GE VERNOVA

IMPROVING PROCESS TRANSPARENCY IN FOOD AND BEVERAGE MANUFACTURING

Achieving a new level of automated operational excellence

HOW DIGITALIZATION MINIMIZES THE RISK OF RECALL

Food and Beverage consumer packaged goods (F&B/CPG) must have deep knowledge about what is occurring on their plant floor in order to effectively utilize their capacity to manage their tight margins. In today's manufacturing environment, traceability is imperative for avoiding and minimizing quality issues that can result in product recalls and harm to the brand equity.

Even with detailed HACCP (hazard analysis critical control point) procedures and SOPs (standard operating procedures) in place, it can be difficult to monitor compliance. Production processes may not be fully documented and can include extra steps and resources. As such, the processes are difficult to track and trace, so they may not adapt to changing business needs.

Electronic work process management can greatly improve traceability by digitizing and documenting both manual and automated processes—and ensuring compliance with HACCP procedures and SOPs. Electronic work process management captures manual data entry on the plant floor and connects it with equipment, people, and systems. F&B/CPG manufacturers can track manual and automated processes in real time, capturing data and creating a critical infrastructure for taking immediate corrective action.

In the event of a recall, work process management enables the availability of historic production data on batches/lots, equipment set up, validated calibrations, operators, and more. With it, companies can minimize the scope of a recall, or minimize the possibility of having a recall in the first place.

NEW FDA REGULATION

In January 2023, FDA announced a final rule on Requirements for Additional Traceability Records for Certain Foods (Food Traceability Final Rule) that establishes traceability recordkeeping requirements, beyond those in existing regulations, for persons who manufacture, process, pack, or hold foods included on the Food Traceability List (FTL).

This new food traceability regulation applies only to a small set of higher-risk food products (see list of products on the right). However, this regulation will likely set a standard that would need to be met by all food supply chain partners even if many food products do not need to comply with the new FDA traceability rule.

The new requirements mandate identification and rapid removal of potentially contaminated food from the market, resulting in fewer foodborne illnesses and/or deaths, according to FDA. Companies subject to the rule must maintain records containing key data elements (KDEs) associated with specific critical tracking events (CTEs). They must provide information to FDA within 24 hours or within a time to which FDA has agreed.

The final rule aligns with current industry best practices and covers domestic as well as foreign firms producing food for U.S. consumption in the entire food supply chain. Because the ruling requires entities to share information with partners in their supply chains, FDA says the most efficient way to implement it is to have all those subject to the requirements in compliance by the same date: January 20, 2026.

FDA's new food traceability list includes:

- Various cheese products

- Tomatoes

- Shell eggs

- Tropical tree fruits

- Nut butters

- Fresh-cut fruits

- Cucumbers

- Vegetables other than leafy greens

- Herbs, leafy greens

- Finfish

- Melons

- Crustaceans

- Peppers

- Molluscan shellfish and bivalves

- Sprouts

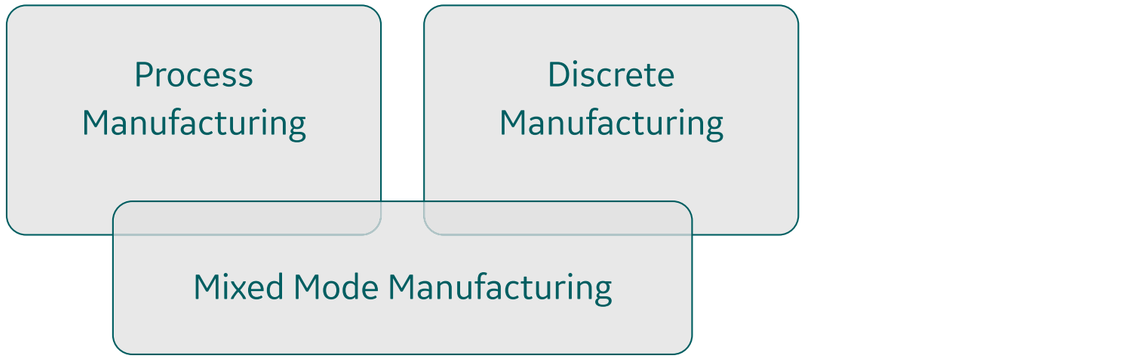
- Ready-to-eat deli salads

For more details about the food products included, visit https://www.fda.gov/food/food-safety-modernization-act-fsma/food-traceability-list

End-to-end transparency with Proficy Smart Factory– *With Proficy Smart Factory software, F&B/CPG companies can accurately document what happened during all phases of production to ensure compliance with new and existing regulations and use this data for continuous process improvement.*

In addition, the software provides:

