

The Valpak[®] Manufacturing Center:

**SHOWCASE OF
AUTOMATED PRINT
PRODUCTION FOR THE
21ST CENTURY**



• **Plant Tour**

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Supplement editor: Patrick Henry

IN THE PRINT FACTORY WHERE THE GOAL OF EVERY OPERATION IS “THE QUALITY OF THE PROCESS”

An Interview with David Fox, Vice President of Manufacturing, Cox Target Media



The Valpak® Manufacturing Center is a technological showcase for computer integrated manufacturing (CIM) in print. How was this unprecedented level of system-to-system integration achieved?

Integration was a project keynote from the very beginning. We put a huge amount of planning and coordinated effort into it with the support of all our partners. We took a top-down approach to integration, drilling down to every level of functionality and evolving specifications as we proceeded.

In the project's first two years, we held monthly partner meetings that ran from two to three days and could involve as many as 80 people. The degree of technical cooperation and personal camaraderie that we gained during these meetings would prove to be invaluable at every stage of implementation.

Cox used the services of some 30 manufacturing and technical partners in building the Valpak Manufacturing Center. How did you coordinate the activities of such a large number of vendors?

Having a disciplined and structured approach to project management was critical. Each partner focused on managing the details associated with their scope of work while Valpak focused on managing the integration points among all the different partners.

In addition to the monthly technical meetings, we also held a series of sessions for the highest-ranking executives of our partner companies. These meetings helped build solid, top-level working relationships and gave each president or CEO a comprehensive understanding of what Cox Target Media was looking to accomplish. Sharing the big picture with everyone at the top created an atmosphere that made it much easier to coordinate efforts and address issues as they came up throughout the project.

The Valpak Manufacturing Center also will be an exemplar of “lean” manufacturing. What will make its production “lean,” and why is it important for a printing factory to operate this way?

Today, many print producers are looking to lean manufacturing for help in driving down costs. Traditional lean methodologies focus on reducing waste and eliminating redundant process steps in existing operations. As a “greenfield” project, we had an opportunity to design the plant from the ground up without inefficiencies or redundancies of any kind. To achieve this, we've implemented buffering strategies based on having no more than three to four hours' worth of work in process at any given time. Moving work through the plant at this rate is much more efficient than the three-day press-to-processing cycle that used to be the norm.

What lessons about CIM, automation, and systems integration can other printing businesses—including smaller companies—learn from what has been achieved at the Valpak Manufacturing Center?

In any undertaking, project management and planning are key. The infrastructure has to be there from the beginning as well, so it's particularly important to start with process design. For the VMC we defined the process, selected the equipment, and wrapped a building around it. Then we were ready to tie all the pieces together through systems integration, detailed process definition, work instructions and training requirements. You must also document the process, check it constantly, and maintain it as implementation moves ahead. No matter how much automation we put in place, people are still critical to running and sustaining our manufacturing processes.

The Valpak Manufacturing Center: A Plant with an Edge on Tomorrow

It's big enough to hangar 13 Boeing 747s, but it would take many more jumbo jets than that to haul its projected output of 54 billion advertising inserts per year.

Under one 10-acre roof, it will produce double the combined volume of two original Valpak plants as it slashes job cycle times from the better part of a week to a handful of hours.

Each year, Valpak sweeps more than 500 million insert-filled Valpak “blue envelopes” into U.S. Postal (USPS) mail trays for delivery.

It will showcase some of the world's most advanced systems in printing, collation, packaging, warehousing, material movement, and mail distribution as it positions Valpak Direct Marketing Systems, a division of Cox Target Media, for growth and leadership in the direct marketing industry for the next 20 years. (Cox Target Media is a division of Cox Newspapers, owned by Cox Enterprises of Atlanta, GA.)



tion to a previously undeveloped location, the VMC comprises 470,000 square feet of manufacturing and office space.

Resting 18 feet above sea level on a foundation of 1,400 concrete pilings, each about 70 feet long, the plant is built to withstand a minimal Category 4 hurricane. In an emergency, the plant can make its own electricity and sustain operations with an uninterrupted power supply system—a flywheel-driven system that furnishes current during the few seconds it takes for the main generator to come on line. Uninterrupted operation will be the keynote of the VMC as it follows a 24/6 schedule that reserves Sunday for maintenance. Four shifts of 125 people will work here, but not as machine tenders. They have been trained for new roles in the plant's largely hands-off environment: roles that will broaden their skills and encourage them to shift their thinking from traditional production to monitoring, troubleshooting, and software support. And although the new Valpak Manufacturing Center is operating, Cox is still seeking to fill various skilled positions, including management and leadership.

Happy To Stay “Blue”

Not only is Valpak opening its new manufacturing facility, but it's also celebrating 40 years business in 2008. To help celebrate, Valpak is giving its familiar blue envelope a makeover. Beginning this month, recipients will start to see the newly redesigned envelope in their mailboxes—a look designed with input from some 10,000 Valpak consumers.

As they reach for their Valpak inserts, consumers won't know that the trusted mailers are now coming to them from a dazzling new plant in St. Petersburg. But those with a professional interest in print manufacturing history-in-the-making should get ready to watch a great deal of it unfolding here—one blue envelope at a time. ■

The plant uses automation, robotics, and software integration to an extent without precedent in any segment of the printing industry.

Print Manufacturing Redefined

Although there's an undeniable gee-whiz factor in almost everything to be seen at the new Valpak Manufacturing Center (VMC) in St. Petersburg, FL, the futuristic impression it gives isn't just for show.

The plant is the product of a \$200 million, multi-year investment in designing a completely new print manufacturing process—a process that uses automation, robotics, and software integration to an extent without precedent in any segment of the printing industry. Unprecedented, too, is the fact that inside the facility, there are no production “departments” in the traditional sense. Its various systems are so completely integrated that the entire VMC is like one, vast, seamless printing machine, self-directing and self-monitoring as it operates virtually non-stop.

The Factory That “Thinks” for Itself

The breakthrough behind it all is real-time, system-to-system communication as mediated by the “higher intellect” of centralized SAP management software that oversees every function and process in the manufacturing workflow. That capability makes the VMC workflow the first true working application of end-to-end digital integration for print manufacturing in daily practice, anywhere.

The home that Cox Target Media has built for the future of printing and mailing is a lake-fronted, 20-acre site on the west side of I-275 in the Gateway area of St. Petersburg, just south of Tampa. A “greenfield” project that brings all-new construc-

A Billion Here, a Billion There, 10,000 at a Time:

How Automation Lets Valpak Bring Short-Run Efficiency to High-Volume Production

Calling the new Valpak Manufacturing Center a showcase of print automation describes what it is, but “revolutionary” would be a better word to express what it represents.

Now in operation after more than five years of meticulous planning and construction, the \$200 million, 470,000-sq.-ft. facility is the computer-controlled print factory of tomorrow where Cox Target Media will transform almost everything about the production of its signature product—the familiar blue Valpak envelope that delivers localized inserts to nearly 46 million households in North America every month. In that transformation can be seen not only the future of advertising printing by Cox, but the promise of automation for the printing industry as a whole.

The plant has the capacity to produce 54 billion inserts annually, all of it in 10,000-piece batches that would be considered short-run quantities in almost any printing environment.



In the VMC collation area, envelopes are filled, formed, and sorted entirely without human intervention.

Short runs mean frequent job changeovers, and changeovers, in conventional production, mean downtime for equipment makereadies—a cumulative loss of manufacturing efficiency that could never be permitted to occur in the high-volume, 24/6 production scenario envisioned by Cox.

