



A warehouse control system and new technology are the heroes at Simon & Schuster's New Jersey distribution center.

By Bob Trebilcock,
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Simon & Schuster: A twice-told tale

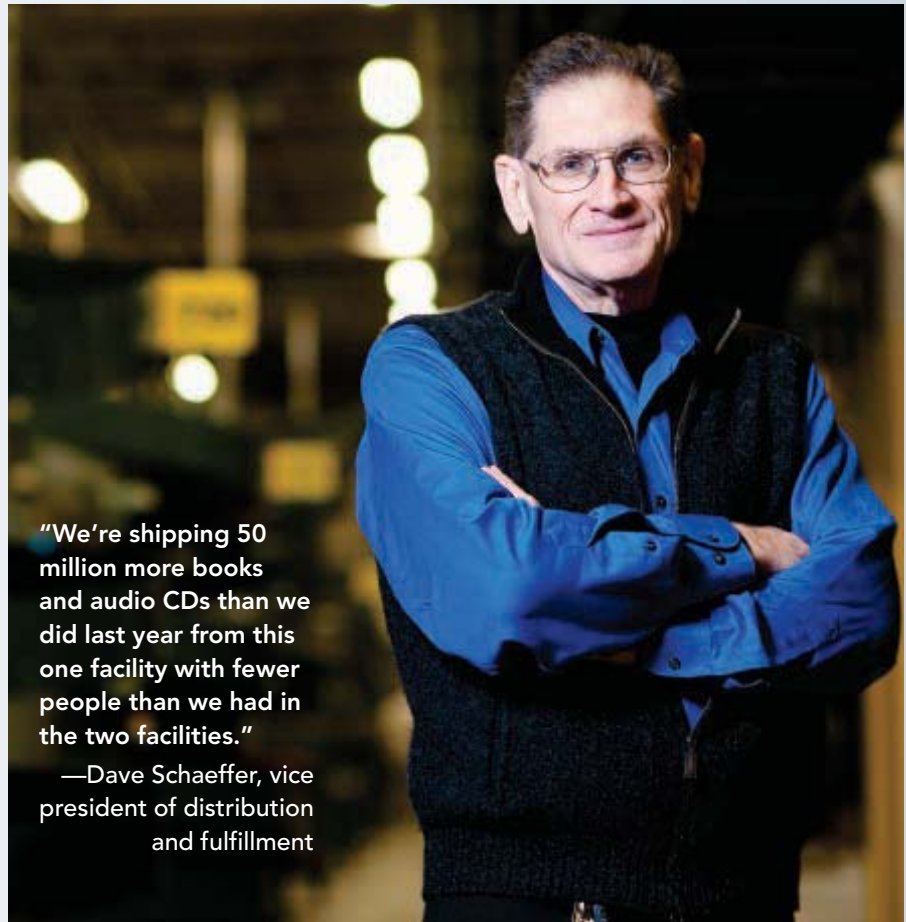
Every distribution center has a story to tell, especially one that's gone through a significant system upgrade. Some have happy endings, some are thrillers, and some are mysteries (What were they thinking?).

The story of Simon & Schuster's 600,000-square-foot book distribution center in Riverside, N.J., is a little like a historical novel, one that unfolds carefully over time with a number of chapters through the years. Today, the facility ships more than 135 million units a year, relying on a mix of materials handling equipment and technologies that have been optimized around flexibility and efficiency. That wasn't always the case, but it won't ruin the story if we jump ahead to the end first.

Most recently, Simon & Schuster implemented a new warehouse control system (WCS; AL Systems, www.alsystems.com) to synchronize manual processes, like full pallet and pick-to-pallet picking operations, with a voice-driven piece picking operation that also uses conveyor and a sliding shoe sortation system. The WCS also updates the warehouse management system (WMS) in real time, ensuring that all of the components of an order arrive at the dock at the right time to get best-selling titles to retail and wholesale booksellers.

The improvements also allowed Simon & Schuster to consolidate order fulfillment operations that had been spread across 1.2 million square feet in two facilities into the one 600,000-square-foot space in

Riverside. "We're shipping 50 million more books and audio CDs than we did last year from this one facility with fewer people than we had in the two facilities," says Dave Schaeffer, vice president of distribution and ful-



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PHOTOGRAPHY BY JEFF FUSCO

fillment. “All told, we increased our throughput by 50% while adding just 20% more manhours.” But, that’s only part of the story.

