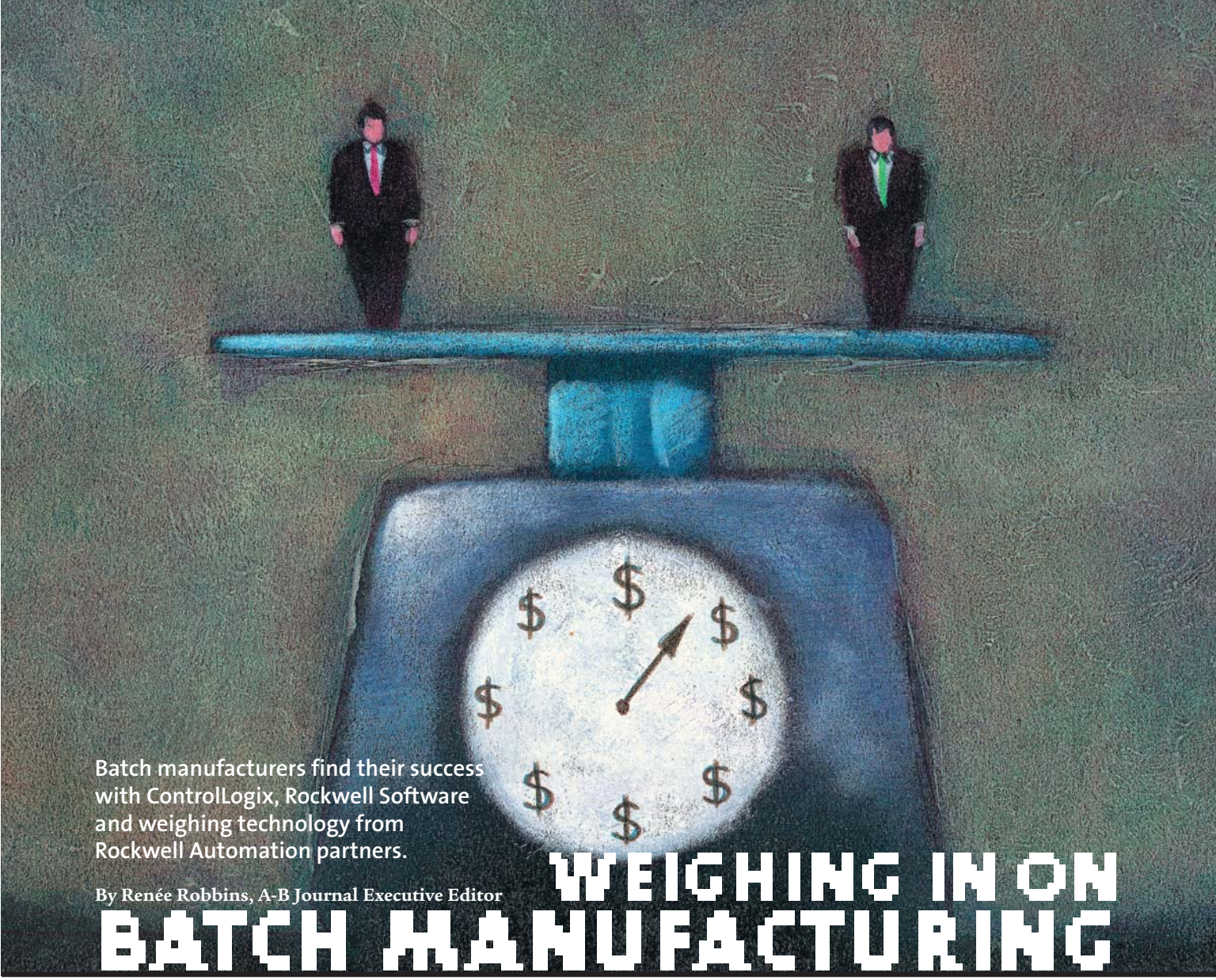

Batch manufacturers find their success with ControlLogix, Rockwell Software and weighing technology from Rockwell Automation partners.