In the new plant, designed and built for Cox by The Austin Company, the solution to the downtime problem is automating the workflow so thoroughly that it never has to stop. Under the direction of a centralized production system, machines will prompt other machines to send them what they need, when they need it, in what is essentially a print-on-demand operation on an unprecedented scale. Output will be continuous, and human intervention will be minimal. At every stage of the process, Cox and its technology partners in the Valpak project will demonstrate new applications of auto-

ated throughput on which other printing companies are sure to model automation breakthroughs of their own.

It's All Hands-Off from Here

The chain of events begins at “receiving induction,” the plant area where client-supplied inserts and other externally printed items are transferred from their delivery trucks for entry into the production workflow. From this point until the concluding stage where pallets of ready-to-mail envelopes are forklifted to outbound trucks, the process is almost entirely hands-off: no significant manual handling of production supplies or printed matter takes place. The raw materials—paper, plates, ink, and chemistry—are stored in a press warehouse that carries, in keeping with the Valpak center’s “lean” manufacturing profile, no more than four days’ worth of inventory.

Web offset is the printing method, and four web roll widths (56", 63", 70", and 77") are used. The ramps on the roll transport system from Automatic Handling International, Inc. can accommodate three widths, and whenever a press “requests” a roll, the system automatically dispatches one of the correct size to the pressroom for continuous paper supply. Inks are centrally pumped to the presses from 3,953-lb. totes in the press warehouse area, along with chemistry. Vessels are staged in tandem so that as soon as one is empty, the other can begin pumping to keep the flow to the presses uninterrupted.

In the fully automated plate room, plates the size of a door—35" x 78"—are exposed on four Kodak Magnus VLF (very large format) Quantum CTP devices with automatic plate loading and sheet removal. The plate transport system installed by Burgess Industries automatically routes plates to whichever device needs them, and then moves the plates through the rest of the processing stages and on to the pressroom. An operator monitors the plateroom systems, but at no point are plates handled or touched. After imaging and processing, the Burgess system guides the plates to shearing, bending and punching stations. The bar-coded plates are scanned in transit to track their progress through the plateroom and to confirm which press each plate is being delivered to.

Up, Up, and Away

The Burgess equipment ushers the plates out of the plateroom by lifting them almost to the ceiling on a plate elevator. The plates, still on a Burgess conveyor, pass through a portal in the upper wall into the pressroom, where their destinations are press-side pods in which they are stored for mounting by the press crews. From the plate room to the press bays—as in nearly all other sections of the plant—every inch of travel is automated. In the Valpak Manufacturing Center, the only things that move about without mechanical

assistance or computerized guidance are human beings. The pressroom is the domain of two specially configured Sunday 4000 commercial heatset web presses from Goss International. Each consists of two sets of CMYK cylinders that print in alternation. The Sunday 4000's AT (Automatic Transfer) feature can bring cylinders on and off impression at will while the press continues to run at top speed. While one set of cylinders prints, the other can be stopped and re-plated.

Stop the Presses, but Keep Printing

In the Valpak pressroom, the switchover occurs every 10,000 impressions, corresponding to the 10,000-piece NTA (Neighborhood Trading Area) batches in which the blue envelopes are addressed and sent to household recipients. While one NTA batch is printed on the “odd” cylinders, the “even” cylinders can be taken off impression and prepared for the next batch. The Goss AT capability makes it possible to leapfrog from one NTA to the next every 12 to 20 minutes, and output, as a result, is continuous. The presses never stop printing, even with half of their cylinders momentarily disengaged.

The 2,500-fpm Sunday 4000 presses use gapless blankets that slide on and off to facilitate rapid changeovers. Closed-loop color control assures consistent print quality. The Goss machines will be able to produce, in batches of 10,000, 54 billion inserts per year—more than twice the current production volume at Valpak's current plants in Largo, FL and Elm City, NC.

On each press, a Viking C pinless jaw folder from Foldex converts web ribbons into three streams of signatures containing up to 88 inserts each. The signatures are immediately seized and transported by Muller Martini's signature capture system, an overhead conveyor fitted with clamps that grasp the signatures and carry them to a buffer area from which they will be automatically delivered to collating and inserting stations.

The Muller Martini system gathers shingled signatures onto reels that are staged in the “presentation station,” a large rack where the signatures await transfer to the BÖWE BELL + HOWELL collation line. As directed by SAP production control, Automated Guided Vehicles (AGVs) from Egemin Automation Inc. pick reels from the rack and deliver them to the collators, which trim and slit the signatures into stacks of free-standing inserts.

Meanwhile, an automated paper waste removal system from Kongskilde Industries conveys scrap from 52 collection points in the pressroom and the collation area. Consisting of nearly three miles of pneumatic piping and numerous pieces



In the press hall, two Goss Sunday 4000 web presses print non-stop with a plate change every 12 minutes on alternating sets of cylinders.

of auxiliary equipment, the Kongskilde system can dispose of as much as 18 tons of waste per hour.

That's a Wrap

Now the inserts are ready to be enclosed in their blue envelopes. With the help of BÖWE BELL + HOWELL, Valpak has come up with a more efficient way to collate inserts into the envelopes. Instead of time-consuming standard insertion, the collating line wraps and folds envelopes around each batch of inserts, applying glue and ink-jet addressing to complete the mailing piece. In this way, envelopes can be filled and finished much more rapidly.

This stage of the workflow is a typical example of how process-specific automation has enabled Valpak to dramatically shrink production cycle times. Once, from start to finish, completing a mailing would take four days. Now it can be accom-

plished in about four hours.

Filled and sealed, the blue envelopes are streamed to a robotic mail tray “cell,” or work station, provided by BÖWE BELL + HOWELL in collaboration with CapStone Technologies and Automated Concepts Inc. Here, envelopes are stacked and accumulated in four sorting bins. Robotic arms manufactured by FANUC Robotics position USPS mail trays to receive the envelopes, which the arms then “sweep” from the bins into the trays in the correct sortations for postal carrier routes.

Next, the trays are lifted onto conveyors that transport them to the plant's “high density storage area” provided by Daifuku America, where finished mail is staged prior to palletization and shipment. Palletizing, which is fully auto-

In the new plant, workflow is so thoroughly automated that it never has to stop.

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Valpak Manufacturing Center Is Also a Showcase Of Energy and Environmental Efficiency Measures



Cox Target Media (CTM) has placed significant emphasis on energy efficiency and in the design of its new 470,000-sq.-ft. Valpak production facility in St. Petersburg, FL. In addition to equipping the facility with some of the world's most advanced systems for printing, packaging and distribution, CTM also has invested in state-of-the-art energy efficient systems and equipment to help run the facility in a responsible manner and hold down operating costs.

Recycling is a high priority. Excess paper in the form of trim, chip, supplied inserts, signatures from collation, and press waste is vacuumed to a central area and recycled. Aluminum plates used in the printing process are also recycled, as are containers, totes and pallets. Even the scrap concrete used in the facility's slab and concrete pilings was reused for the facility's road base.

CTM seeks out companies that share its commitment to the best sustainable business practices and selects material suppliers that offer environmentally friendly products and services. Examples abound in the materials specified in the design and construction of the facility, including a 2-in. section of foam sandwiched in between the poured concrete, tilt-up walls; energy efficient windows in the production area and translucent Kalwall panels

in the warehouse; and a white poly roof designed to minimize the heat gain typical of standard roofing materials.

Bottom-Line Benefits

Myriad energy efficiencies also help to lower operating costs—a tall order for a facility with large industrial equipment. In the press hall, two Goss Sunday 4000 heatset web offset presses use AC motors with tight control tolerances to reduce operating costs and paper waste. The shaftless design of the presses reduces energy consumption by eliminating rotating components like gears, shafts, clutches and couplings when transmitting power from the line shaft motors to the press itself. A regenerative thermal oxidizer is used to destroy the volatile organic compounds discharged by the presses.