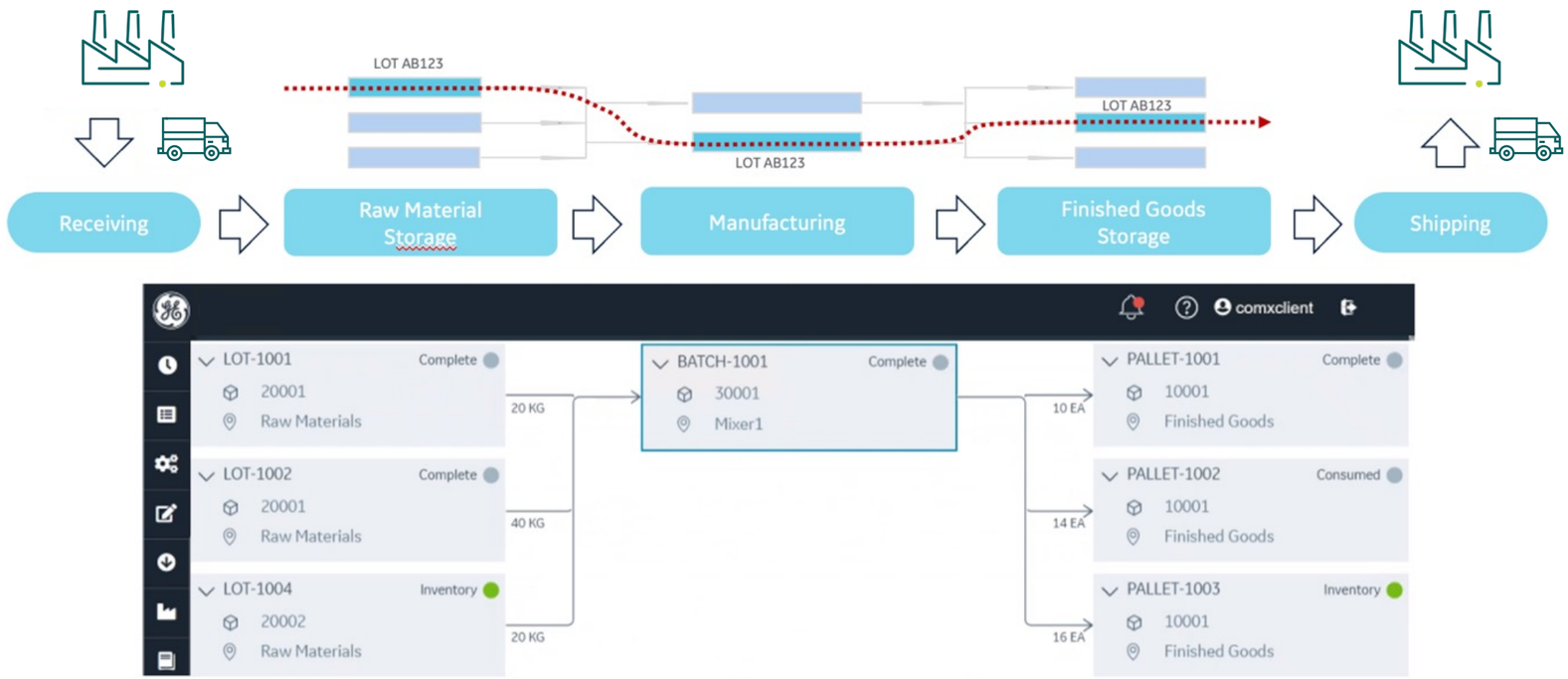
- Holistic data collection and storage
- A structured model – data in context (batch, product type, grade, etc.)
- Enforced digitized work processes/SOPs
- A complete collection of relevant data (for operational technology/information technology)



Inventory and genealogy –
Accurately document what happened during all phases of production

To meet traceability requirements, it is important to have full knowledge of the origin and quantities of the materials flowing through the system, along with precise knowledge of when these materials were used in the process.