Setting the stage for improvements

Simon & Schuster, the publishing division of CBS Corp. and one of the best

known names in consumer publishing, was founded in 1924 by Richard L. Simon and M. Lincoln Schuster. The publisher releases books under the Simon & Schuster name as well as through such well-known imprints as Pocket Books, Scribner, Free Press, Atria, Touchstone, Gallery Books, Howard Books, Threshold Editions, Atheneum Books for Young Readers, Little Simon and Simon Spotlight, and audio under the Simon & Schuster Audio banner. Publishing nearly 2,000 titles a year that are distributed in more than 100 countries, the list of authors includes Stephen King, Jodi Picoult, Glenn Beck, Vince Flynn, David McCullough, Mary Higgins Clark and Bob Woodward. Simon & Schuster also provides distribution services to independent publishers.

Today, about 70% of Simon & Schuster’s annual volume is shipped from Riverside; the rest is shipped directly to accounts from the printer. The facility supports several channels including large retail customers like Borders and Barnes & Noble; online retailers like Amazon.com; wholesale distributors; independent bookstores; price clubs and mass merchants; as well as a limited direct-to-consumer business.

That wasn’t always the case. The Riverside facility was originally built in the 1950s by Macmillan Publishing Co., which had a significant textbook and reference business. When Simon & Schuster purchased Macmillan in 1995, it already had its own

600,000-square-foot distribution center in Bristol, Pa.

For years, says Schaeffer, the publisher operated both facilities. That’s because the two facilities had distinct layouts to support unique businesses. Simon & Schuster’s facility in Bristol was built for the consumer market: The facility carried large volumes of a relatively smaller list of titles with a short life span—the latest bestsellers were shipped to Bristol from the printer and then quickly turned around to fill demand at stores.

The Riverside facility in its original configuration was just the opposite: It carried small volumes of a large number of SKUs that might remain in reserve storage for years. That’s because library reference books might have a shelf life of many years. “When I started working there, we had one title that we had only shipped twice in two years,” says Schaeffer.

Originally, Simon & Schuster wanted to combine the two facilities into Riverside, which had a total of 48,000 pallet positions. The problem: The facilities used different pallet sizes, which meant the inventory in Bristol wouldn’t fit in the racks in Riverside. “We were constantly chasing our tail capacity-wise because our volumes continued to grow and the Riverside facility wasn’t as space efficient as it needed to be,” says Schaeffer.

Starting in 2000, however, Simon & Schuster began to write a new distribution chapter through a step-by-step series of improvements. Each incremental improvement brought new capabilities and capacities to Riverside and laid the foundation for a new order fulfillment strategy and consolidation of the two facilities.

Narrow aisle racking and lift trucks make the most of Simon & Schuster’s storage space.





Cartons are delivered by conveyor to and from the order fulfillment and mezzanine areas in the facility.

that changes according to how the titles are selling in the market,” says Schaeffer. “Our inbound order volume can vary by a magnitude of five times from a low business day to a peak business day.”

Being able to respond to sudden shifts in volume led to more changes with a goal of creating a system that is accurate, efficient and flexible, especially around piece picking.

Beginning in 2008, Simon & Schuster re-engineered the split case picking area, replacing a traditional serpentine system, where an associate picked from pallet flow rack and worked his way through the pick zones, to a centralized split case picking area directed by voice and serviced by an automatic case erector and a conveyor and sliding shoe sorter similar to the shipping sorter.

To gain capacity, a mezzanine was added. That addition created room to consolidate the titles still shipped from Bristol. Finally, the project included a new warehouse control system. That measure provided more accountability and traceability as cartons traveled through the warehouse. “With the new system, we can record more information for quality control,” says Schaeffer. “In the old system, if an order was rejected, we had to check it against a lot of paperwork. In this system, we scan the ISBN number to check the order, which allows us to automate the QC processes.”

Bringing it all together

Once all of the improvements were in place, Simon & Schuster was able to devise a new distribution strategy.

Writing a new chapter

The first of those steps involved gaining capacity. In 2000, the traditional pallet racks in Riverside were converted to a very narrow aisle (VNA) storage system and VNA lift trucks were added to the fleet. That change increased the case storage capacity of the building by about 45%, says Schaeffer.

The next year, Schaeffer outsourced returns processing to a third-party logistics provider, freeing up another 25,000 square feet in Riverside. In all, those two projects freed up about 50% of the storage space.