The production area uses 400-watt metal halide fixtures with energy efficient, pulse start ballasts. Occupancy sensors control the lighting in central areas, and the lobby is lit using compact fluorescent bulbs rather than incandescent lamps.

The new plant also achieves a high-water mark in climate control by virtue of a highly efficient HVAC system that eliminates hot exhaust from work areas and reduces both cooling costs and noise levels. A central water-cooled system with high-efficiency chillers and a condenser water loop reconfigured to improve the efficiency of the facility's cooling tower are integral to the system. In addition, the irrigation systems use reclaimed water to promote water conservation.

Wisely, the St. Petersburg facility is designed and fortified to resist the sometimes adverse weather conditions visited on the Florida Gulf Coast. Built 18 feet above sea level and anchored by 1,400 concrete pilings, each about 70 feet in length, the structure is designed to withstand a minimum Category 4 hurricane.

From recycling to reductions in energy consumption to precautions designed to lessen the impact from natural disasters, the Valpak Manufacturing Center is as remarkable for its comprehensive attention to energy conservation and efficiency as for the sophisticated automated workflows that make it go. ■

Goal and Game Plan for Cox Target Media: More Power to Inserts in the Marketing Mix

If you've been living under a rock for the past 40 years, you may have failed to notice that the business of advertising inserts has shed its penny-ante reputation to be recognized as the powerful direct marketing channel it is today. No company typifies the industry's metamorphosis and future prospects better than Cox Target Media in Largo, FL, whose signature Valpak brand delivers 20 billion targeted inserts each year to nearly 46 million unique, qualified households throughout the United States and Canada in those blue Valpak envelopes. Every month, nine out of 10 recipients open and look through the envelope's contents, a rewarding, relevant, and reliable mix of ads from national, regional and local advertisers.

According to a study released by ICOM Information and Communications, 86% of American households reported using inserts last year, and a 2007 Multi-Channel Direct Mail Study by the U.S. Postal Service revealed that people who received a direct mail advertisement were almost twice as likely to purchase a product or service from a retail Web site as people who received only online advertisements. Metrics like these were instrumental in CTM's decision to construct a new manufacturing and distribution facility in St. Petersburg to ease capacity overload at its other facilities, improve operating efficiencies, and support long-term growth. Once it ramps up to full production in early 2008, the new facility is expected to give CTM the capability to produce around 54 billion inserts every year.

According to CTM President and CEO Bill Disbrow, "Cox Target Media continues to strengthen its position as a national leader in the direct marketing industry. Our \$200+ million Valpak Manufacturing Center in St. Petersburg will more than double our production capacity and will showcase state-of-the-art equipment in printing, assembly, packaging and warehousing. This project is ambitious, but the demand in our industry is such that we expect the investment to pay for itself in six or seven years."

The St. Petersburg facility also will enable CTM to introduce enhanced consumer

targeting and new products in the long term, Disbrow says. He points out that the most significant point of differentiation between old-style, scattershot mass mailings and Valpak's highly selective, highly targeted methodology is that Valpak puts an advertiser's message squarely in front of the audience most likely to act upon it.

Better Targeting = More Options

Over the years, the company has progressively refined its mailing criteria in order to qualify recipients by age, income, family status, home ownership, demographic, purchasing behavior and disposable income, etc., taking into account geographic differences and factors like circulation, frequency and duration. The logic is disarmingly simple: the more narrowly targeted the contents of the Valpak envelope, the greater its value to advertisers and consumers. By giving CTM the ability to print different versions of an insert for each group of 10,000 households, the new facility will provide even more versioning options for Valpak advertisers.

"The new manufacturing process we have implemented at the Valpak Manufacturing Center in St. Petersburg represents a dramatic business change and is something of a printing revolution for us," Disbrow says.

As Internet advertising options used by large enterprises have worked their way down to the small and medium-sized businesses, CTM also has made major strides to extend the reach of the envelope. Valpak.com, one of the largest local savings sites on the Internet, increases the online exposure of its advertisers' inserts and serves as the entry point for monthly on-envelope promotions and sweepstakes. Online access gives mobile consumers an opportunity to view advertisements in locations that are convenient to them, while enabling advertisers to reach a broader audience with a demographic mix that many marketers prefer. In August 2006, Valpak made headlines as the inaugural content provider of online inserts for Google Maps, making it easy to print a map and directions along with the inserts. ■

By giving CTM the ability to print different versions of an insert for each group of 10,000 households, the new facility will provide even more versioning options for Valpak advertisers.



CTM is committed to the best sustainable business practices and selects material suppliers that offer environmentally friendly products and services.

CONTRACTING, ARCHITECTURE, AND ENGINEERING: The Austin Company



The 470,000-sq.-ft. Valpak plant was built and equipped in quadrants, one quadrant at a time.

“The Austin Company was selected because it specializes in providing architectural, engineering, construction, and consulting services to newspaper, printing and distribution clients.”

In 2004, Cox Target Media selected The Austin Company to provide architectural, engineering, and construction services for the Valpak Manufacturing Center. Construction began in June 2005. As the contractor of record, Austin carefully chose approximately 50 local building service providers to complete the work.

To finish the 470,000-sq.-ft. plant in the project's relatively short time frame, the building was constructed, completed, and equipped in four successive quadrants. As soon as the first quadrant was constructed, it was turned over to Cox to begin the equipment installation and commissioning process. Work on the next quadrant would be completed shortly thereafter, and then that quadrant, too, was available for equipment.

During design and equipment installation in the quadrants, Austin consulted with the partners on a daily basis to communicate the impact of plant engineering decisions on their portion of the work. Construction proceeded in this well-coordinated manner until the plant received its certificate of occupancy in April 2007.

High, Wide, and Handsome

One major operational component of the building that required careful design attention

was the Automated Storage and Retrieval System, an 85-ft. high system of storage racks enclosed in an integrated structure. Initially, because of the height of the racks, there was some concern on the part of local authorities about how the building would appear from I-275, the freeway that approaches the plant after a scenic sweep across Tampa Bay. The height of the racks meant that the building would have to be correspondingly tall. Austin incorporated exterior architectural features to ensure that the plant would fit properly into St. Petersburg's industrial landscape.

The Valpak project was typical for Austin as it was a design-build assignment with most services sourced locally. Because Austin can engage qualified contractors wherever a project is located, the money and the economic benefits stay in that community—a strategy that helps Austin's clients to be perceived as good corporate neighbors. This certainly proved to be the case in building the Valpak plant, where contractors from the Tampa-St. Petersburg area provided 95% of all services.

Austin's service portfolio is more than just bricks-and-mortar projects. The firm also offers consulting services in strategic planning, operations improvement, and facility location strategies. Under The Austin Method®, its proprietary design-build approach, Austin seeks integrated solutions to complex and challenging facility problems by acting as a single source for all facility planning, design and construction services. As such, Austin assumes all responsibility for budget, schedule, and quality in an effort focused on conserving the client's time and money.

The sheer size of the Valpak assignment and the challenge of building in quadrants prompted the firm to carry out the task in a series of well-planned stages that paralleled the development of a new form of print manufacturing within the very walls it was erecting. As a result, Austin has gained even greater experience in phasing and managing projects of this magnitude. Although it has withdrawn its personnel now that the plant is open, Austin continues to work with Cox to fine-tune its landmark creation in St. Petersburg. ■

www.theaustin.com

PREPRESS CTP: Kodak Graphic Communications

“Kodak was selected because of its reputation as an industry leader and because its automated plate loading solution supports Valpak's hands-off production environment.”

One of a number of unusual angles to the story of the Valpak Manufacturing Center is the fact that it served as a beta test site for an important new product even before the plant went into formal operation. It was here that Kodak Graphic Communications validated a solution that would prove crucial to the success of one of the plant's most remarkable subsections: its fully automated, 100% hands-off digital platemaking department.