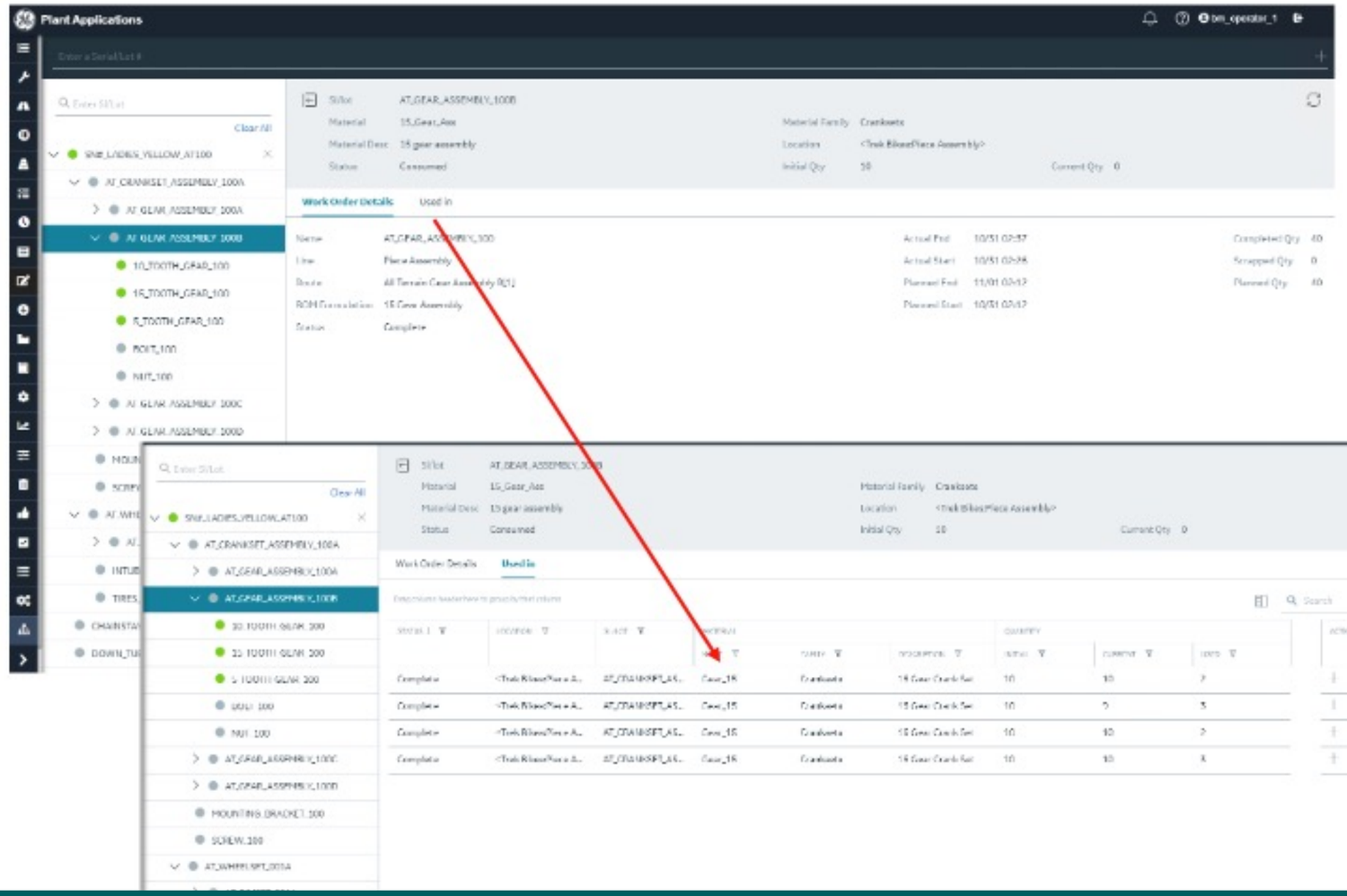
Detailed documentation of material usage is particularly important when one lot of ingredients can flow to multiple batching systems over an extended period of production.



Proficy Smart Factory

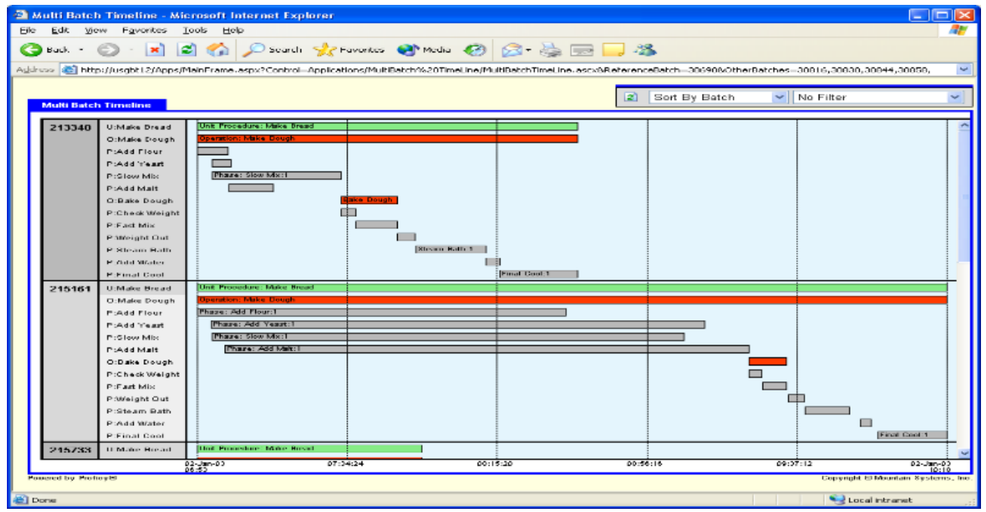
Genealogy (tabular)

