



Case study | By AP staff  
Faster book finishing

# Swiftly downstream

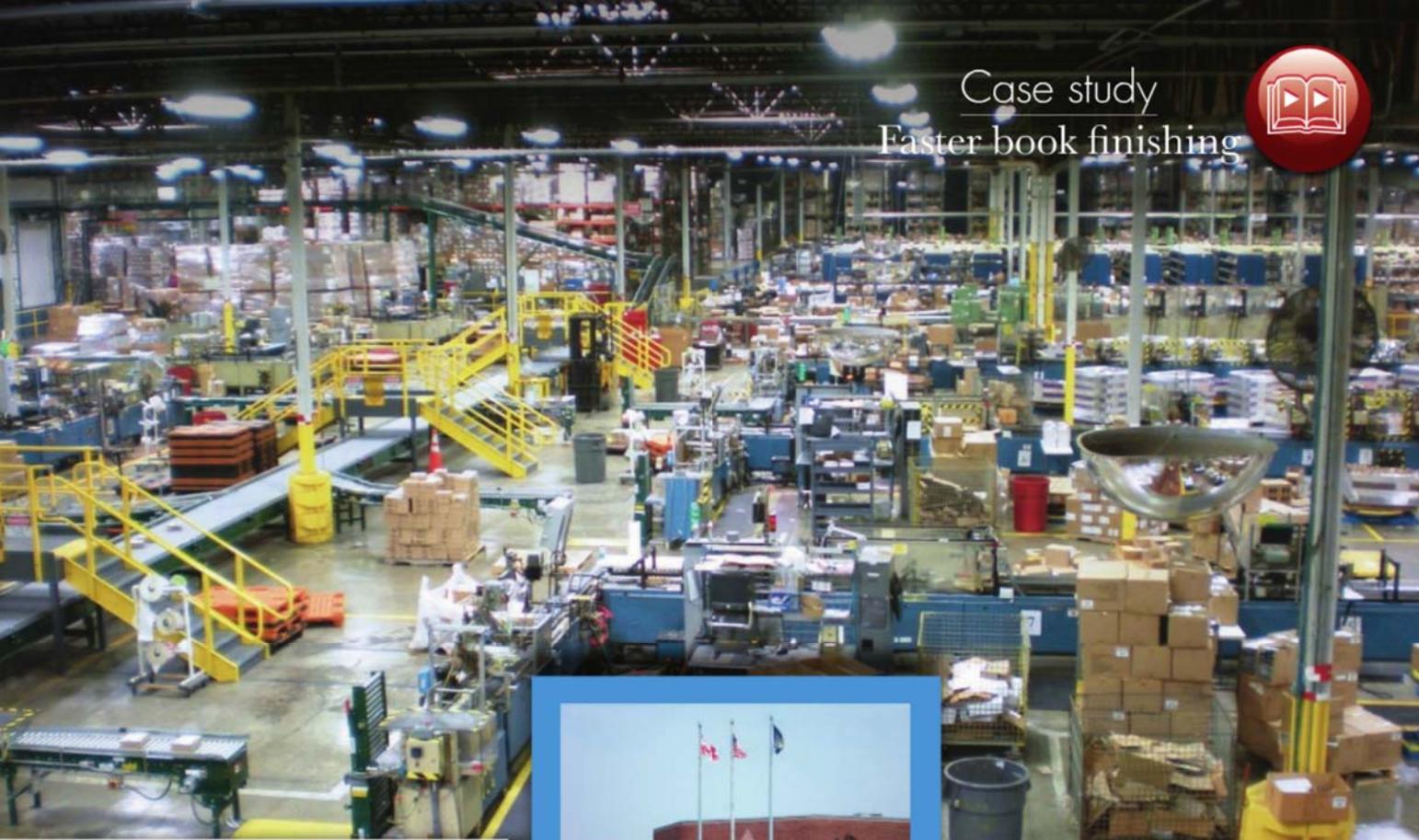
Conveying solution streamlines throughput

**H**arlequin ([www.eharlequin.com](http://www.eharlequin.com)), the world's largest publisher of romance novels, recently eliminated finishing bottlenecks with integrated, inline digital print and binding equipment. Its distribution center in Depew, NY, employs advanced conveying technology to minimize product damage and downtime, reaching a throughput rate of more than 1,000 paperback books per hour.