Tested in the real-world environment of the Valpak CTP department was the automatic pallet loading (APL) option installed on each of four Kodak Magnus VLF Quantum platesetters. The APL contains 1,200 plates in two high-capacity bays, each holding 600 plates that are loaded directly into the machine on the shipping pallet. When one pallet has dispensed all of its plates, the platesetter automatically switches to the second pallet without operator intervention. Kept loaded in this way, the platesetters have over 24 hours of plate supply before the empty pallets need to be replaced.

The Magnus VLF units—mechanically identical for consistent performance and quality—also are equipped with the X-speed option for highest throughput of the 78" x 35" Kodak SWORD Excel thermal plates used to print the Valpak inserts. Because Kodak's CTP systems have always supported open architecture, the Magnus VLF units were inherently compatible with the plant's system integration requirements.

Continuous Platesetting on Demand

The platesetters run on Kodak's Prinergy EVO workflow, which was adapted for improved communication with the plant's centralized SAP software. This enables the CTP devices to respond instantly to requests for new plates during job changeovers, which occur once every 12 to 20 minutes as production moves from one regionalized batch of inserts to the next. An automated plate transport system from Burgess Industries carries the press-ready plates to a pair of eight-unit Goss Sunday 4000 web presses on the other side of the wall that separates the platesetting area from the pressroom.

The Kodak and Burgess systems were designed for tight integration without the need for special modification. That integration, together with the labor-eliminating effect of APL, means that from the time the Valpak plates are uncoiled at the Kodak factory to the moment they are mounted on the Goss Sunday 4000 presses, no human hand touches plate material.

Valpak is using another innovative product from Kodak: a “hovercart” pallet carrier that rides on a cushion of air along guide rails from the plate staging area to the platesetters. Operators can easily maneuver the hovercart from device to device as they replenish the automatic pallet loaders with fresh packages of plates. ■



Doors open to reveal the APL (automatic plate loading) option of the Kodak Magnus VLF Quantum platesetter.

www.graphics.kodak.com

PLATE MANAGEMENT AND HANDLING SYSTEM: Burgess Industries, Inc.

“Burgess plate management and handling.” As a production concept, it seems simple enough: a method for managing the delivery of the exact set of plates to the exact press cylinders at the

exact time so that printing can continue on schedule.

That’s what Burgess Industries’ plate management and handling solution for the Valpak Manufacturing Center does—but at a level of technical sophistication that accomplishes far more than simply moving plates

from point A to point B.

Yes, the system does convey plates from four Kodak Magnus VLF Quantum platesetters to the plant’s two Goss Sunday 4000 presses. But it also manages the on-demand output of the plates by monitoring their consumption during printing. And, the Burgess system maintains quality control over the entire platemaking workflow by inspecting the plates for image quality and validating their delivery at every critical step and location in the process.

As a feat of mechanical, electrical, and automation engineering, the Burgess system is one for the textbooks: a 26,000-sq.-ft. integration of more than 170 automated modules including 16 press elevators; 32 “smart” plate pod delivery systems; two prepress elevators; 16 plate indexing systems; and a platform of multiple networks for system control, integration with other vendors’ systems, and communication for plant functions.

About half of its apparatus is suspended from the ceiling or mezzanined 21 feet in the air over the Sunday 4000s—an unusual setup, to be sure, but just the right configuration for a system that raises imaged plates almost literally to the roof, passes them through an opening in the wall between prepress and

press, and streams them in precise order and quantity to the continually running presses.

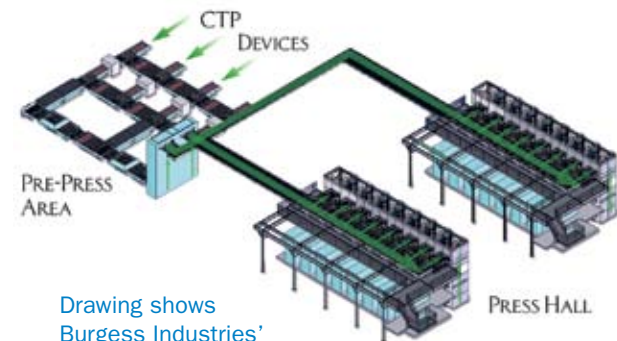
Under Continuous Inspection

The sequence begins as a fully automated plate transport subsystem in prepress ushers imaged and processed plates to precise registration by shearing, punching, and bending, all of which is performed at a rate of up to 80 plates per hour on equipment supplied by Burgess. Automated inspection by CCD cameras keeps image quality parameters under continuous scrutiny, while bar-code scanning assures proper plate-to-cylinder orientation and routing to the correct press cylinder. The press-ready plates then are elevated and conveyed through the wall into the press hall on overhead delivery lines, one for each press.

Their ultimate destinations are the “smart” plate pods—intelligent dispensing storage and delivery units, located five steps away from the 32 press cylinders they serve, from which the press operators take press-ready plates for mounting. What makes the pods intelligent is their ability to act as self-inventorying plate “warehouses” that direct the CTP devices to produce new sets of plates on demand as the presses consume them. The pods then report back to the Goss Press Center that they contain new sets of plates, ready to run on press.

With job changeovers occurring every 10,000 impressions, this means staying ahead of a requirement for changing up to eight plates every 12 minutes. Keeping the pods filled in this way turns platemaking into an exercise in fulfillment-driven supply and demand—the key to achieving Valpak’s goal of nonstop production in the pressroom, on the collation line, and so on through to delivery.

Burgess believes that the plate management and handling system it created for the Valpak Manufacturing Center is the largest and most sophisticated installation of its kind anywhere in the world. It certainly is one that speaks volumes about the company’s commitment to making all printers believers in integrated manufacturing through automation management. ■



Drawing shows Burgess Industries’ integrated plate management and handling system for Valpak, consisting of over 170 automation modules including elevated plate delivery and “smart” plate pod system.

“Burgess Industries, Inc. was selected because of its automation and performance capabilities to provide the most advanced plate management and delivery systems.”

PRESS SYSTEM: Goss International

“Goss International was selected because it is a world leader in web offset press technology and a pioneer in automation for print.”



Valpak’s Goss Sunday 4000 webs print continuously in short-run batches of 10,000.

If there is a heaven for printing applications, that may be the place where the match between the Valpak Manufacturing Center and Goss International’s Sunday web press and workflow technology was made.

As specifications for the facility were developed, the vision for automated production shared by Valpak and Goss International became clear: Goss innovations such as Automatic Transfer, Autoplate and the Goss Web Center emerged as essential tools for the task at hand: high-speed, non-stop insert production with job changes achieved every 10,000 impressions without stopping the presses.

Not one but two Goss Sunday 4000 web presses run this marathon six days a week in the Valpak pressroom, where they are seamlessly connected with an automated plate transport system from Burgess Industries. Goss International also equipped each press with a specially designed Foldex jaw folder

that can deliver multiple streams of signatures as fast as the presses can print them and linked the systems with an equally automated folding and finishing solution.

The identical eight-unit Sunday 4000 presses have a 78" web width and a cylinder circumference of 35" for two-around printing

with a 17½" cutoff. Printing at 2,500 fpm, the shaftless, servo-driven presses feature gapless blankets that maximize image area and minimize paper consumption by limiting the non-printing area of the blanket to about 4 mm. Fully automatic Goss Autoplate plate changing and continuous plate supply by the Burgess system make it possible to print inserts for one 10,000-impression NTA (Neighborhood Trading Area) mailing every 12 minutes, with no downtime in between.

This can happen because the presses’ Automatic Transfer (AT) capability keeps four units on impression while the other

four are plated and prepped for the next NTA. At the 10,000 impression mark, the active units come off impression, and the idle units go on impression simultaneously. As long as the web width or the folding format doesn’t change, the press can run continuously through a virtually unlimited number of job changes.