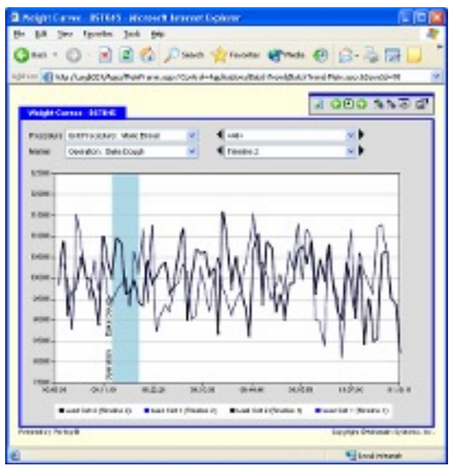
- View genealogy links for serials/lots/batches with complete parent/child hierarchies represented
- View details of each link (lot/serial) and where and when it is used

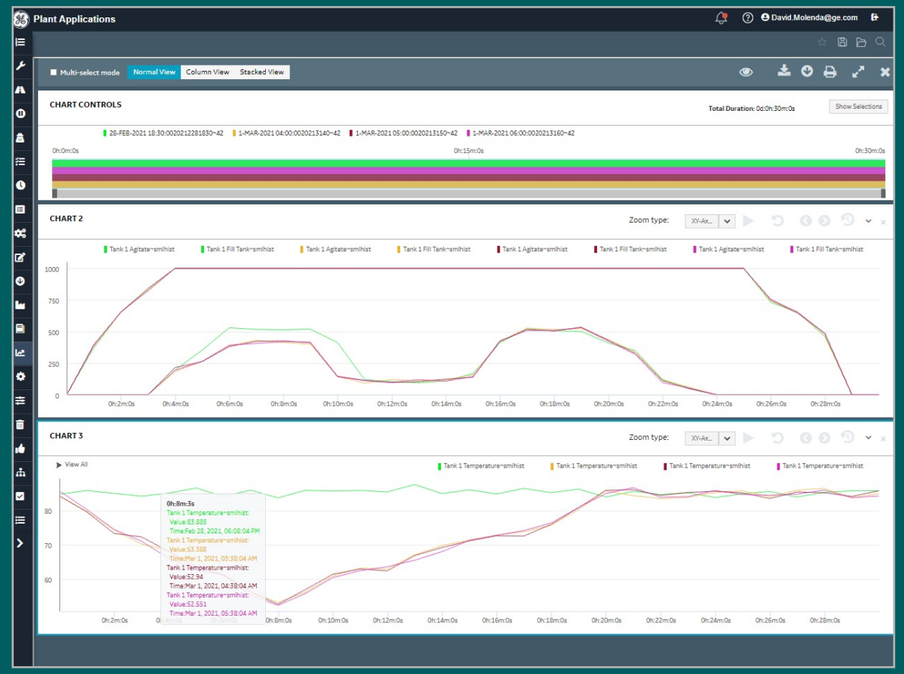


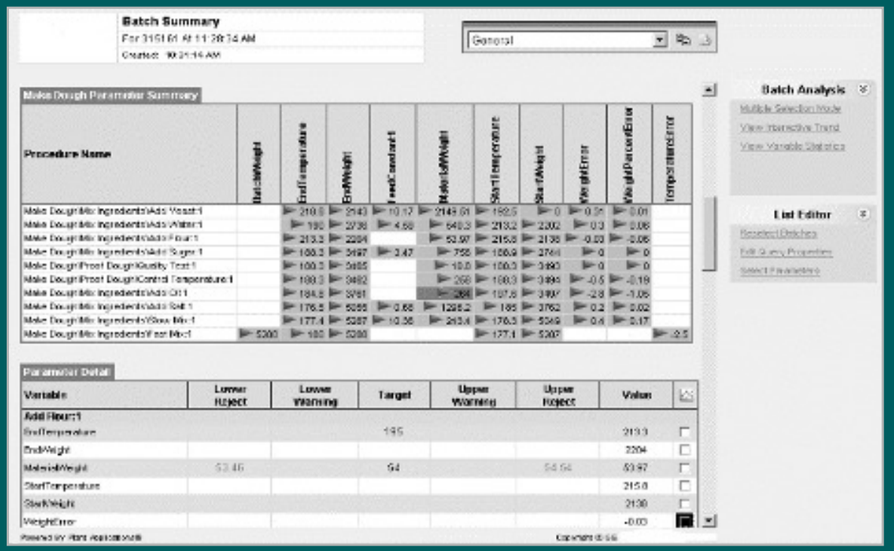
Batch analysis

- Provides batch analysis and reporting according to ISA88*
- Generates electronic batch records
- Adds to both new and existing systems
- Analyzes scheduled and completed batches









*https://www.isa.org/standards-and-publications/isa-standards/isa-standards-committees/isa88

POWERFUL SOLUTIONS FOR THE PLANT FLOOR

Proficy Smart Factory MES is used by CPGs for its ability to track data in batch operations, because batches can be tracked as work orders with a set of operations. At this operational level, all sorts of granular data can be collected.