By Renée Robbins, A-B Journal Executive Editor

WEIGHING IN ON BATCH MANUFACTURING

Obsession with weight seems to be a disease of modern industrial societies. But in industrial environments — especially those where batch processing is the order of the day — accurate weight is about much more than carbs in a Big Mac. In batch manufacturing, precise weighing and measuring means production-line efficiency, product consistency and, ultimately, customer satisfaction and profit.

Armed with technology from Rockwell Automation and its partners in weighing systems, batch processors such as cream and lotion manufacturers and soap makers maintain their product quality and consistency, improve their process efficiency and positively affect their bottom lines.

The Cream of the Crop

A privately held manufacturer of leading bath and body creams, Coty US recently embarked on a $6.25 million project that consolidated its cream processing operations into a single 906,000 sq. ft. facility in Sanford, N.C. The consolidation aimed to drive down costs, increase production capacity and improve product quality and consistency.

Coty contacted Geometric Controls, Inc. (GCI), a system integrator located in Bethlehem, Pa., to explore potential in-house cream processing solutions. GCI proposed implementing a three-stage production process — receiving, pre-weighing and compounding — with Rockwell Automation products and customized software from GCI providing the technology backbone.

"We've been working with Rockwell Automation products for more than 15 years," said Eric Roller, chief technology officer, GCI. "Any time we work on a project involving machine

>> Speed and Repeatability Too

Measuring the weight of ingredients as they are transferred is one way to use weighing technology to improve batch operations. Batching and filling rely heavily on the speed and repeatability with which material is transferred for each recipe executed. Every transfer requires precise cut-off control over valves, screw feeders or pumps, as cutoff control greatly influences a manufacturing plant's bottom line.

When Cincinnati-based Procter & Gamble (P&G) needed a more streamlined solution to better control the rapid transfer of materials such as detergent, liquids and other products into containers, it partnered with Rockwell Automation Encompass Partner Mettler Toledo. The result was QiMPACT (Qi), a material transfer control strategy for batch, blending and filling operations. Qi combines Mettler Toledo hardware and software with P&G's predictive adaptive control (PAC) technology to gain tighter control over the material transfer (ingredient addition) component of P & G's batch, blending and filling operations.

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At the heart of the Qi material transfer control strategy is the QiMPACT matroller (material transfer controller) embedded with predictive adaptive control algorithms. Using the PAC technology, the matroller measures the weight and flow rate of a material at periodic points and then builds a mathematical model of the process.

The material transfer control system can predict the exact moment material cut off needs to occur during the transfer. Because cut off is determined in advance, there is no need to slow the batching and filling process to control normal process variability. Transfers can be executed using simple and fast on-off control, rather than the complex dribble feed control typically used.

The Qi strategy has produced tangible benefits for P & G. "Over time, P&G has been able to increase manufacturing input by 30 percent, while increasing cut-off accuracy by 90 percent over previous systems," says Mettler Toledo Qi Business Development Manager, Rodger Jeffery.

Mettler Toledo:
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control, we look to Rockwell Automation to provide the solution. The company's integrated architecture and ability to employ batch mobility and standardization in its products through ISA S88 standards made it a natural fit for Coty US."

Coty US and GCI worked together to devise an efficient production process. In the receiving stage, raw materials are shipped directly to Sanford. Once at the plant, in-house laboratory engineers conduct their own testing and sampling to ensure top quality, and Coty US keeps track of the inventory in a customized database built by GCI.

"GCI developed an advanced and highly flexible receiving system that integrates with our Oracle enterprise manufacturing system and in-house labs," said Joe Kennedy, director of application development, Coty US Inc. "The customized database allows us to easily access material information and make intelligent manufacturing decisions."

After lab acceptance, raw materials are made available for the preweighing stage. At this point, the raw materials stay in storage until the Oracle enterprise manufactur-

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ing system generates a work order and bill of materials.

Once a work order is initiated, Oracle sends the bill of materials and work order via an Ethernet network to a GCI-customized pre-weigh software application. This application scales the work orders and bill of materials for production. Ingredient weight instructions are then passed to the pre-weigh operators. As the ingredients are weighed, the pre-weigh software application generates bar code labels for the ingredient containers.

Production is up 500 percent. In a 24-hour period, Coty US can process up to 60,000 kilos of product.