The presses also have Goss Ecocool dryers with integrated chill rolls and pollution control; Goss Contiweb FD pasters with automated reel loading; and a full suite of Goss Omnicon press controls and Goss Web Center workflow controls. Functions include prepress interface for automated presetting; full integration of closed-loop control systems for color, register, and cutoff; and an automated link with MIS—in this case, the centralized SAP applications that direct the entire Valpak production scenario.

Job Orders Overnight

SAP sends the next day’s job orders to the Goss Web Center in JPDF. The Goss Web Center, a file server containing job data for each 10,000-count run, interfaces with the presses’ Omnicon and Omnicolor systems to automate job presets and running controls. The goal is to minimize operator intervention in these processes, and achievement of the goal is seen in the fact that both presses can be fully crewed by a total of six people.

Goss International says that because Omnicon and the Goss Web Center are available across its entire commercial web product line, smaller web operations can enjoy many of the same advantages as the Valpak plant. Goss AT technology is available on Sunday 2000 as well as the Sunday 4000 presses, and a growing number of printers worldwide are using this continuous printing option for 16- to 64-page formats. Black-plate-only changes with AT can be extremely efficient for book printing and versioning, while eight-unit AT presses like those at Valpak complete four-color job changes on the fly with minimal waste. ■

PRESS SYSTEM: INLINE FOLDING/FINISHING: Foldex Corp.



“Selected as part of the agreement with Goss, **Foldex Corp. provides a unique folder design that meets Valpak’s specialized inline finishing** and format requirements.”

After printing, the two Goss Sunday 4000 presses in the Valpak pressroom slit their 78" webs into as many as seven ribbons representing various mixes of inserts for the NTA being produced. To complete the inline finishing sequence, the 7"- and 14"- wide ribbons must be formed into three parallel streams—a requirement that press folders are rarely called upon to meet and that very few, as a result, are capable of handling. Foldex Corporation rose to the challenge by furnishing a pair of its Viking C folders for three-across signature production in collaboration with Goss. The Viking C, a gravure-style, pinless jaw folder with variable cutoff capability, uses the same 17½" cutoff as the Sunday 4000 presses for Valpak. On each press, the Foldex upper folder accepts the ribbons and passes them to the lower folder, from which they emerge as a three streams of product, cut and folded into signatures. Depending on the composition of the NTA, the folders can operate either in straight mode, producing one signature per cutoff, or in collect mode, in which two cutoffs make one signature with double the number of inserts. In straight mode, separating the A and B signatures yields six distinct product streams at the delivery.

One technically demanding part—passing the three streams through to the lower por-

tion of the folder without overlap—is achieved through a tight integration of the Foldex equipment with Goss hardware and system controls. Foldex also collaborated with Muller Martini in the planning of the signature capture system that conveys finished signatures for reel winding prior to collation.

A Ready-Made Answer

As a web press manufacturer, Goss typically provides folders for presses such as those installed at Valpak. Foldex, however, offered an established folder design that enabled the three-stream concept to go forward. The companies worked together in the pre-order stages of the project to refine the application for the Valpak products.

The result was an adaptation of Viking C folder, a descendant of Foldex’s flagship product, the Viking folder—the first wide-range, variable-cutoff folder to operate successfully as a dual-size cutoff solution for offset web presses. A unique double former and bypass ribbon superstructure, aided by a new nip system design, gives the Viking C the three-wide capability that production for Valpak requires.

Implementation required some assistance on the human side, since inline signature folding had not been part of the routine for personnel transferring to St. Petersburg from Valpak’s Largo and Elm City plants. At these plants, web output is sheeted and taken to the bindery for folding. The transition created a need for training and an opportunity for Foldex to provide it on the pressroom floor. The experience yielded insight into improving ease-of-use in folder controls—another valuable outcome for Foldex.

The Viking C illustrates how other web printers can break into high-output inline signature folding. Foldex can adapt its folder technologies to many specific applications—for example, the ability to form and cut signatures for inserts is also a solution for producing direct mail. The Valpak project showcases Foldex’s broad expertise in tailored applications, high throughput, and fully automated production for web printing environments of all kinds. ■

www.foldex.com

SIGNATURE CAPTURE SYSTEM: Muller Martini USA

“Muller Martini was selected because it offers a **comprehensive solution and turnkey installation of a signature capture system** that included JDF-enabled workflow.”

What possibly could keep up with a pair of high-speed web presses running non-stop to produce as many as 12 different products simultaneously in on-demand batches of about 10,000 each? In a conventional printing plant, the answer would be “nothing,” and the result would be a logistical nightmare of backlogged jobs in an unbreakable choke point between the pressroom and the rest of the workflow. The Valpak Manufacturing Center, however, is anything but conventional, and the fully automated Muller Martini Press Delivery System that keeps its output continuous renders choke points meaningless.

In the Valpak pressroom, each of two Goss Sunday 4000 presses sends printed webs split in up to six ribbons into a Foldex Viking C folder that forms the ribbons into signatures. At the heart of Muller Martini system, Macos, Muller’s JDF master control solution, has all of the pertinent job information and specifica-

each stream and transports them to the next stage of production—the staging area for collation, where the signatures are automatically wound onto PrintRolls. In this area, out of sight of the press crews, Topveyor delivery stations deliver 12 press streams into 12 Muller PrintRoll P-220 twin winding stations.

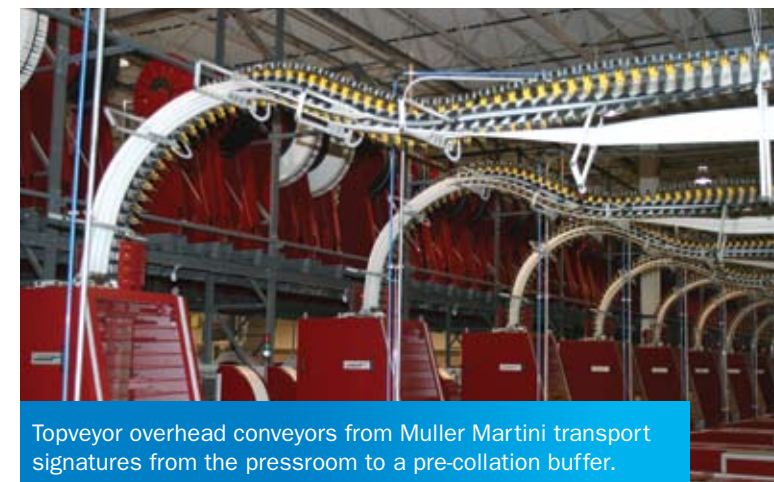
No Hands—or Eyeballs, Either

The entire process is digitally integrated with a fully automated storage and retrieval technology from Daifuku America Corp., creating a virtual buffer system for the PrintRoll-stored signatures. Muller Martini has also integrated 36 automatic twin PrintRoll unwinding stations across nine inserting and enveloping lines supplied by BÖWE BELL + HOWELL.

The operation is so automated that when the Muller Martini conveyors transport the streams through the pressroom wall into the fully automated winding and buffer area, the press operators don’t control the action or even see it happening. Instead, they watch a virtual image of the signature capture process on 17" color Macos screens mounted at each press console.

The Macos control system is key in managing the on-demand nature of Valpak’s production by notifying each press in real time as to the status and correct signature counts throughout the run, assuring that exact counts are attained. Macos also sends messages back to the presses to initiate their AT on/off impression function for the next six unique signatures. The Muller Martini system thus acts as the gatekeeper of the count and inventory in the first JDF/JMF-enabled integration of this kind anywhere in the industry.