For example, data that requires e-signatures, verification, validation, machine data, equipment, data, manual data, or all of these data combinations, can be captured, which is a powerful tool. Other solutions on the market typically have separate ways of capturing automated data and manual data. Proficy Smart Factory brings all the data together.

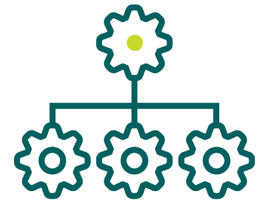
Data is sent directly to the operator in real time for manual entry changes or information they need on the machine interface. The software brings work to the operator as activities in an inbox, where they can determine whether or not to take action.

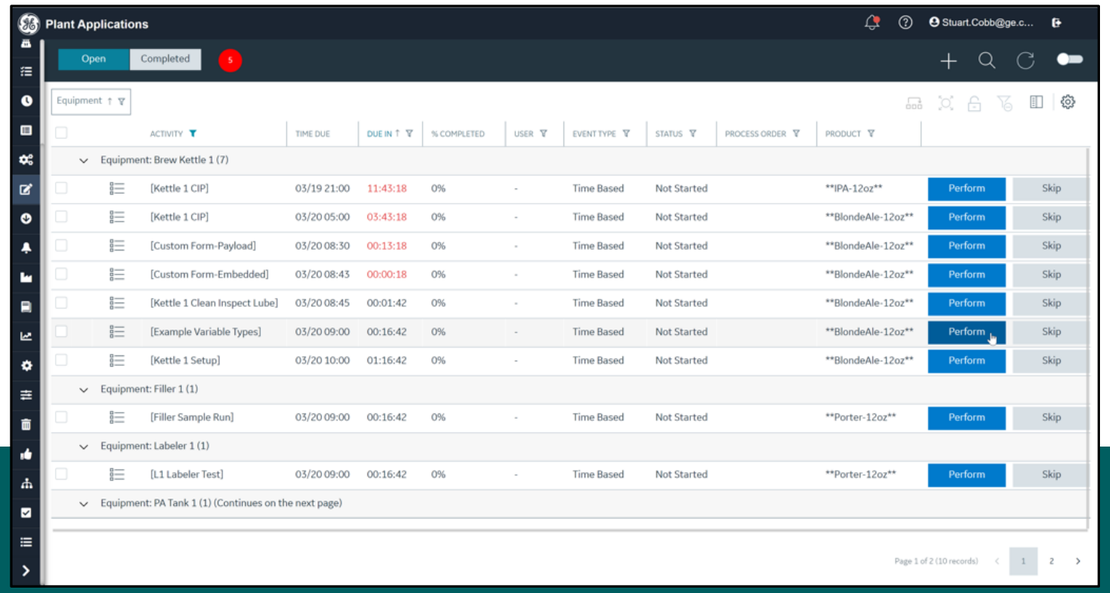
A supervisor or process engineer sends work to the operational level versus an operator being handed shift information on paper. This new way of pushing work down to the plant floor enforces business process rules associated with food safety and regulations, for example. If processes are not compliant, the system flags it, and operators don't have to worry about flagging it themselves.

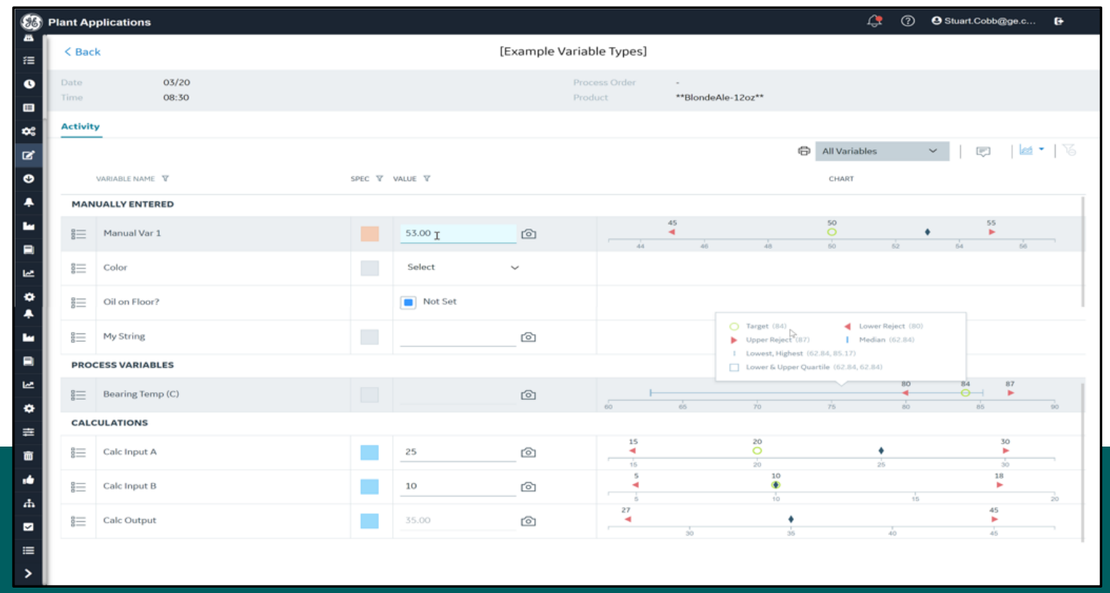
An activity consists of essentially data elements, or data that needs to be captured as part of that work. That data could be automated, such as an oven temperature, or manual where an operator is removing a thermocouple, checking the temperature, and then manually entering the reading.