Those space-saving initiatives were followed by three more fundamental improvements. In 2004, Simon & Schuster consolidated operations from a Canadian warehouse into the New Jersey facility, increasing volume by 10%. To accommodate that volume plus internal growth, two more shifts were added.

Once the third shift was in place, Simon & Schuster took on a series of technology and equipment upgrades in the 50-year-old facility.

- In 2005, a homegrown, legacy WMS was replaced with a Tier 1 WMS package.

- In 2007, the existing conveyor and shipping sorter were upgraded

to include a high-speed, sliding shoe sorter. The combination doubled the carton processing speed from less than 60 cartons per minute to 120 cartons per minute.

- That same year, the staging and shipping area was reconfigured and upgraded with the addition of four stretchwrappers. The palletizing area was tripled in size from having room to build 120 pallets to having room to build 384 pallets. And, additional space was created to stage about 1,000 pallets for outbound delivery. “We only have 11 dock doors, so we need to be able to stage pallets, especially on peak days,” Schaeffer says.

Designing for flexibility

Despite those changes, the facility was still constrained for space. For instance, there might be 25 trailers in the yard that still had to be unloaded. “Although we have 48,000 pallet locations, at any given time, we might have just 100 positions open,” says Schaeffer. “Since we release between 50 and 100 new titles a week, if we don’t ship today, we can’t receive tomorrow.”

In addition, the volume of business going through the facility is variable. “Since we don’t own our own stores, we have to respond to customer demand and





Simon & Schuster relies on extendable conveyors to receive floor-loaded trailers.

With order fulfillment processes consolidated in Riverside, the Bristol facility now serves two functions. For one, it provides reserve and over-flow storage for Riverside. If the inventory for a title falls below a 90-day supply in Riverside, pallets of inventory can be shipped from Bristol to replenish that title. In addition, the Bristol facility ships seasonal items, such as calendars.

The Riverside facility is now more in tune with an industry that is undergoing significant changes as e-books become an ever-larger percentage of the business. As such, Schaffer sees only modest growth in sales volume, but tremendous growth in the number of units and titles being sold. Attracting additional independent publishers as distribution clients is an ongoing strategic objective. Going forward, Simon & Schuster is shipping a smaller number of units per title, but more titles than in the past.

While full pallet and pick-to-pallet carton picking operations are still directed by RF and bar code scanning, the combination of a new WCS, the automatic carton erector, conveyor and sortation equipment and voice recognition technology has driven a new level of productivity and accountability in the piece picking area.

"Prior to putting in the carton erector, we made all the cartons by hand in the pick zones," says Schaeffer. "Now,

the WCS directs the movement of the cartons from one zone to another." The system can also balance the work load by moving the cartons from a zone that is taxed to a zone with available capacity. "If the next zone is busy, the WCS will divert a carton to a zone that is idle to optimize the flow through the facility," Schaeffer says. "In the past, we were only as fast as the slowest line."

As a result, where it once took up to 7 hours to move a carton through the line on a busy day, a carton can now be completely picked in 2.5 hours, even during a busy period.

While the old paper picking method was accurate, voice-directed picking has brought improvements in productivity and accountability. The system, for instance, ties an associate to a pick. If there's a problem with an order, "we can identify who handled the order and find out what happened," says Schaeffer.

Simon & Schuster has also

As part of the latest improvements, voice recognition and a sophisticated warehouse control system were added to improve picking processes.

implemented an employee incentive program that rewards employees for exceeding a certain number of picks per hour along with a standard for accuracy.

The most important key to success is that everyone working in the facility, from the supervisors to human resources personnel and company executives, learned how to do voice picking. "Everyone has become an advocate for voice from the top levels of our organization on down," says Schaeffer.

In addition to throughput and productivity improvements, consolidating operations at Riverside has saved freight, since two orders going to the same store may have been shipped from two different facilities in the past, and improved the customer experience. "We constantly got complaints from customers because they received their order in two different cartons on two different days," says Schaeffer. "Now, their order is delivered complete."

Despite those improvements, the final chapter to the distribution story in Riverside has yet to be written. "Our next step will be to implement a labor management system across the warehouse," says Schaeffer. "With engineered labor standards, we believe we can achieve greater productivity and greater pick rates." □



The book on distribution

The improvements allowed Simon & Schuster to synchronize manual processes

In Simon & Schuster's new materials handling system, a warehouse control and warehouse management system (WMS) work together with bar code scanning and voice recognition technologies to manage inventory and orders.