Muller Martini collaborated extensively with all of the partners throughout the project to design Valpak’s JDF-enabled workflow. In fact, Muller Martini believes that software integration in this next-generation plant may be even more significant than the hardware installed in what now stands as the most complete implementation of JDF for print manufacturing yet realized. ■



tions for all six signatures. Via JMF messages from the plant’s central server, Macos then configures and automatically processes in real time the unique output of the press line.

Standard Muller Martini components configured for the three-abreast, double stacked folder deliveries start with Floorveyor in delivering, diverting, and aligning the six individual streams of signatures. Topveyor picks up

www.mullermartini.com

COLLATION AND PACKAGING SYSTEMS: BÖWE BELL + HOWELL



On-the-fly envelope wrapping and robotic mail traying are among the unique features of Valpak's fully automated collation system.

“BÖWE BELL + HOWELL was selected because of its innovative design and comprehensive solution offering that includes the first implementation of a robotic mail traying system that completely eliminates manual handling.”

The focal point of activity in most printing operations is the pressroom, but the Valpak Manufacturing Center has a different center of gravity: a multifunctional, highly automated collation system from BÖWE BELL + HOWELL. This is the area of the plant where the familiar Valpak blue envelopes are filled, assembled, printed, addressed, and trayed for mailing. It also is the place to find the most advanced solution for processing printed matter anywhere in the industry.

The workflow begins as automated guided vehicles (AGVs) deliver reels of inserts and inserts in eight- to 32-page signatures. On the main collation line, the product runs through a trimmer; makes a 90-degree turn, and passes through a slitter that divides the two-up signatures into separate stacks. The stacks then enter a collation raceway to be combined with inserts from up to 26 feeders. To keep production continuous, half of the feeders are used for the current NTA—a 10,000-piece batch for a given Neighborhood Trading Area—while the remaining feeders are readied for the next NTA.

Next, the inserts are wrapped into pre-printed blue envelope stock. This process, known as enveloping, achieves lower waste and maintains the same speed at which the inserts were trimmed and cut. Because BÖWE BELL + HOWELL has replaced inserting with on-the-fly wrapping, the throughput isn't slowed by the “collision” of envelopes with their contents (an inherent feature of conventional mailing workflows).

The envelopes, sealed and dynamically addressed, now proceed to sorting bins that are part of the first successful implementation of a robotic automated mail traying system. In this robotic mail traying “cell,” provided by BÖWE BELL + HOWELL with the participation of CapStone Technologies and Automated Concepts Inc., a robotic arm “sweeps” filled and finished envelopes from the bins into USPS mail trays in NTA-specific quantities.

There is no operator intervention at any point in the collation, wrapping, and traying sequence—only a manual label-affixing step after the trays are filled. No one, literally, touches the

printed inserts until they're removed from the envelopes by their household recipients.

The collation system contains numerous technical advances that redefine the concept of efficiency in the high-volume production of direct mail. The nine collators in the main collation track do the work of 80 traditional inserting machines, replacing manual labor with the ability to perform job changeovers automatically. No other installation includes a robotic mail traying cell. Implementing on-the-fly wrapping and overlapped job changeover in a continuous-flow environment is another first.

The integration of many different machines and subsystems into a cohesive whole is in itself a distinctive keynote of BÖWE BELL + HOWELL's role in the Valpak project. BÖWE BELL + HOWELL, which develops industry-leading BÖWE One document management solutions, provided Valpak with job management capabilities that seamlessly integrate with Valpak's SAP.

Zero Tolerance for Mismatches

The result is a comprehensive job validation and management system that assures error-free operation at every stage of the process. In continuous communication with SAP, BÖWE One ensures that inserts are loaded in the correct feeders with visual displays alerting operators to potential mismatches. It also monitors material status and usage in real time to maintain the highest levels of quality and productivity.

The uniform size of the blue envelopes and their inserts is one factor that helps to make it all possible. BÖWE BELL + HOWELL believes that in the Valpak project, commercial and direct-mail printers will see how automation can improve a plant's ability to produce and sell standardized products such as transpromotional documents. They'll also see that in order to achieve the degree of automation that's necessary for success in precision-targeted mailing, it's necessary to invest in systems and software not just for the printing, but for the new center of the production universe—processing on the back end. ■

WAREHOUSE AND MATERIAL MANAGEMENT: Daifuku America Corp.

“Daifuku was selected because it could design and provide highly sophisticated, fully automated material storage and movement systems at key points in the plant's production and inventory management areas.”



The unit load AS/RS for storing reels of printed signatures is but one element of Daifuku's material management system for Valpak.

Daifuku's material handling solutions for the Valpak Manufacturing Center consist of automated storage and retrieval systems, conveyors, sorting transfer vehicles (STVs), automated guided vehicles (AGVs), as well as software and controls. The main unit load automated storage and retrieval system (AS/RS) is a massive, rack-supported structure consisting of 8,252 pallet storage positions in an 85-ft. high bay. An AS/RS consists of rack and a machine called a crane, which moves horizontally along a rail and vertically to a storage position where it picks up and moves a pallet or a tote. Valpak's main AS/RS—the plant's primary storage area for incoming raw materials and finished goods—supports a portion of the building, which was constructed around the rack to enable the highest density storage.

A second unit load AS/RS, adjacent to the pressroom, is a buffer rack for storing the 2,646-lb. reels of printed signatures assembled by the Muller Martini signature capture system. Daifuku GH-200 twin-fork cranes pick up the reels and store them in the rack to await transportation to the BÖWE BELL + HOWELL collation lines. Through SAP and Daifuku's Warehouse Rx® warehouse management system, the collators cue the Daifuku unit load cranes to release specific reels, which are then picked up and delivered by the AGVs.

Riding the Rails

Collated envelope mail trays are held in a third buffer zone known as the high density storage (HDS) area, where the mail-ready envelopes are staged for palletizing. Here, through SAP and Warehouse Rx®, Daifuku M-200 cranes are scheduled to deliver the mail trays via Daifuku conveyor to another work area for sleeving and palletizing in postal route sequence. Palletized mail trays are delivered to the main AS/RS, a lights-out, unattended facility where the blue envelopes are stored by the four

rail-mounted HG-700 cranes to await retrieval for entry into the mail stream.

Rail-guided sorting transfer vehicles (STVs) move inbound pallet loads from receiving into the main unit load AS/RS and deliver pallet loads of full mail trays to shipping docks.

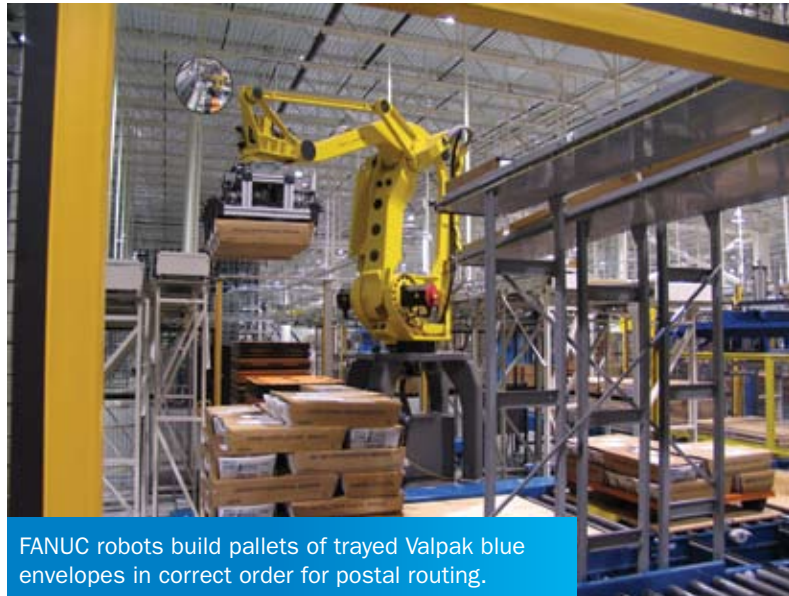
As complex as the Valpak installation is, it uses standard Daifuku equipment. The configuration was customized to meet the specific requirements of the project—a typical assignment for Daifuku, which specializes in tailoring system controls and software to suit particular applications in the many industries it serves. Integrating Daifuku's Warehouse Rx® warehouse management system with the plant's SAP system was a standard host interface that required minor modifications. Because SAP is an industrial standard, it was relatively easy to build a bridge between Daifuku's and Valpak's systems.

