

From the biggest converters to the smallest pilot lines, smart retrofits improve operations.

# Build the perfect converting machine



**W**hile anecdotal evidence from some of the biggest equipment suppliers to the converting industry

By Managing Editor  
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indicates that new-machinery sales are up, machine retrofits and line upgrades continue to provide the means by which many converters stay technically current. Sales and installations of these upgrades are still the way some sup-

pliers keep their shops busy.

At a recent symposium sponsored by Black Clawson Converting Machinery (Fulton, NY), Tony Scott of Black Clawson laid out the main factors converters face in making the decision between upgrading and purchasing new equipment.

Scott stressed that the decision needs to be matched to individual market conditions (mature market vs. growing, domestic vs. international), and that when printers are considering the upgrading or replacement of a line, they should consider those upgrades/purchases that will create the best value for their customers and drive optimal returns.

The examples you'll find here illustrate how savvy upgrades, and beneficial OEM partnerships, help

machine builders, converters and, in one case, a university tech center pilot line, run efficiently and cost-effectively.

## Video inspection morphs into defect detection

For flexo printer PolyCello, Amherst, Nova Scotia, who is growing so fast that they've installed eight PCMC CI presses over the past decade, inspection systems from AVT North America have been a specified part of each press installed since 1994.

But, according to COO Bryan Emmerson, PolyCello had quickly outgrown AVT's first generation of inspection systems and needed to take continuous improvement to the next level. They've been able to do that with AVT's PrintVision/Jupiter defect detection systems, which have now replaced the older AVT systems as specified OEM equipment.



*AVT's PrintVision/Jupiter defect detection systems are standard equipment on PolyCello's PCMC presses.*



An example of inferior corrugated bonding due to poor tension control. Georgia Tech's IPST conquered this problem with help from Hardy Instruments.

"Our continuous pursuit of excellence, which goes hand in hand with our customers' demand for higher quality, necessitates that we detect numbers and types of defects that wouldn't even have been noticed before," says Emmerson. "Our customers now might question something that they would have considered 'fine' three years ago—that's the nature of the printing business. AVT's systems help us take quality to the next level, and they have been very responsive to our training needs. In short, they help us perfect PCMC's already very fine 8- and 10-color CI flexo presses."

"The bottom line is, the AVT defect detection gives us increased accountability at the operator level because we have the ability to track defects," Emmerson says. "Secondly, the bar is being raised on a qualitative-analysis level. Both advantages help us serve our printing customers better."

### Quality tension control, quality paper

Retrofits and upgrades don't just drive improvement for commercial operations. The Institute of Paper Science and Technology (IPST) at Georgia Tech recently benefited from new tension controls from Hardy Instruments (San Diego, CA).

New tension control was implemented on the IPST pilot single-facer corrugator, according to Michael Schaepe, senior research engineer and director of the Institute's Corrugating and Converting Research Laboratory.

There are two unwind controllers used in the system, on the medium and linerboard unwind stands. Each Hardy tension controller takes a summed input from a set of non-Hardy half-

## How to analyze an equipment upgrade

**T**ony Scott of Black Clawson used a control systems retrofit as an example of how to analyze an upgrade—thus making the decision with your head as well as your gut. "Controls upgrades cause the least potential disruption to operations, and have a significant impact on machine capability," he says.

■ **Top 10 reasons for control system change:**

1. Increased downtime, loss of production,
2. Fewer resources to support older system,
3. Cost of upgrading less than the cost of maintaining,
4. Older system can no longer perform required tasks,
5. Older system can not perform new required tasks,
6. No support from system vendor,
7. Management wants/needs information not available from older system,
8. New control schemes can provide economic benefits not available with older system,
9. No one is adequately trained on the older system,
10. You're spending too much time on eBay looking for parts!

How to look at the upgrade:

#### ■ **Technology**

- Controller (PLC, temperature)
- Drives (digital AC and DC)
- Supervisory systems (SCADA/HMI)
- Servo systems (high precision, speed/position control)
- Digital communications (faster response)
- Implementation into plant information systems

#### ■ **Performance**

- Speed increase
- Greater range of material thicknesses/grades
- Throughput at the winder
- Fewer direct employee hours
- Tighter control of line
- Less tail length
- More machine uptime
- Replacement of obsolete, hard-to-find items

#### ■ **Market**

- Will it expand your market?
- Is it needed to match a competitive threat?
- Is it a short-term or long-term market need?

It's easier to match equipment output to mature market growth

#### ■ **Financial**

Are you looking for optimized return on investment (ROI) or return on net assets (RONA)?

Can you utilize another line if you purchase new? Or scrap the old line completely?

Will a new or upgraded line improve your LEAN implementation? Six Sigma? 5S?

According to Scott, the pace of new technology has shortened the product lifecycle of components: especially industrial PCs, DC and AC drives, PLCs, and gauging systems. To compound this, replacement components and software are not readily available.

