



FROM ZERO TO FULL AUTOMATION SORTATION TRANSFORMS DSW'S RETAIL REPLENISHMENT

DSW
DESIGNER SHOE WAREHOUSE®

Designer Shoe Warehouse – DSW – is a leading footwear and accessories retailer that offers a wide selection of brand name dress, casual and athletic footwear and accessories for women, men and children.

With over 430 retail outlets in the U.S., as well as 370 leased departments for other retailers and extensive online sales channels, DSW has been growing and seeking to deliver more value to its customers.

“As the company evolved, and our relationship with our vendors became stronger, we became less of a close-out, opportunistic company and we started buying in-season merchandise,” said Jeff Girard, Senior Vice President of Distribution & Fulfillment at DSW. “What that meant was we were able to tell our vendors what sizes we wanted, and we realized we had a big opportunity to change the way we replenish.”

CUSTOMER SPOTLIGHT

Designer Shoe Warehouse (DSW)
Distribution Center
Columbus, Ohio
www.dsw.com

FROM ZERO TO FULL AUTOMATION ENABLING A DYNAMIC REPLENISHMENT MODEL



DYNAMIC STORE REPLENISHMENT

DSW initiated a strategic shift from a seasonal push model, to a dynamic store inventory replenishment model. The DSW Distribution Center in Columbus, Ohio is the company's main facility for retail replenishment of footwear. In the past, store inventory was replenished through a seasonal push strategy, serviced by a manual case-based, cross dock operation.

When a store sold out of several sizes of a popular shoe – size 7, size 8, size 8 ½ – the only way the store could re-stock those sizes was to order an entire case of the full size range. This limited DSW's ability to consistently offer a full range of high-quality products to its customers.

To reduce lost in-store sales, DSW created a pilot program that used in-season unit replenishment by shoe size; initially this was only for selected, fast moving Stock Keeping Units (SKU). It was a manual process, where associates would pull sizes from open cases of the selected products. Demand exceeded expectations: DSW initially planned to replenish up to 1 million units the first year, and ended up shipping 4.3 million individual units.

This "success" pushed the manual, labor-intensive system for unit level size replenishment to its limits... and beyond. As a result, DSW was convinced that unit replenishment could be a very successful and profitable business model – but that warehouse automation was essential to making it happen.

SORTATION CHOSEN FOR COLUMBUS DC AUTOMATION

The company considered other warehouse automation options, such as robots and put to light. DSW quickly concluded that unit sortation represented the best technology for the Columbus Center:

- › Cross-belt sorters offer the high throughput rates for the company's current and future requirements
- › The technology had been successfully utilized in other major footwear distribution center applications
- › Cross-belt sorters provide high levels of performance and uptime and could be efficiently fit within a tight existing distribution center footprint

After careful consideration of several sortation solutions, DSW chose the BEUMER BS-7 cross-belt sortation system. BEUMER was selected to provide a complete sortation solution, and to work closely with DSW Distribution Center management and other key warehouse automation vendors to transform the Columbus Distribution Center – to take it from a manual, cross-dock distribution operation with zero automation to a state-of-the-art, automation-driven logistics operation.

According to Girard, BEUMER was selected for several reasons: "One, they had state-of-the art technology – they were using brushless track for their carriages, and not only was it state of the art, but it was proven," he said. In the course of considering the various sortation bids, DSW personnel had the opportunity to tour a major shoe manufacturer's distribution facility, and see the BEUMER sortation technology handling shoe unit sortation very effectively. Girard also felt that the flexible design of the chutes would allow variable sizes of footwear boxes to be ran through the sortation system.

INTEGRATING INTO EXISTING STRUCTURE

One of the most daunting challenges facing the team was the existing Columbus building: built originally during World War II for aircraft manufacturing, it was converted to warehouse use by DSW in the early 2000s. The optimal location to place the sorter within the warehouse was on an underutilized mezzanine located above the main floor – and it was a tight fit.

"The problem with the mezzanine is its 1400 feet long and only 100 feet wide," said Girard. "It was the best place to put a sorter because it would be out of the way. The challenge for BEUMER was, they had to design it to fit on the mezzanine, and they actually did a fantastic job."

AUTOMATION DRIVES MULTIPLE CHANGES

When going from zero to full automation, another key challenge is managing all the required changes for the people, processes and physical equipment in the Distribution Center.

Working together, DSW leveraged BEUMER's technical experience and know-how to efficiently plan and implement the necessary changes. The DSW Operations team also spent many hours defining what processes needed to change to generate maximum return on the new automation.

"Prior to the sortation system, a lot of the full cases that we sent to the stores cross-docked," Girard said. "We didn't need to store them in the distribution center, and this changed the way we operated."

"So we had to put up more storage. In addition to that, we had to figure out a way to stage our merchandise so that we could keep the sorter fed and be as productive as possible," he said.

To do this, DSW expanded and modified the racks where cased footwear is stored prior to sortation. New racks and conveyors were set up to create a pallet based wave bank and full case pick module. DSW is able to release pallets of different shoe styles – men's dress, men's casual, for example – staged in specific order for de-casing and induction on the BEUMER sorter.

This allows DSW to sort product by store layout, making the in-store stocking process extremely efficient.

Conveyors carry the cases to the de-casing area where associates cut open and de-case the individual shoes and put them on conveyors to be carried to the BEUMER sorter. Separating these processes allows for efficient labor utilization while leveraging the high-speed BEUMER inductions.