The developer of the world's first computer-controlled AS/RS, Daifuku provides automated storage and retrieval systems, conveyor and sortation systems, and warehouse management/control software solutions to help manufacturers, warehouses, and distribution centers reduce errors, decrease cycle time, streamline processes, and improve productivity. With more than 20,000 installations worldwide, its services also include engineered system design and project integration and management.

The Valpak project is an example of how utilizing vertical space and automating storage functions can enhance the growth potential for printing operations. Any plant looking to efficiently utilize space, reduce cycle time, and improve productivity can benefit from implementing Daifuku's solutions.

Daifuku may have built a “dark warehouse” for Valpak, but in doing so, it has turned a bright spotlight on the promise that automation holds for printing operations of all kinds. ■

MATERIAL HANDLING: FANUC Robotics America, Inc.



“FANUC Robotics America was selected **because it provides robotic material handling systems for mail traying, sleeving, and palletizing** that require little or no change-over to handle different product types and sizes.”

Robotic arms from FANUC Robotics America, Inc. combine mechanical muscle with computer-controlled finesse at three critical material-handling points in the Valpak mailing workflow: traying, sleeving, and palletizing.

In the robotic mail traying cell at the back end of the BÖWE BELL + HOWELL collation line, five FANUC M-710iB robots pick full- or half-size USPS mail trays into which they “sweep” up to 40 lbs. of finished envelopes for the NTA batch being processed. Tray sleeving is the job of four M-6iB robots that meet the trays as they proceed along a conveyor to a “tray funnel” at the sleeving work cell. There, the robots pick and push sleeves—box-like wrappers open at the ends—onto the trays. Because the trays and sleeves are meant to be re-usable, the robots handle them with the appropriate amount of TLC.

Next, two M-410iB robots do the tray palletizing. Fed by four lines that deliver the trays, each robot builds two pallets at a time by picking either a USPS or a Canadian postal pallet and placing it onto a conveyor. Then, by arranging and stacking the sleeved trays like bricks, the robot

builds a pallet conforming to any of 65 pallet patterns specified by the two postal services. If building a pallet to conform to a particular mail route creates a gap in the pattern, the robot fills the space simply by inserting an inverted, empty tray.

All 11 robots are standard FANUC products that have been customized with end-of-arm tooling for each of the three applications. Designed for rapid change-overs such as switching from full trays to half trays at the traying cell, the units are universally and infinitely programmable robots that can adjust to every nuance of the tasks they are performing.

“Minds” of Their Own

In the Valpak plant, the FANUC robots are exceptions to the rule in being preprogrammed with all of the instructions they need to perform their assigned tasks. This means that they don’t have to take their cues from centralized software—once connected to the network, they’re fully ready to tray, sleeve, and palletize. Extensive on-board self-diagnostic systems continually monitor the robots’ performance, but most of the time, there’s little to report. FANUC Robotics says that because the units have a MTBF (mean time between failure) period of more than 50 months, it’s seldom necessary to do more than grease them once a year to keep them hard at work.

Robots can automate any repetitive material handling application. FANUC Robotics has installed many of them in printing plants, where they are used chiefly for palletizing heavy items like magazines, books, and folding cartons. The robots typically are found near presses and bindery machines, stacking the printed matter as it comes off the equipment. Mail tray sleeving is a new application for FANUC robots, but the system developed for the Valpak can be used in any plant wishing to automate the processing of presorted mail. ■

ROBOTIC MAIL TRAYING CELL: CapStone Technologies www.capstone.com

In a plant that produces more than 500 million envelopes annually, simply placing the envelopes into USPS mail trays presents an enormous challenge. Each of the nine collators installed by BÖWE BELL + HOWELL can output more than one ton of mail per hour; all of which must be trayed and delivered to the next stage of production in another area of the facility. Valpak recognized this back-end function as a significant opportunity for cost savings.

CapStone Technologies, a business engineering firm specializing in process optimization exclusively for the print/mail industry, collaborated with BÖWE BELL + HOWELL to develop an automated solution utilizing robotics. The result, the plant’s robotic mail traying cell, is an innovation applied for the first time in the industry as a key component of the Valpak project. The robotic mail traying cell improves efficiency by automating the following tasks:

- handling empty USPS mail trays at



the collator

- sweeping envelopes from the collator into USPS trays
- delivering loaded USPS trays to the next work area in the plant

It does so by utilizing:

- a four-bin stacker unit at the collator output, accumulating envelopes in sorting bins by tray
- a de-nester unit presenting single, empty USPS full- and half-trays from a queue
- a robot with specialized end-of-arm tooling to sweep envelopes from the bins into empty USPS trays presented to

it by the de-nester unit

- a tray tagging zone, to convey filled trays so that tray tags can be inserted. Trays requiring rework are staged until they have been completed.
- an exit conveyor presenting completed mail trays to the next stage of production

By integrating directly with output from the collators, CapStone’s robotic mail traying cell eliminates formerly non-value-adding activity for sustainable savings. The benefits to Valpak include:

- reduced labor and peripheral costs
- optimized collator net throughput
- centralized tray staging and handling to consolidate related operations ■

“Selected as part of the agreement with BÖWE BELL + HOWELL, **CapStone customized the design of the robotic mail traying system** to meet Valpak’s specific criteria.”

AUTOMATED GUIDED VEHICLES: Egemin Automation Inc. www.egeminusa.com

Keeping product in continuous motion at the Valpak Manufacturing Center is the job of 17 automated guided vehicles (AGVs) from Egemin Automation Inc.: 13 vehicles for reel handling, plus four forklifts for palletized loads. The reel handlers operate in the print roll area, moving reels of signatures from buffer storage to the collators. The forklifts transport pallets of filled trays from the collation line to a station where the pallets are broken down into smaller loads for sorting by postal route.

The guide path that the battery-powered vehicles follow on these rounds is 13,000 feet, or nearly 2.5 miles, in length. The path, however, is a virtual one, requiring none of the floor-embedded cabling that older AGV systems use. The Egemin vehicles carry their own routing instructions in on-board computers that get wire-



less pick-and-drop commands from central SAP.

One of the key characteristics of the reel vehicles is their placement accuracy. After an AGV picks a reel of signatures from the buffer rack and transports it to the collating line, it reports the successful drop to SAP. The fit of the reel must be precise, and if anything impedes the transfer, SAP is notified. Safety-oriented “interlock” specifications developed by Egemin ensure that before an AGV attempts to deliver a load to another piece of

automated equipment, the receiving unit will confirm that space is available so that delivery can proceed.

The Valpak vehicles use the same standard chassis, controls, and software that Egemin manufactures for all of its AGVs. Egemin modified the transfer mechanism of the reel vehicles to adapt them for reel picking and handling. Egemin also met Cox Target Media’s requirement to make the transfer mechanisms exchangeable from vehicle to vehicle so that each AGV could be used for reel handling or pallet transport as needed. ■

“Egemin was selected for **offering robust, easy-to-maintain AGVs able to interface** with upper-level control systems in the fully automated environment of the Valpak plant.”

PAPER WASTE COLLECTION SYSTEM: Kongskilde Industries, Inc.



Kongskilde's waste removal system for Valpak conveys paper scrap through 15,000 feet of pneumatic piping.