Proficy Smart Factory also provides specification management that can be applied to any part of that data – warnings, rejects, or user limits, for example. Operators can also be alerted when a process is out of specification or when work is overdue.

The software helps keep processes and operators in compliance. Operator actions are tracked and recorded, and e-signatures are captured where applicable. More importantly, the system checks to see if work is performed currently. At the same time, if the data value exceeds a compliance or spec limit, alerts and escalation flags can be deployed.

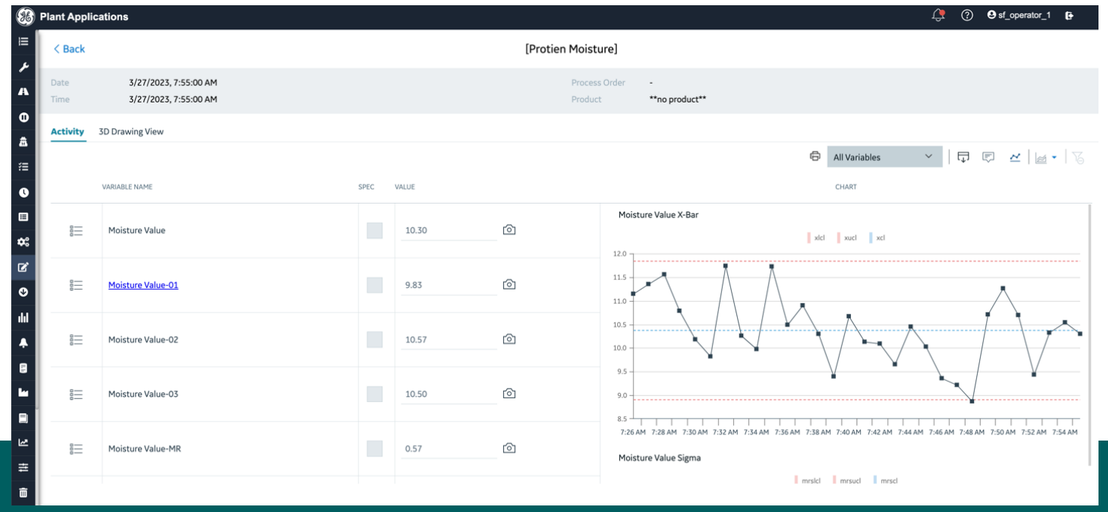


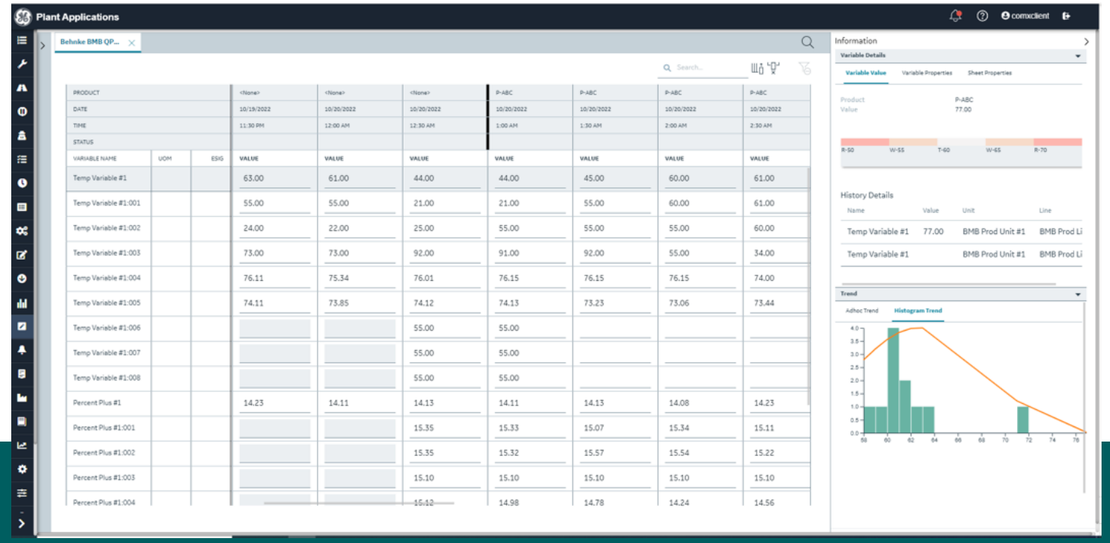




WORKFORCE MANAGEMENT

The last few years have triggered a major labor challenge for F&B / CPG companies. Labor shortages have been reported across multiple industries, especially skilled labor.1 The arrival of COVID made it even harder for manufacturers to fill these gaps with high cost of training temporary workers who were brought in to replace sick workers. Additionally, operators had to maintain safe distances while on the floor and not share devices or stations due to safety protocols. Transfer of knowledge from a skilled to a non-skilled labor force has been challenging to say the least. One way to manage or effectively use the temporary labor force is by breaking down work elements into tasks or smaller work elements, simplify the decision making process for this work force and by providing a mobile friendly user experience, thus easing the transition to using systems without having to go through a steep learning curve. In Proficy Smart Factory MES, this is achieved via Activities. As explained earlier, Activities are a great way for plant personnel to organize work, especially when it comes to data collection, compliance and providing work instructions. Activities can collect both automated and manual data elements in the context of the work to be performed. Example a quality check, giving manufacturers the opportunity to automate the data collection process and simplify it for operators to collect data manually where there is no alternative to automation. Work instructions can be provided via simple line based instructions asking operators to acknowledge or complete PDFs or other graphical views all within the activity for the operator to access. Additionally, the entire user interface for all Apps within Proficy Smart Factory was designed to be mobile friendly. No