Slip-Torque provides the gentle handling needed to transport Harlequin's book blocks from the stacker to the binder.

Harlequin's digital print line can print and finish more than 1,000 paperback books per hour.





Harlequin's 400,000-sq.-ft. distribution center in Depew, NY. The facility handles 130 million books annually.



### High-volume publisher's need for short runs

With bestselling authors like Debbie Macomber, Susan Wiggs, Linda Lael Miller, Sherryl Woods, Gena Showalter and more than 1,000 others, Harlequin produces 130 million books annually in North America alone. These travel through a 400,000-sq.-ft. distribution center in Depew, NY. Another 120 million books annually are distributed internationally. The company manages over 2,000 title configurations each year for the North American market in paperback format, trade size and hardcover. Its selling channels include retail, book club and its own e-commerce portal.

Since the mid-1990s, order volumes have become unpredictable. To ensure inventory, Harlequin printed additional copies on offset equipment, much of which never left its warehouse. For a number of years prior to setting up its short-run digital printing operation, these additional copies averaged 7.5 million units per year. Even with this overproduction, production calls were not always adequate and offset reprints took too long to satisfy market timelines.

"For some time we had been looking at ways to print some of our books digitally," says John Reindl, general

## About Harlequin

Toronto-based Harlequin Enterprises Ltd., a wholly owned subsidiary of Torstar Corp., is the global leader in series romance. According to the Romance Writers of America ([www.rwa.org](http://www.rwa.org)), romance fiction is more than a \$1.3 billion business with the largest share of the consumer book market.

Harlequin publishes more than 110 titles a month in 28 languages and in 114 international markets. Since its inception, the publishing company has sold approximately 5.8 billion books.

The company has offices in 19 countries. In 2009, Harlequin celebrated 60 years of book publishing.

See [www.eharlequin.com](http://www.eharlequin.com).



manager, Harlequin Distribution Center. "The technology finally got to a point where the digital printers could support the type of paper that we use. We wanted to mimic the print quality of offset so that the consumer would not notice the difference.

"We also wanted a solution that we could set up in our own distribution center," explains Reindl. "So our approach was to bring in digital printing to facilitate our short-run printing needs, which is anywhere from 500 to 4,000 copies of any one title, to top off the main offset runs. But we still planned to outsource the bulk of our printing to our offset printer."

"With 95% of our books in the same format, and few changeovers associated with our production process, we felt we could target a higher degree of automation and inline processing than we had seen elsewhere," Reindl adds. Harlequin's vice president of operations, Jim Robinson, was responsible for the designing the company's inline digital printing process.

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### Integrated print finishing

Harlequin selected an Océ (www.oce.com) VarioStream high-volume, continuous-feed printer, a toner-based solution that digitally prints almost 10,000 books in an eight-hour shift. One hurdle was some of the back-end finishing processes' limited capacity.

After printing, the 16-page signatures are cut, folded and stacked to create book blocks. The blocks are bound and sent to a three-knife trimmer before they exit as finished books.

"Many digital printers print the books and then do the finishing offline," says Reindl. "We wanted to

do it differently, with all of our production inline, meaning we would start with a roll of paper on one end, and a finished product would come out the other end." Harlequin needed a solution that would move book blocks from one part of the production process to another. "But the book blocks are still loose signatures," he says. "The importance of getting the book blocks out of the folder and to the binder without the book blocks tipping over, and maintaining their stability, was a critical part of the process. We searched and found only one solution that would allow us to do this."

Harlequin selected a multifaced, integrated conveying approach designed and built by Shuttleworth Inc. (www.shuttleworth.com) specifically for conveying cut-paper products. The design incorporated the following systems:

- Star Rollers |** As the book blocks exit the stacker toward the binder, they travel on a 15-ft.-long conveyor equipped with Star Rollers developed by Shuttleworth. These eliminate shingling or creeping of the bottom layers of paper when stacks are transported and accumulated on the conveyors. The Star Roller profile (shaped like a star) enables loose stacks of paper to be conveyed and accumulated between the stacker and the binder without disrupting the integrity of the stacks, because only the points of the star touch the stacks. Regular rollers would push the bottom sheets back, resulting in a shingled stack, while belt conveyors are incapable of accumulating stacks of paper.

