



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 Plant Applications from GE Digital, part of the Brilliant Manufacturing suite. As an on-premises solution, Plant 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. 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 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 Workflow from GE Digital, part of the HMI/SCADA suite—Toray Plastics utilized data-driven information to gain visibility into potential production interruptions and downtime. Toray Plastics also leveraged 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.

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

“By implementing GE Digital's HMI/SCADA iFIX 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 Brilliant Manufacturing suite:

- iFIX provides operational visibility to enable better decision making
- Workflow drives more consistent operations with dynamic electronic formats
- Plant Applications optimizes operations and ensures product quality with real-time data
- Historian helps improve asset performance and production through data collection and aggregation





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

Americas: 1-800-322-3616 or 1-434-978-5100

Global regional phone numbers are available on our web site.

www.ge.com/digital/products/ifix