matter the device or form factor, the App display adapts to the device and allows an easy transition for operators to an easy to use user interface that supports touch and utilizes mobile tools like the camera to capture pictures and even barcodes. With analytics like SPC and alerts built into the app, it allows the operator to visualize the results of his work immediately and take remedial action if required or call for help. The software also provides an Operator Log for operators to share information in the form of log entries and handoffs with their fellow operators or experts to seek advice or help. The tool also allows the operators to tag these notes to specific Acitvities (work) or other events like downtime to drive a conversation around the entry from fellow team members. With mobile integration, operators can easily utilize the camera function to capture videos, capture images and annote them and attach any relevant files to the entry. This allows operators to share knowledge and drive a continuous improvement culture.





1 - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7646642/

FARM TO FORK TRACEABILITY

The concept of farm to fork in the food and beverage industry continues to be a priority for consumers. It goes beyond just your company's suppliers, but to your suppliers' suppliers. In addition to the food safety aspect, consumers want to know where ingredients are sourced, and if the sources are sustainable or non-GMO, for example. Manufacturers must have certificates of analysis (COAs) to prove these product attributes.

Raw material traceability must go down further than one or two nodes in the supply chain. At the same time, there is onus on your suppliers to provide data that ties back to your product because the consumer wants this information, and it can be required for regulatory compliance.

From a traceability standpoint, the gold standard has been one forward and one back. Or from a manufacturing facility's point of view, where did I ship product, and where did the material I used come from?

As a manufacturer, you might not be the root cause of a recall problem. The problem may have occurred in the cold chain prior to your facility or in the farmer's field, which software tools can you help you define where the problem originated. But the tool will only work if the right data is already in the system to solve the problem. At the end of the day, it is the manufacturer that defines what data is captured.

CASE STUDY:

