LISTEN. THINK. SOLVE.®

For Tissue Converters Looking for Faster Changeovers, OEM Rolls Out Lean Machine with New Level of Flexibility

Engineers at PCMC standardized on the Allen-Bradley Logix control platform from Rockwell Automation to help maximize end-user acceptance

Solutions

Logix Control Platform

- Allen-Bradley ControlLogix programmable automation controller integrates high-speed discrete and motion capabilities on the same platform
- Integrated motion with Kinetix 6000 multi-axis servo drives help precisely guide the position and profiling of the paper rolls
- PhaseManager and add-on-instructions (AOI) in Allen-Bradley RSLogix™ 5000 programming software help reduce design time
- Additional components include Allen-Bradley GuardPLC™ programmable safety controller, PanelView Plus CE interface, HPK Series™ and 1326 motors, terminal blocks, photoelectric sensors, proximity sensors and safety I/O

Intelligent Motor Control

- Allen-Bradley PowerFlex 700 AC drives deliver precise motor torque and speed control

Support

- Global support for PCMC's U.S. and European manufacturing operations

Results

Increased Throughput

- Shortened lead time by 25 percent with more efficient assembly and testing
- Standardization reduced number of parts by one-third
- Helped reduce CAM profile to 100 segments from 900
- Helped increase average rates from 50 logs per minute to over 60 logs per minute
- Helped reduce testing time by 67 percent

Rockwell Automation worked with PCMC to standardize the Forte on the Allen-Bradley Logix control platform.

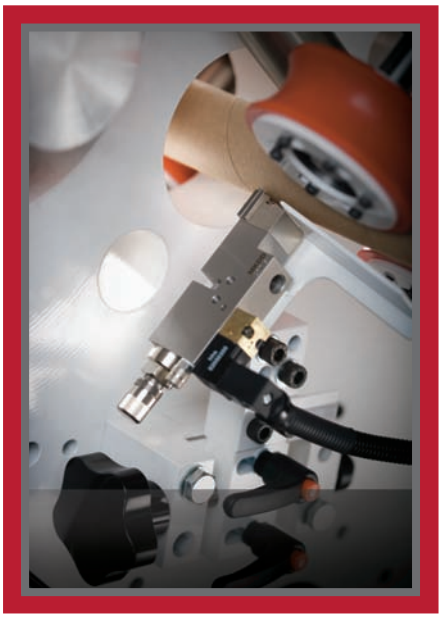
Background

Thanks to modern technology, today's consumers can be choosy when it comes to buying paper towels and bath tissue. Gone are the days of one-size-fits all. Today's shoppers have choices: one ply, two or even four. They can opt for super strong or ultra absorbent and decide whether they prefer a smooth surface or a quilted design.

To help meet the full spectrum of consumer preferences, Paper Converting Machine Company (PCMC) builds tissue-converting machines that are flexible, while still providing the speed, quality and profitability that major paper-towel and bath-tissue manufacturers demand.

PCMC, a leading designer and manufacturer of tissue converting technology based in Green Bay, Wis., has designed a next generation surface rewinder featuring unprecedented flexibility, speed and end-user acceptance.

The machine builder, recently acquired by Barry-Wehmiller, combined its 85-year history of innovative engineering with its parent company's lean approach to



The Forte uses the Allen-Bradley ControlLogix programmable automation controller.

machine design to create the new rewinder – dubbed the "Forte." The result is an undeniable success for PCMC. The blend of technology and manufacturing best practices has orders for the new machine "rolling in."

Challenge

After being acquired by Barry-Wehmiller in 2005, PCMC spent two years incorporating the company's lean manufacturing principles. This helped streamline the number of PCMC vendors, reduce the number of components in each machine, and moved the company to standardize manufacturing practices at its production facilities in the United States and Italy.

PCMC's tissue converting business offers a series of machine modules configurable into complete converting lines based on its customers' application product needs. A typical converting line begins with the unwind stand, which unwinds the web of tissue or towel material from the parent roll. From there, the product moves to the embosser which adds texture and bulk to the paper. The rewinder applies perforations and then wraps the paper into long, tight rolls of adjustable diameter and length – called "logs" – around a cardboard core. A tail sealer applies a thin layer of glue to the end of the roll to keep it from unraveling, and the accumulator then stores the rolls until they can go through the log saw, which cuts the rolls into consumer sizes.

One of the more complex parts of the line is the rewinder. Tissue paper is relatively fragile and can be easily damaged or torn during the rewinding process. The challenge was to design a rewinder that operated reliably at high output rates with precise handling of the fragile tissue web, yet was fast and flexible enough to change over from one product to the next within minutes.