Receiving: Simon & Schuster gets close to 100% advance shipment notifications (ASNs) from its printers. Inbound freight is scheduled by appointment and prioritized by criteria such as how well an item is selling. A shipment of a best-selling title, for instance, may be given priority over a replenishment title. About 80% of the inventory received (1) in Riverside arrives in full pallet quantities, although the facility receives some returns and some print-on-demand titles on pallets with mixed SKUs. Pallets are unloaded by lift truck. New titles that have never been stocked before are weighed and measured by the cubing and dimensioning system to create a profile for storage in the WMS. Otherwise, a bar code label accompanying a pallet is scanned to determine a location on the dock where the pallet will be staged (2) for putaway.

Putaway: Once product is staged on the dock, it's putaway into storage within 24 hours. Pallets are picked up in the staging area by the swing reach trucks that operate in the very narrow aisle storage areas (3) and are then directed by the WMS to a putaway location. The operator scans a check digit to confirm the putaway location and the pallet is now available in the system. In the current configuration, full cases are picked from lower levels in the storage area while the upper levels are used for reserve storage.

Replenishment: Pick waves are run daily in the WMS system, which also generates

replenishment orders throughout the warehouse based on the stock needs in split case (4) and full case picking (5) areas. To replenish the split case picking modules, for instance, the WMS directs an associate to pick the required cartons as if they were any other pick. The cartons are labeled and inducted onto the conveyor system (6) that delivers them to the back side of the pick module for replenishment.

Picking: When it comes to picking, an order may be filled with a full pallet pick (3), split case picks (4), full case picks (5), or a combination of the three. When the WMS creates an order, it will generate tasks in three hierarchies. For instance, if a customer asks for 1,057 books, and there are 1,000 books on a pallet and 10 books to a carton, the

Simon & Schuster Riverside, N.J.