Technology that protects your brand image

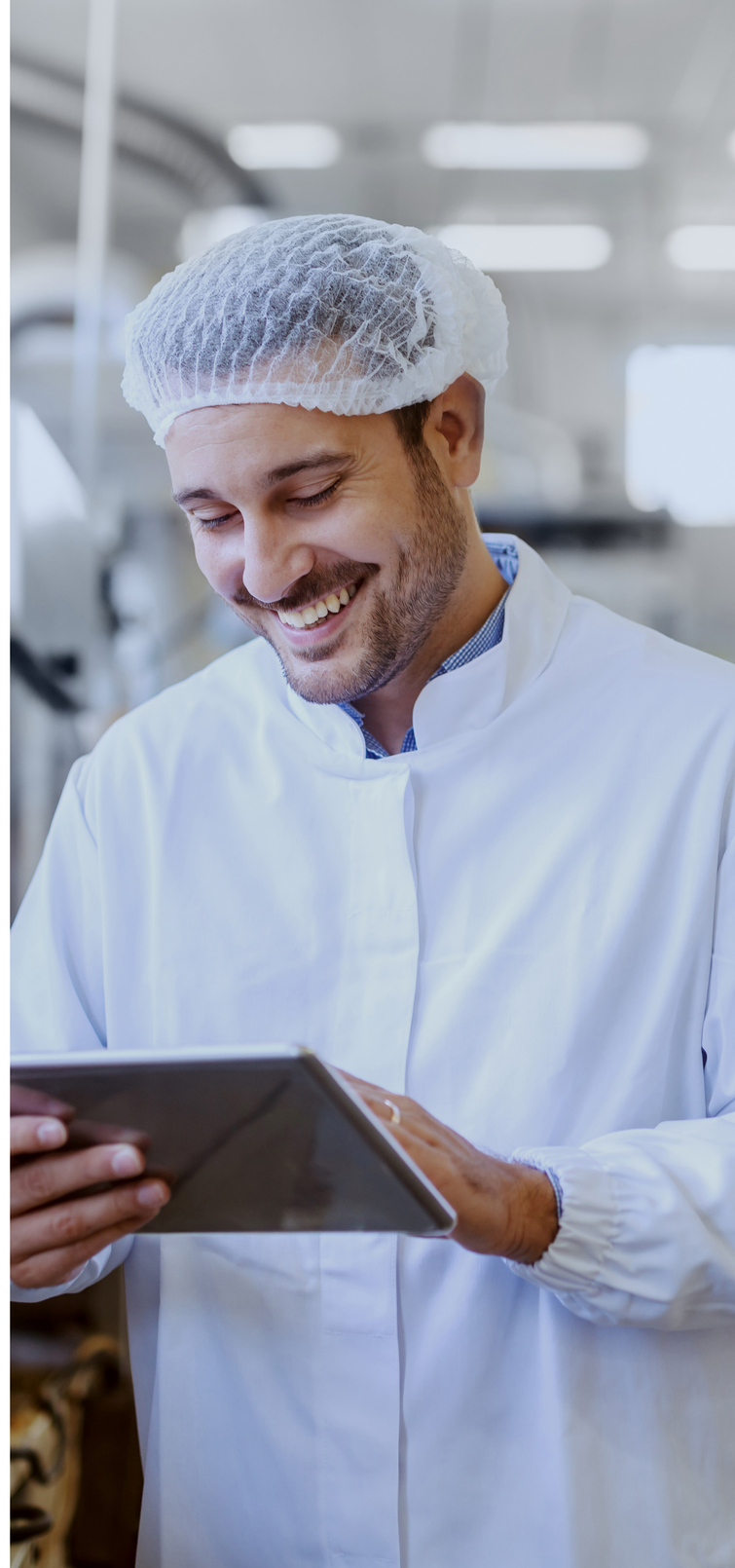
A large CPG company carefully watched as its competitor was receiving consumer complaints about a product. The CPG company used GE Vernova's Proficy Manufacturing Data Cloud (MDC) to help them analyse potential similar issues since they share raw material suppliers with their competitor.

MDC is a cloud based solution that pulls manufacturing data from all sites across the enterprise. It aggregates and "flattens" the manufacturing data making it much easier to perform deep and fast analysis. Based on the complaints at the competitor's operations, the CPG company queried its plants where the exact product it competed with was made just to ensure that complaints were not surfacing for its products.

With a simple and easy to build report, this CPG company tracked its plants making that particular product, down to the lines it was produced on and which batches ran during the time period when the competitor company began getting complaints. They were able to quickly confirm that the consumer complaints were likely unique to their competitor's products and were not of a broader industry concern.

If they ever ran into this issue, MDC can quickly locate the affected lots, where they were made, what day, what machine, what plant, what region or country, etc. The trace could be completed in minutes.

This powerful example shows how GE Vernova solutions enable high levels of tracking and genealogy. The CPG company was able to take proactive traceability steps to protect its brand image if a similar complaint was ever made about its product.



SYNCHRONIZE YOUR DATA AND OPERATIONS

Proficy Orchestration Hub solves the problem of product data and variance in product data across multiple systems. Sometimes when you look at your MES, PLM, or ERP system, the product specs may not match. Orchestration Hub notifies the plants of product source data variances from systems like ERP/PLM, identifies the elements of variances and allows for a routine synchronization between the plant floor systems and the source data systems. If an out of spec issue occurs, you now can synchronize it across all systems.

Proficy Orchestration Hub can be used at the enterprise and plant floor level and connects to Proficy Plant Applications to provide visibility and identify any discrepancies between systems. If a discrepancy is identified, the data is flagged for product variance. Manufacturers can then run reports to see how often the variance occurs or how often operating instructions are out of sync.

By improving process transparency, F&B/CPG companies can precisely document all phases of the production to ensure compliance with new and existing regulations and use this data for ongoing process improvement.

For more information visit: https://www.gevernova.com

With Proficy Orchestration Hub, product synchronization can occur across all systems with a click of a button.

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ABOUT GE VERNOVA'S PROFICY® SOFTWARE & SERVICES

GE Vernova's Proficy® Software & Services empowers teams, illuminating the path to a greener, more profitable future. Our proven industrial software accelerates innovation, enables connected workers, and operationalizes sustainability. We're driving measurable progress for over 20,000 diverse customers around the world.
The Proficy portfolio includes cloud-based and on-prem HMI/SCADA, MES, industrial data management, and analytics. Our software solves the toughest industrial challenges and is used in applications such as discrete, hybrid, and continuous manufacturing; utilities automation; metro transit; and much more. Proficy offers architecture flexibility including single machines, remote substations, and complex, distributed networks that span multiple factories and geographies.

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