“Kongskilde Industries was selected because it provided a continuous, high-volume, on-demand waste removal system capable of handling up to 18 tons of waste per hour.”

In most printing plants, waste removal is a daily chore involving considerable manual labor—but it doesn't have to be that way. Waste removal can be automated, and when that happens, good things follow: reduced dependence on manpower; safer working conditions, and higher productivity in a clutterless environment where presses and other equipment are free to operate at their highest speeds.

For proof, look no further than the Valpak Manufacturing Center, where Kongskilde Industries has installed an extensive and complex waste removal system that extends from the pressroom through the collation area. Within it, a 15,000-ft. network of pneumatic piping conveys waste paper from 52 collection points located near production machinery. Assisting the process are 22 conveyor belts, 16 blowers, 11 vacuum systems, 10 paper separators, three self-cleaning dust collectors, two manual dumping stations, and a high-capacity baler.

Maintaining constant suction, the Kongskilde system captures collected waste on demand in response to signals from the collating stations, which are not permitted to call for waste removal until the plant's centralized control system confirms that enough good envelopes have been prepared for each 10,000-piece NTA. Then, waste removal is fully automatic and almost entirely unattended. The system has no

operators, and except at the final stage where plant personnel remove baled scrap from the baler for loading onto trucks, no human intervention takes place.

Keeping Tabs on Trash Removal

In designing and installing the system, Kongskilde used standard components in a unique configuration for the Valpak plant. Also unique is the control technology that makes it possible to monitor the entire system at any time. Status can be checked both centrally and at remote monitoring stations at various points within the plant to diagnose problems and to guide maintenance personnel.

Kongskilde's waste removal system stands somewhat apart from the other partners' solutions in that it doesn't communicate through centralized SAP. Instead, it interfaces directly with the machines it serves via its own fiber optic network: for example, the BÖWE BELL + HOWELL collators or the Foldex folders on the Goss Sunday 4000 presses. Each tells the Kongskilde system when and how to react according to the volume of paper waste it is producing.

Given the nonstop character of operations at the Valpak plant, uninterrupted production wouldn't be possible without continuous, high-volume waste removal. During peak periods, the Kongskilde system could be called upon to remove as much as 18 tons of waste per hour. For example, the Goss presses, operating without a letup by virtue of their AT on/off impression feature, produce loads of waste at full running speed every 15 minutes. That waste has to be removed at the same rapid pace, never being permitted to accumulate.

Kongskilde currently is installing a similar system for a printing company in Cape Town, South Africa, in a plant even larger than the Valpak facility. In the Valpak project, Kongskilde was able to draw upon its experience in hundreds of installations for waste removal in the paper, plastics, and packaging industries. The company believes that automating the process can help even the most technically sophisticated printing plants turn this unglamorous but necessary task into a valuable source of production efficiencies. ■

VMC Production Overview

(continued from page 5)

matic, includes sleeving the trays into brick-like packages that another pair of robotic arms stack upon the pallets in patterns based on mail routes. FANUC also supplies the robotic systems for sleeving and palletizing.

Into the “Dark Warehouse”

The pallets then move to the most physically imposing area of the Valpak plant, the automated storage and retrieval system (AS/RS). Installed by Daifuku America, the AS/RS is a steel forest of 8,252 pallet locations in eight rows of 12 tiers

containing 86 storage bays. Standing eight stories tall, the vast rack structure soars all the way to the roof and is, in fact, a structural member of the building.

Daifuku robotic cranes move among the tiers, picking and retrieving the pallets for shipment. The AS/RS is a “dark warehouse” built for fully unattended operation. No people work here as the machines swiftly and silently marshal the printed inventory for entry into the mail stream.

This process, along with nearly everything else that takes place in the Valpak facility, is under the all-seeing eye of SAP's Advanced Planner and Optimizer (APO), a set of applications for supply chain management. As the heart of the plant's centralized production control system, APO monitors all production systems and coordinates their functions by telling them how and when to interact with each other: for example, by triggering the on-demand delivery of web rolls and plates to the presses; or by moving signatures from the buffer racks to the collating stations via AGV when the collators signal that they are ready.

Integration “middleware” from Cast Iron Systems handles all of the computerized messages exchanged by the partner systems during production. The middleware channels the feedback from each system and, based on the information it gathers, transmits the appropriate instructions.

The messaging and trafficking are continuously monitored to assure that all process steps are carried out, with error messages alerting plant personnel to anything that may not be going according to plan. Thanks to oversight by SAP, Valpak personnel can concentrate on monitoring production instead of tending machines. As the machines “talk” with each other through the medium of SAP, their human operators “listen in” to assure that all is well.

No “Black Holes” in This Universe

In keeping with the short-run nature of its output, the entire facility and all of its processes are designed with “lean” manufacturing in mind. The overriding goal was to avoid building up large, clumsy buffers of material waiting for the next stage of production—the bane of inventory management in non-automated print plants. In Valpak's lean manufacturing environment, the emphasis is on moving product through and out of the plant, not on amassing quantities of it. At Valpak, the product is almost always in motion, and nothing is permitted to accumulate in “black holes” of unprocessed material anywhere on the production floor.

The lesson to printers everywhere is clear, and a comment from an executive of one of the partners says it best: “For those of us that are still excited about print, this level of automation is one of the best examples that we have seen in a long time. The success of the Valpak project proves that the ultimate value of the printed product is greatly improved by the application of automation.” ■

The VMC Partner Parade

In addition to those mentioned in the article, the following partners provided products and services to the Valpak Manufacturing Center:

- **American Power Conversion (data center cooling)**
- **Benson Security Systems, Inc. (plant security)**
- **Bristlecone, Inc. (SAP integration)**
- **Chuck Blevis & Associates, Inc. (strategic planning consultation)**
- **Circadian Technologies, Inc. (shift schedule optimization)**
- **CMC (envelope wrapping)**
- **CompuLink Network Installation Services, Inc. (cabling installation)**
- **Ring Power Corp. (backup generators/ uninterruptible power supply)**
- **Solutions in Action, Inc. (material handling)**
- **Strong Communications, Inc. (A/V, digital signage, paging)**
- **Sun Microsystems, Inc. (server network and backup/recovery)**
- **Tann Corp. (oxidizer for environmental control)**
- **Technotrans America, Inc. (ink and chemistry dispensing)**
- **Troy Sheet Metal (duct work for presses)**
- **Wonderlic, Inc. (staff skill assessment)**

VALPAK MANUFACTURING CENTER: Sponsor Directory

The sponsors of this special supplement to *Printing Impressions* about the Valpak Manufacturing Center are:

Cox Target Media • Largo, FL • 727-399-3000
www.coxtarget.com www.valpak.com

The Austin Company
Cleveland, OH
440-544-2600
www.theaustin.com

BÖWE BELL + HOWELL
Wheeling, IL
847-675-7600
www.bowebellhowell.com

Burgess Industries Inc.
Plymouth, MN
800-233-2589
www.burgessind.com

**CapStone
Technologies, LLC**
Lincoln, NE
402-330-5018
www.captechno.com

Daifuku America Corp.
Reynoldsburg, OH
614-863-1888
www.daifukuamerica.com

Egemin Automation Inc.
Holland, MI
616-393-0101
www.egeminusa.com

Foldex Corp.
East Greenwich, RI
401-886-5557
www.foldex.com

**FANUC Robotics
America, Inc.**
Rochester Hills, MI
800-47-ROBOT
www.fanurobotics.com

Goss International
Durham, NH
603-749-6600
www.gossinternational.com

**Kodak Graphic Communications
(prepress & consumables)**
Norwalk, CT
203-845-7000
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Kongskilde Industries Inc.
Bloomington, IL
309-820-1090
www.kongskilde.com

Muller Martini Corp.
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**COX
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