- Slip-Torque Conveyor Technology |** This conveyor is also outfitted with Slip-Torque Technology from Shuttleworth. Slip-Torque employs polished stainless steel shafts individually powered by a continuous chain. These shafts are covered with segmented, loose-fit rollers (Star Rollers), which form the conveyor surface. Slip-Torque provides the gentle handling needed for transporting Harlequin's book blocks from the stacker to the binder.

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"It is the weight of the products being conveyed, combined with the coefficient of friction between the shafts and the inside diameter of the rollers that provides the driving force," explains Shuttleworth's Ralph Matchett. "As the weight of the product increases, there is a corresponding increase in the driving force supplied. As products stop, the segmented rollers beneath them also stop, creating very low backpressure accumulation and significantly reducing product damage."

### ◎ Buffer Accumulation Conveyor |

If the line is running normally, there will be no accumulation of book stacks on the conveyor. The stacks would just be flowing through to a blade stop before entering the binder, which indexes one stack at a time into the binder. But if the binder were to go down, then the book stacks are diverted into a buffer conveyor, (also Slip-Torque enabled) which can accept up to 85 stacks (5 minutes worth of throughput). Once the binder is cleared, the book stacks will automatically feed into the binder.

The buffer conveyor reduces total line delays by allowing the printer, folder and stacker to continue production for a cost-effective period of time when the binder is down. This gives greater productivity, and reduces product damage and operating time.

"We thought we would have some downtime with the binder and the cutter, so we built in a buffer conveyor," says Reindl. "If the binder goes down, we have the buffer that allows us to accumulate the book stacks until the binder comes back up and then it feeds them automatically right back into the binder. We haven't had to use it much, but when we have had to, it has worked quite well."

### Lower inventory

With its streamlined digital printing and finishing capability, Harlequin can now cost-efficiently print and finish, in-house, whatever overages are needed on a just-in-time basis.

The company also can print and finish short runs for select titles that require very small initial quantities.

The new print and finish line has significantly improved Harlequin's inventory load, resulting in a 15 - 20 percent reduction in titles held in stock.

"The key value of the conveying system is that it supports our inline process, which is critical to the success of the system," says Reindl. "Our print

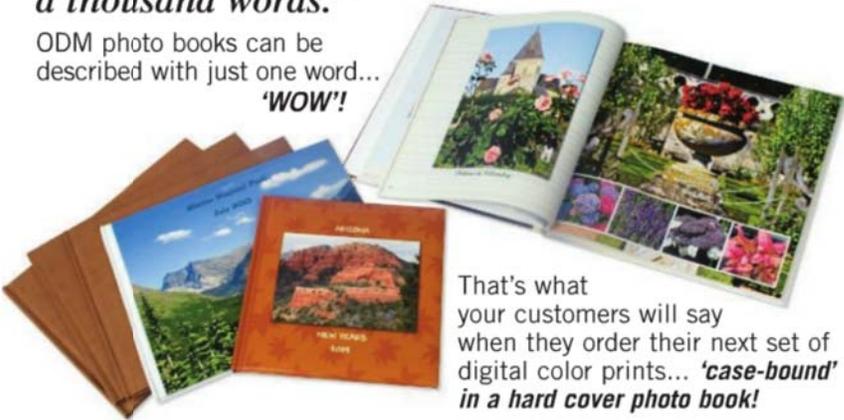
and finish system would not have been possible if we did not have a solution that allowed us to maintain stable book blocks coming out of the stacker and going into the binder, and a back-up solution to keep the print and finish throughput operational in the event of binder malfunction." ◎



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- ✓ Digital Color Tables of Contents
- ✓ Digital Color Backmatter
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- ✓ Digital Color Outside Covers
- ✓ Digital Color Endpapers
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