He also points out that:

■ **A new production line, completely commissioned and running, can cost in excess of \$3 million and take more than one year from bidding to production.**

■ **An equipment upgrade, on the other hand, can cost less than \$200,000 and be started up in 90 days.**

bridge load cells and outputs an analog signal to a pneumatic brake.

Tension on the paper is approximately 3 pli on both lines and the pneumatic brake requirement is 0 to 15 psig. The two controllers are networked on an Ethernet network and communicate with a PC, and with each other, using Hardy's exclusive Control-Link network.

Prior to the retrofit, the operator had to manually adjust a pressure-regulating valve for braking on the unwind rolls. Load cells were in place and connected with an analogue panel meter. The operator adjusted brake tension according to the observed dial position. Problems associated with this process were slow response time and web-tension migration during extended operation.

After the Hardy tension-control systems were installed, the new equipment was put through a wide range of tests over two days to determine how well tension could be controlled.

The controllers provided precision control in a way that far exceeded expectations. At one point, a severely out-of-round roll was installed, of the type that could never actually be processed in the equipment, and the controller still maintained precision control.



*Converter Printpack reaped ergonomic benefits with Raptor air-powered chucks from Tidland.*



*At Georgia Tech's Institute of Paper Science & Technology, tension control had been a problem on a corrugated line. Here, Hardy Instruments HI 3600 tension controllers, installed at the operator's console, help provide precision control at all times.*

During startup the operator would thread up the corrugator while the controllers remained in stand-by mode. Once the line was ready, the operator would press the start key to activate the automatic tension-control system. By using a programmable start level, the operators could easily feed the paper through the machine.

During the runs, the line was tested to determine how the tension control would perform when the line was accelerated or decelerated at various rates. The tension was controlled extremely well in all acceleration/deceleration sequences.

Other key advantages: 1) control of paper tension maintains constant heat transfer and avoids single-face delamination at slow-down; 2) control of paper tension maintains constant heat transfer as the paper roll diameter decreases, ensuring constant conditions for the duration of the experiment; 3) the automatic control system allows personnel to run out-of-round rolls that otherwise could not have been run, or at

the very least would require rewinding; and 4) tension control during high speed operation (up to 1000 fpm) is critical to avoid costly corrugator wrap-ups that cause considerable downtime and possible equipment damage; regarding new and inexperienced technicians, the Hardy tension control system has virtually eliminated the concern of wrap-ups.

Tension control is vital in the corrugating process, as poor tension control will result in poor quality combined board, especially warp and poor bonding. Quality tension control results in quality product.

### **Better motors make better diecutters?**

Western Printing Machinery Co., Schiller Park, IL, is a custom builder of diecutters and rotary diecutters for both converters and printers in the graphics-arts industries. In-line finishing equipment is also manufactured, including perforators, plow towers, folders, gluers and the like.

Substrates handled include folding carton stock, flexible film, and corrugated, in addition to nonwovens, foils and paper.

Shortly after GraphExpo 2004, WPM decided to install Cartridge DDR motors from Kollmorgen (Danaher Motion, Wood Dale, IL) on some of its converting and diecutting systems.

WPM Inc. was impressed with the Cartridge DDR's ability to simply mount and run, saving WPM machine builders critical time and resources. The Cartridge DDR bolts directly onto the system and reduces the amount of motor needed to drive component parts. With this technology, WPM's converting systems are now more productive and efficient.

"Our ISD Series, for Integrated Servo Design, features the Kollmorgen motors," says Kim Markovich, vp sales & marketing for WPM. "The

reason we chose them was, in a word, technology. They offered the most torque in the smallest package. They're maintenance-free, bearingless, and are quick to replace in case of failure—less than 30 minutes.

"We sold our first customer on this type of system in February of this year and we intend to follow that up with several more," he says.

### Retrofit not a wrenching experience

Rugged Raptor chucks, from Tidland, were the perfect choice to replace older models and save operators the "wrenching" maintenance and core size changes of the older variety on a European turret unwind at Printpack's Jackson, TN plant.

"Ease of operation was the chief thing on our minds when we searched for unwind chucks for our laminator line," says Stan Jones,



According to Kim Markovich, Kollmorgen motors provided "the most torque in the smallest package."

maintenance manager at the plant. "Previously, operators had to turn wrenches, which was definitely not ergonomic. We became a beta test site for the Tidland Raptor line two years ago."

The Raptor series, designed for shaftless applications, offers toolless air-powered changeover in less than a minute. Ergonomic benefits to operators are that they don't have to remove the entire chuck from the machine for routine maintenance or for core size changes.

According to Jones, Printpack ordered a complete set of the Raptor chucks, plus two spares. "Tidland made the retrofit pretty painless," he says. "We sent drawings, and the Tidland rep took the proper dimensions.

"It's worked out great—our operators love the new chucks," concludes Jones. "We have the whole gamut of

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Cartridge DDR motors from Kollmorgen mount directly onto a converting machine, using the machine's existing bearings to support its rotor.

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