"When our customers are in production, they require fast and consistent performance," said Jon Vander Pas, tissue product line engineer leader at PCMC. "We knew we needed to look beyond center-driven winding technology which places too much tension on a web."

"Previously, we focused on center-driven technology, but after conducting extensive market research, we saw an opportunity to create a unique machine – leveraging PCMC surface winding technology – that could better meet our customers' needs," said Vander Pas.

PCMC set out to design the new rewinder and turned to Rockwell Automation to help meet Barry Wehmiller standards of lean design and the competitive needs of its customers.

Solution

To address the need for a lean, easier-to-use design, PCMC standardized on the Allen-Bradley® Logix control platform from Rockwell Automation, which includes an integrated suite of control, networking and visualization technologies. As part of this platform, the rewinder features multiple Allen-Bradley ControlLogix® programmable automation controllers (PAC) for all discrete, process, motion and drive control. The multi-disciplined controller combines motion and sequential control into a single control environment, helping to eliminate the need for a separate motion controller and all the costs associated with programming, installing, synchronizing and stocking spare parts for it.

A high-speed SERCOS interface provides seamless integration, from the ControlLogix controller to the Allen-Bradley Kinetix® 6000 multi-axis servo drives and the Allen-Bradley PowerFlex® 700 AC drives, to help precisely guide the position and profiling of the paper rolls.

The machine features an open access design and modular software design principles. Allen Bradley PanelView™ Plus operator interface terminals, with PCMC custom-developed Active X controls, help quickly access hundreds of machine parameters and diagnostics. In addition, all of the components inside the rewinder have front-mounted connectors and other features that make them easier to access for unscheduled and routine maintenance activities.

Results

The new Forte is one of the fastest rewinders available on the market. Traditional rewinders produce around 50 "logs" per minute (lpm). PCMC's new Forte technology, with its integrated design, can produce well over 60 lpm and can operate at web speeds of up to 800 meters per minute. "Guiding a web at near-zero tension, it practically floats around the core," said Vander Pas. "It maintains caliber and bulk even at high converting speeds."

By standardizing its control platform and components, PCMC reduced the number of parts in its rewinder by one-third. This minimizes the number of spare parts it needs to keep in inventory, saving space and capital. Additionally, the standardized components shorten training time for both PCMC personnel and the end customer.

The servo drives, which have enclosures that are up to 50 percent smaller than those required for competing drives, help reduce the machine's footprint. The integrated motion control capabilities of the ControlLogix controller further reduce panel space by eliminating the need for a separate motion controller.

Equally important, the integrated motion control capabilities helped PCMC meet its performance standards more quickly. "The seamless integration helped reduce testing time by nearly 70 percent," said Vander Pas. Using the Logix Position Caming (PCAM) capability and a new interpolation method, PCMC can implement a CAM profile for the rewinding process using only 100 segments instead of the 900 segments required with the old solution. The approach helps reduce memory usage and smoothes the rewinding process, increasing production speed and reducing the likelihood of torn paper.

Because of the open design of the Forte, customers have access to hundreds of parameters, allowing them the flexibility to customize the machine's basic settings. The Forte also can store recipes, giving

customers the ability to seamlessly change over their lines from one product to the next, with little or no downtime.

"Our customers expect a lot from us, due to our experience in this market," said Vander Pas. "The Forte Surface Rewinder supports our legacy, offering innovation and quality, not to mention around-the-clock support from both PCMC and Rockwell Automation. With its global support, in addition to market acceptance and technical excellence, we feel that Rockwell Automation provides the best overall value to help meet our needs, and consider the company a strategic member of our supply chain."

Orders for the Forte have already started to roll in, demonstrating the success of PCMC's association with Rockwell Automation. "We expect the installation of the Forte line to help improve productivity, quality, flexibility and profitability for Papersource," said Benoit Laferriere, president of Papersource, a company that recently purchased the Forte.

Tim Sullivan, CEO of PCMC, commented on the sale, saying, "The Papersource order is a great testimonial to the efforts of our people. There is a new energy at PCMC. From the strength of our design team, to the craftsmanship of our operations team, to the skill of our experienced customer service team – all our associates are focused on bringing value to our customers. It is exciting to see Papersource recognize our people's efforts and reward us with this major project."

The Allen Bradley Kinetix 6000 multi-axis servo drives and Allen-Bradley PowerFlex 700 AC drives help guide the position and profiling of the paper rolls.

The results mentioned above are specific to PCMC's use of Rockwell Automation products and services in conjunction with other products. Specific results may vary for other customers.

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