BEUMER SORTATION SYSTEM

The BEUMER cross-belt sortation system is a high-accuracy, high-throughput system with extensive use in retail and direct-to-consumer order fulfillment applications. It is designed to deliver 99.99% sortation accuracy – accuracy it delivers at Columbus and other distribution operations.

The system at the Columbus Center is engineered to support throughput up to 10,000 units per hour. It has a total of four high-speed induction units and 250 double level half-pipe chutes.

Four automatic induction units are positioned at one end of the sorter with cross-induction capabilities. This allows for the exact induction of shoe boxes in the smallest sorter belt pitch, enabling the highest possible system throughput. The system balances the group of induction lines to ensure product flows on the sorter in wave sequence.

BEUMER's state-of-the-art induction technology dynamically adjusts the acceleration and speed of each induction belt, based on both the next available sorter tray and the position of the item on the induction line, significantly improving positioning accuracy on the target tray. Each induction unit has a capacity of 2,908 units per hour, enabling the entire induction platform to supply a total of 11,632 units per hour to the sorter.

Shoe boxes pass through an item re-centering system then to a 5-sided overhead camera scanning system unit where each box's SKU/UPC is scanned. The scanner passes the barcode information to the sorter control system. Based on order information received from the WMS, the BEUMER sorter control system dynamically determines the optimized sort destination based on customized DSW business rules and the current state of the machine to minimize re-circulation.

UNIQUE TECHNOLOGY DRIVES BEUMER CROSS-BELT SORTER

Unique to the BEUMER System, the cross-belt uses a high efficiency, on demand, contactless energy supply to transfer power from the stationary sorter track to the moving sorter trays. DSW also saves energy via BEUMER's state of the art OptiDrives which are more energy efficient than linear drives.

Specially designed to operate more efficiently and use up to 80% less energy compared to asynchronous linear motor drives, the BEUMER OptiDrive delivers up to 66% greater start-up force and features a proven online diagnostic and remote maintenance system. These sorter features help reduce the number of system components by 50 percent and the contactless energy supply requires minimal maintenance and provides very high sorter availability.

The BEUMER system has 250 double level chutes in three rows, located on either side of the sorter, so that products can be discharged to any of the 500 destinations. Each chute provides two unique sort destinations via upper and lower chambers. The chutes are Teflon-coated, half-pipe chutes with custom-designed chute end stops.

"If you think about it, each one of the 12 million units we're going to pull out of this system come out, one at a time, out of the chutes," said Steve Reade, DSW Director of Distribution Services. "We spent a lot of time with warehouse associates and the engineering team to come up with what this looks like, and it's proven to be pretty effective."

Also custom for DSW, the chutes have been sized to accommodate a wide range of shoe box sizes. The chute designs were carefully crafted to ensure that the chutes do not damage the shoe boxes, since part of the fundamental product and brand appeal of designer shoes is the pristine condition of the box.

And the specially designed chute end-stops enhance associate efficiency and improve pack rates: the custom design maximizes the ergonomics associated with clearing the chutes and scanning each box for packing into the store cases. Alphanumeric displays and lights inform the associates working at the chutes when an order is ready to be packed out. Associates use a wrist scanner for each shoe box as they pack each case; it is then sealed and delivered via conveyors to the shipping dock.

FLEXIBLE RESIDUALS PROCESS

Another example of leveraging a manual process to enable automation is the DSW residuals process. When less than a full case quantity is needed for a wave, the entire case is inducted on the BEUMER sorter, and the extra shoe boxes discharged to a residuals area, where they are scanned and placed on shelves for temporary storage.

When these individual units are needed in a future wave, they are then picked and loaded onto a conveyor heading back to the sorter for the next wave. This process saves money and time in allowing only full case picking without complex break-case or re-stocking of unit quantities.

The entire sortation process is seamlessly managed by the BEUMER Sortation Software (BeSS), a highly flexible control system optimized to serve the Columbus Center's operational requirements. It features custom dashboards that provide easy-to-follow graphical readouts on wave status, throughput, chute availability and capacity.

BEUMER's ability to customize the BeSS Software and integrate it with DSW's existing WMS platform was integral to the successful integration of the sortation technology into the existing DSW operation.

"BEUMER was great in working with us on the controls side of things, to listening to what our needs were, and actually making some edits on their control

system to handle some of the merchandise that other people have to deal with," DSW's Girard said.

SORTATION HELPS DSW EXCEED GOALS

In the first year of the Columbus Center's ramp up to full operation, the BEUMER System has exceeded DSW's expectations. Initial plans were to take six months to bring the system up to full throughput – but that goal was reached in just two months.

Pack out rates have greatly improved with this solution. Prior to automation, the average rate was 120 units per hour; the initial goal was to pack out 274 units per hour for the best return on the automation investment. In fact, the Columbus Center quickly reached 325 units per hour, exceeding the projected goal by 20 percent.

The Center's personnel have really embraced the new technology – according to DSW's Girard, working on the sorter is now one of the most sought-after assignments in the entire Columbus Center. "People always fear automation. It comes in and they believe it's going to take away jobs. For us, it actually added jobs, because it allowed us to handle significantly more throughput," DSW's Reade added. "So net-net, we actually added more people, even though our productivity has increased so much... In the end, the results really helped every single person in this building."

The success of the sorter's performance mirrors the successful partnership BEUMER established with DSW and the other consultants and vendors who were part of the team that brought full automation to the Columbus Center.

"At DSW, we have four core values that we live by: one is passion; another is collaboration, then accountability and humility," said Girard. "As we went through the process, and met more and more BEUMER folks, we realized that they shared those same values – and I believe that's been the key to the success of this project."

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