield site, the company has begun implementation at three additional plants in the US.

Products

- Proficy Plant Applications
- Proficy Operations Hub
- Proficy Historian

Major food manufacturer harvests low-hanging fruit with digital tools

The charge into modern food processing

The Process Engineering Manager at a major food manufacturer began his presentation at the GE Digital users conference with an apology for his "ridiculous" accent. But within a few minutes of his detailing the digitalization efforts he spearheads, any preconceived notions about this fruit processing guy and his funny way of speaking were squashed.

He's doing smart things.

An agricultural cooperative with nearly a dozen manufacturing plants that produces beverages and fruit snacks, this major fruit processing company has enjoyed massive growth over the past decade, now processing 200 million pounds annually, producing 75 million pounds of dried, sweetened fruit (up from 10 million pounds just a few years ago).

The Process Engineering Manager works out of a plant in the United States. *"It's the largest fruit-processing plant in the universe. At least I think that's true,"* he said with a chuckle.

Like many companies, the team is on the road to digital transformation. The plant uses iFIX from GE Digital for its HMI/SCADA. The system includes more than 70 iFIX clients and collects data from more than 50 PLCs and 300 variable frequency drives. The company also adopted GE Digital's Proficy Plant Applications software to monitor performance and capabilities with their dried fruit-packaging machines. *"We were focused on improving overall equipment effectiveness (OEE) using the software's efficiency management module,"* he explained.

To implement Proficy Plant Applications and go beyond their existing iFIX HMI/SCADA system, the fruit processor worked with a controls system integrator, who was responsible for putting together a turn-key solution with support from AutomaTech, a GE Digital partner. The manufacturer had a small implementation team responsible for guidance on the solution.

Results

- Decreased downtime

- Greater insight on machine uptime

- Improved visibility into performance metrics

- Increased cross-team collaboration

- Digital tools to facilitate year-over-year growth

Overcoming Challenges

Throughout the process, the team learned valuable lessons. Among them, cross-team input is critical.

"Looking back, we recognized how engineers weren't fully represented in the initiative," the process engineering manager said. *"And three-fourths of the team was IT who didn't understand the key outputs we wanted to measure."*

The team also learned that partial successes were, at the end of the day, still successes. *"We got hung up on trying to find a 100% solution. Trying to solve every situation. We realized we needed to start by going after low-hanging fruit."*

A Virtuous Cycle

To initiate a series of successes, the company focused on throughput—processing more pounds of fruit every day. He led weekly meetings to focus the team's efforts and maintain commitment to the strategy. He developed a model in Proficy Plant Applications to map the entire production process. He utilized the iFIX add-in to generate custom SQL reports.

And...sure enough...the data began driving improvements. The team discovered excessive downtime on conveyer lines, which was quickly remedied by changing the loading process. His team developed greater insights on machine uptime. Soon enough, a funny thing happened among coworkers—they began developing what the process engineering manager labels metric curiosity. *"They wanted*

to see the data. They wanted this enhanced visualization so operators would get more interested in their performance."

Wins prompted buy-in, which prompted more wins, which is reflected in year-over-year growth.

Currently, according to the manager, the company is processing 75 millions pounds of fruit per year. It's impossible to maintain the growth they've experienced in recent years, so the collective is looking internally to

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"Let operations know that this is a project for the whole plant, and they're going to play a role in that." The process engineering manager discussed the company's use of GE Digital tools to ramp up OEE at its plant in the United States.

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determine how to make processes more efficient courtesy of digital tools. Automated efforts mean that resources are freed up to explore ways to *"do what we do better."*

One target—modernizing electronic data capture. With the current machine-failure-monitoring system, supervisors write the cause of failure on a whiteboard, photograph the board at the end of the day, then email that image to the group. The process engineering manager knows there's a better, digital solution.

"I am excited to make that happen for our company," he said. That sounds pretty smart, no matter how you say it.

Lessons learned

Throughout the adoption and implementation process, the team learned some lessons:

- When possible, stick with an out-of-the-box solution.

- Get alignment and buy-in from stakeholders. Clarify who needs the data and what roles and responsibilities team members have related to it. *"Let operations know that this is a project for the whole plant and they're going to play a role in that."*

- Good data is critical to success. *"It sounds simple, but people often need to be trained to develop usable data."* (Avoid the "garbage in, garbage out" quandary.)

- Share the tools early in the process. Make data easily accessible.

- Don't overcomplicate the solution. *"There are times when 95% is better than trying to be 100%."*

European Margarine and Cheese Manufacturer Achieves Personalized Production Information

Data from existing systems is integrated and compiled in the Proficy Historian information system

When investing in new process systems, it is a major advantage if they can be installed on existing technologies. This major European margarine and cheese manufacturer chose Proficy Historian as the main information system for its whole factory.

The main products at the site for this global manufacturer are margarine, fresh cheese and UHT products such as a vegetarian cream alternative. The factory has invested in the Proficy Historian information system which allows large volumes of data to be handled such as temperatures and the weights of raw materials from all the production lines. Things move rapidly in the food industry and at this plant 2,800 values are logged every second.

User-friendly Presentation Tool

At the same time a Proficy web-based tool for presenting Historian data as rich information has been installed. In principle everybody in the company can use the system to obtain information and access presentations of all or parts of the factory's production.

"What really made Proficy attractive for me was the ease with which you could start up and use the system," explains the Project Manager at the plant. "Furthermore, there is an interface with Proficy that makes it easy to process information in Excel if you want to use this program. The staff can easily get information from throughout the factory and therefore don't have to waste time ringing around to the various departments."

Supplier Independent System

The manufacturer is able to keep its existing process systems which come from a variety of suppliers. This is possible because Proficy Historian supports the supplier-independent OPC standard which acts as an interpreter between the servers. "We have opted for a strategy of not having to depend on one supplier," explains the plant's Project Manager. "We chose Novotek as they were able to present a smart structure that solved our problems in a simple way. This allows us to handle large quantities of data at the same time as being flexible both in general and in detail."

Soon On Everyone's Computer

A great deal of time and effort has been put into installing and testing the system as all parts of production are to be connected together. The demands being made on reliability are great and testing has been done outside production hours. "The information system is now online and logging at full capacity," the Project Manager continues. "I use it myself and can see that everything works. Before long other users will have access to the system and eventually it will be open to everybody."

"Having general access to information doesn't violate our corporate IT policy. As the system is web-based, no new software is required – after all the majority already have a browser installed in their PC."

Company

European Margarine and Cheese Manufacturer

Solutions

- Production Management
- Information systems
- Web-based portal

Products

- Proficy Historian
- Proficy's web-based information portal

Benefits

- Implemented with existing technologies
- Excel for reporting
- Easy to use, improved data visibility and reporting
- Personalized production information available all over factory

About GE

GE (NYSE: GE) is the world's Digital Industrial Company, transforming industry with software-defined machines and solutions that are connected, responsive and predictive. GE is organized around a global exchange of knowledge, the "GE Store," through which each business shares and accesses the same technology, markets, structure and intellect. Each invention further fuels innovation and application across our industrial sectors. With people, services, technology and scale, GE delivers better outcomes for customers by speaking the language of industry.

Contact Information

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