Once filled and labeled, these containers are placed on a pallet for the specific work order and brought to the processing mezzanine where six kettles perform compounding, or cream manufacturing. The pre-weighing system provides Coty US with complete control over what goes into a batch.

After the ingredients are pre-weighed, the weight data is made available to Rockwell Software RSView32 human-machine interface software. RSView32 shares this data with a Rockwell Software RSBizWare Batch batch management server, allowing operators to view kettle availability and make intelligent batching decisions.

The batch management software manages the recipes as well as the kettle heating, cooling, mixing and blending. After the operator selects a kettle, the RSBizWare eProcedure software module initiates each process phase. EProcedure uses a Web-based interface to sequence and document manufacturing operations and walks the operator through recipe instructions to ensure materials are added accurately to their designated kettle. Operators scan the ingredient container bar codes, enabling the batch management software to monitor

>> Weigh Scale Module for CompactLogix, MicroLogix 1500

Encompass Partner Hardy Instruments, San Diego, Calif., recently introduced a CompactLogix weigh scale module, the HI 1769-WS. This single-channel PLC-style weigh scale module is optimized for use with Allen-Bradley MicroLogix 1500 and CompactLogix controllers. Hardy Instruments makes a variety of scales, scale controllers and weighing modules for use with Allen-Bradley and Rockwell Software brand hardware and software.

The new module reads and conditions weight and diagnostic data supplied by strain gauge load sensors or scale load cells and communicates this data over an integrated backplane to a CompactLogix or MicroLogix 1500 processor. The HI 1769-WS system needs no external stand-alone scale instrument with a wired communications link to the PLC, thereby reducing installation costs. The module also includes Hardy Instruments' core technologies:

>> Waversaver eliminates the effects of vibration, providing a stable weight display

>> C2 provides electronic calibration without the need for test weights

>> The Integrated Technician system provides diagnostics and troubleshooting techniques.

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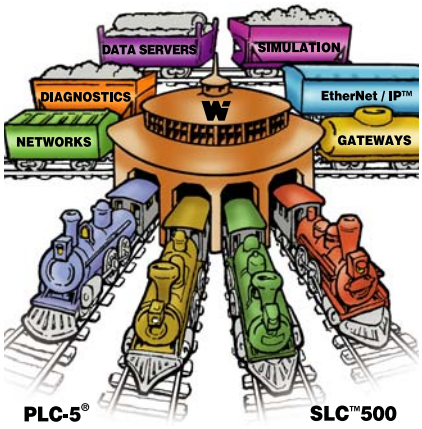

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Rice Lake	Circle 615	Weighing Indicators
Vishay BLH	Circle 616	Gate-Weigh Controller Process Weighing Indicators/Transmitters

material weight and correlate it to the RSView32 weight data — ensuring batch consistency.

Coty US uses an Allen-Bradley ControlLogix controller for running batch phases and pumping the product directly from the kettles to three high-speed tube-filling lines and three high-speed bottle-filling lines. This has sped up the operation and eliminated operator downtime, since workers no longer have to wait for product at the packaging stage.

Communication between ControlLogix, RSBizWare Batch and RSView 32 occurs over an Ethernet network.

The new cream processing operation is capable of managing nearly 500 different recipes to produce more than 300 different items. It requires just two operators to run multiple batches, and production is up 500 percent. In a 24-hour period, Coty US can process up to 60,000 kilos of product. Before, the contract manufacturers Coty used were capable of producing only 15,000 kilos of product in the same amount of time.

According to Kennedy, the benefits of the consolidation go beyond production increases. "We are now able to achieve repeatability and consistency. We not only get the consistency we want, but we're able to check and certify that consistency through RSBizWare Batch's electronic documentation capabilities."

The final benefits were the more than $4.1 million a year in savings and a transition that went unnoticed by Coty US's large retail customers.

"If it wasn't for the ingenuity of GCI and the advanced capabilities of Rockwell Automation technology, we would not have met our tight time-to-market schedule," said Kennedy. "Not only did they help us meet our target, but they also provided us with a return on investment in under a year in a half." ABJ

Rockwell Software RSView 32:
www.software.rockwell.com/rsview32/

Rockwell Software RS BizWare Batch:
www.software.rockwell.com/rsbizwarebatch/

Allen-Bradley ControlLogix:
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