SIZE: 600,000 square feet

PRODUCTS: Books, audio CDs

THROUGHPUT: 11,500,000 units per month

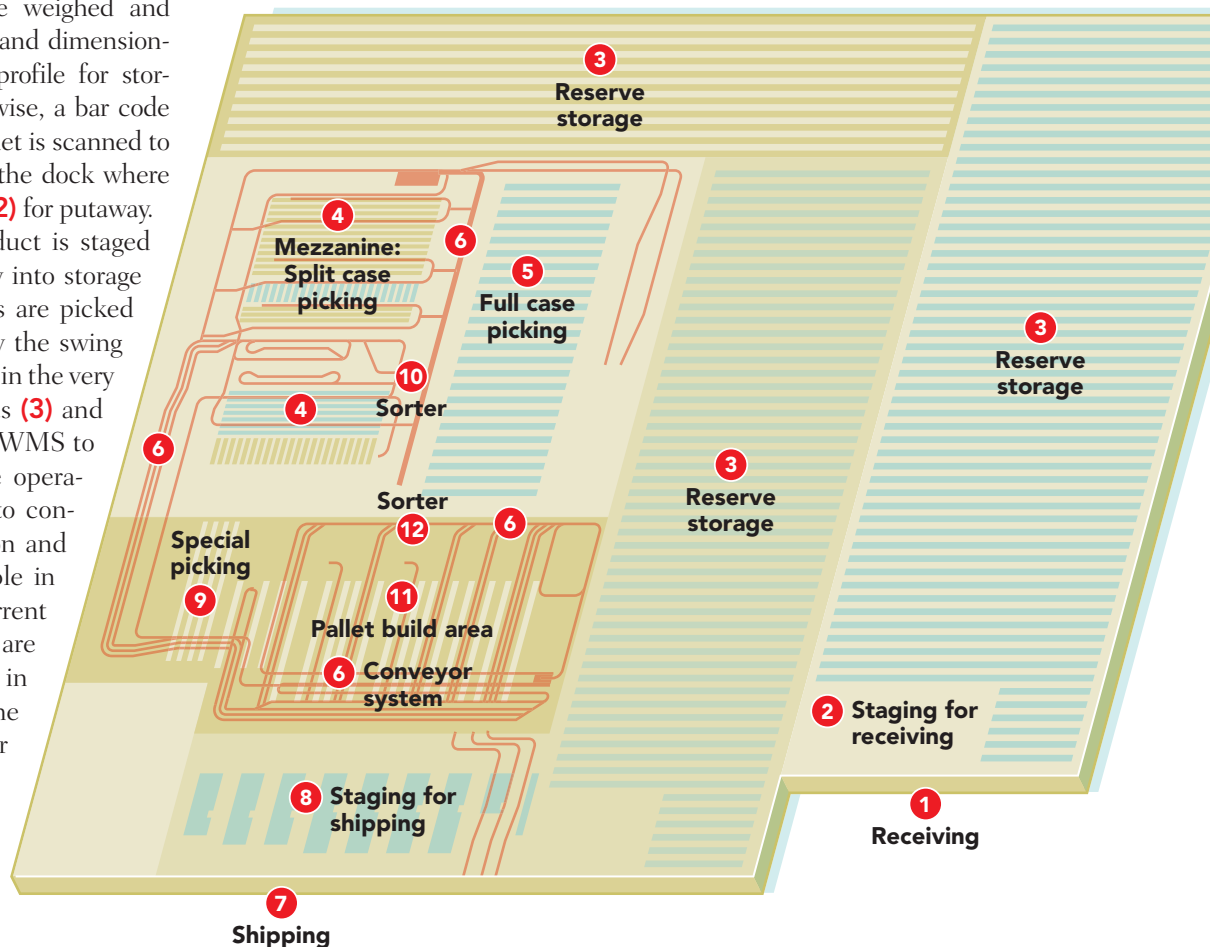
STOCK KEEPING UNITS (SKUs): 25,000

SHIFTS: 3 shifts/5 days per week

EMPLOYEES: 225 in operations

system will generate an order for one pallet, five cartons and seven individual picks. The system then synchronizes the picks so that all of the components of that order arrive at the shipping dock (7) at close to the same time by supplying the warehouse control system (WCS) with the carton records for that order. The WCS tracks the cartons and updates the WMS on the status of the order on a real-time basis.

Pallet picking: This is the most straight forward pick. The WMS directs an operator to a pick location (3). Once the operator confirms the pick by scanning a bar code, he is directed to a staging



location (8) on the dock.

Carton picking: The Riverside facility stocks some titles that are perennial best-sellers. These are stocked in a special storage area (9) so they can be picked directly to the conveyor (6). For the remaining titles, picking instructions are delivered by the WMS to the operator on an RF terminal. Cartons are picked to a pallet (5), and an operator may be picking multiple orders for multiple customers. Once the pallet is full, the operator drops it off at a conveyor induction area, where the cartons are loaded onto the conveyor (6). They are conveyed to a quality control area, where the cartons are weighed and compared to a calculated expected weight. Following a bar code scan, each carton is sorted (10) to a pallet building area (11) near the dock. Once the pallet is built, it's stretch-

System suppliers

Warehouse control system and voice recognition system: AL Systems, www.alsystems.com

Voice recognition engine: Voxware, www.voxware.com

Voice recognition devices: LXE, www.lxe.com

Warehouse management system: Manhattan Associates, www.manh.com

Conveyor system and sorter: Hytrol, www.hytrol.com

Pushback, carton flow, pallet flow, drive-in and bin rack systems: Frazier Industrial, www.frazier.com

Narrow aisle (VNA) lift trucks: Landoll (Drexel), www.landoll.com/mhp/drexel/SL-50/

Pallet handling lift trucks: Hyster, www.hyster.com

Mobile and fixed bar code scanning devices: Psion, www.pSION.com

Printers: Zebra Technologies, www.zebra.com

Weighing and dimensioning: Quantronix, www.cubiscan.com

wrapped and staged (8) on the dock.

Split carton picking: To initiate picking in the split carton area (4), cartons are automatically erected and labeled with two bar codes that can be scanned on two sides. The empty carton is then sorted by the WCS to the right zone to

initiate picking. Picking is directed by the voice system. Once all of the items in the first zone have been picked, the WCS sends the carton by conveyor (6) to other zones until all the items for that carton have been picked. If the pick can't be completed, the carton will circulate until a title has been replenished or it goes to a quality control area for completion. Once all the items for that carton have been successfully picked, it's conveyed to the weighing and cubing station. A sorter (12) in between the picking areas and the shipping dock (8) diverts the last carton of every order to a station where the shipping papers are added. The carton is then conveyed to the pallet build area (11). There the pallet is built, stretch-wrapped and married to other components of the order on the dock (8).

Shipping: Once all of the components of an order have been assembled on the dock, they are loaded onto a truck for shipping (7). □