BEUMERGROUP



L.L. BEAN DISTRIBUTION CENTER EXPANSION AND MODERNIZATION

What began in 1912 as a mail-order business selling the Maine Hunting Shoe® is today a global brand with two manufacturing facilities, more than 60 retail stores in the United States and Japan, and a million-square-foot order fulfillment facility that processes an average of 45,000 customer orders a day.

As the popularity of L.L.Bean's iconic duck boots and outdoor gear continues to soar, company officials turned to BEUMER Group for a modernization and expansion of the packing sorter at its Freeport, Maine distribution center to increase order capacity and maximize system capabilities.

"We needed to have an order fulfilment center that could handle processing for omni-channel orders," said L.L.Bean Director of Engineering & Project Management, Michelle Stash. "We needed to make sure we had the infrastructure and the capacity to match the growth that we were expecting for the future."

Installed in the mid-1990s, the existing operating system had a pre-sorter on a single side where products were brought into the distribution center. From there, items were placed onto the sorter, dumped off when chutes became full, then reintroduced into the system in a secondary sort process, in essentially what is known as a 2-pass-system. The old re-circulation line accumulated items until there was no space left, causing the sorter to shut down. Delays and shutdowns caused by the operational limitations of the system reduced throughput capacity and system productivity.

The nine-month modernization project at L.L.Bean was largely about improving the architecture of the packing sorter's control system. The project included installation of a BEUMER Sorter Control System (BeSS) to manage wave sorting and interfaces to a new WMS from Manhattan Associates and a new



WCS from Fortna. BEUMER engineers reconfigured the sorter from the current two-pass system to a pre-sorter for order groups destined for final sort at put walls.

Additionally, a new induction platform was installed to free up space for 140 new packing chutes, with all existing packing chutes outfitted with new controls.

“L.L. Bean contacted us and said they wanted to maximize their facility versus expand out into other real estate and other parts of the country,” said BEUMER Logistics Service Manager, Bill Fredrikis. “We gutted the control system and reconfigured the entire electro mechanical layout of the system to provide four virtual-sorters built into one” “We transformed a pre- and secondary sort system into a four virtual-sorter system with large compartmental chutes.”

GREATER FUNCTIONALITY AND SORTER CAPACITY

Prior to the modernization and expansion, the packing sorter did not have the capability of notifying operators about upcoming pick waves, making planning and organizing of daily work flows difficult. With L.L.Bean’s improved packing sorter, product is picked in waves matching the number of destinations on the sorter. During the pick process, product is sorted into one of up to four pick totes, each representing a pack wave matching one sorter quadrant.

For example: Pack wave size = No. of destinations per quadrant X number of orders per destination.

With six orders per order group, this calculation provides a pack wave size of 160 x 6 equaling 960 orders and a pick wave of 4 x 960 equaling 3,840 orders.

In this process, the WMS is also creating “order groups” consisting of orders that will be sorted to one destination on the sorter. Each order group should represent a total cube less than what a sorter destination can hold. The four sorter quadrants are identical in size and configuration, so any pack wave can go to any quadrant, or induction area. Pack wave totes are staged and fed a specific induction area when released by the WCS.

Sorter capacity of the new system is 9,257 trays per hour past each induction area, totaling 37,028 trays per hour of mechanical capacity. With an 85 percent tray utilization, the system can operate at an average of 7,868 units sorted per hour per induction area for a theoretical possible total of 31,472 units per hour.

OVERCOMING CHALLENGES

Perhaps the biggest challenge of any system upgrade is keeping an existing system operating while modifications and additions are being made. During the L.L.Bean project, the existing system ran during the day, with testing of the new system taking place overnight.

Daily testing of the existing and new WCS systems were conducted to ensure zero production interruption prior to complete commissioning of the new system.

As is typical with most improvement projects, there are unanticipated challenges, as well. At L.L.Bean, it came in the form of a sprinkler line comprised of two pipes running directly under the full length of the sorter with a sprinkler head every few feet. To eliminate the



risk of sprinkler heads being broken during modification, shutoff valves were installed, and lines drained to make them inactive during the system upgrade.

Another factor was the integration with existing material handling equipment in the center. Sorter supports, inductions, scanners, and other misc. equipment had to be modified to continue normal operations while installing all the final equipment.

CREATING A BETTER WORK ENVIRONMENT

In addition to greater sort capacity, the L.L.Bean packing sorter upgrade improved the work environment for L.L.Bean operators. For example, new workstations provide a better view of the packing chutes, allowing operators to quickly observe and handle the packout process quickly and efficiently.

While the induction area configuration remains primarily similar as before the packing sorter upgrade, chute areas have been enlarged. Previously, operators stood in a small, congested area surrounded by packing material. They were tasked with monitoring chutes and packing individual orders into polybags to be shipped. Now, operators patrol a group of chutes. When one is ready for pack out, items are loaded into a tote and carried to another area of the facility for packing. Rather than items piling up at chutes while packing takes place, chutes are freed up much faster and more destinations are available for the next allocation. This allows a significantly higher level of orders to flow through the system compared to the previous configuration.

"Our transformation over the last few years has really extended the life of this facility. It's allowed us to, essentially, double the capacity of this facility and do it cost-effectively," noted Wayne Steele, L.L.Bean Director of Fulfilment & Logistics.

CONTINUING COLLABORATION

BEUMER's ongoing relationship with L.L.Bean includes providing maintenance, IT and operational training and customer service support for the upgraded packing sorter.

As the Maine-based retailer plans for future growth, L.L.Bean and BEUMER Group continue to collaborate on future upgrades to maximize sorter system capabilities.





AT A GLANCE

L.L.Bean Packing Sorter – Technical Data Scope of Work

- BEUMER Sorter Control System (BeSS) handling all Wave sorting and interfaces to Manhattan and Fortna systems
- Crisplant Machine Control (CMC) on Linux RedHat OS handling all control of the Packing Sorter
- BG Fusion Graphical system for the Packing Sorter layout presentation
- Software and configuration modifications to BeSS & CMC to accommodate the new inductions and chutes
- New Power Panel installed under Induction Platform 1 & 2
- Custom RIC-4 boxes for modern PC's with Windows OS to communicate with the Packing Sorter ISD-networks
- Installation and commissioning of new MAI inductions (Vision Systems) and MAI tables for Induction platform 1 & 2 and Induction platform 3 & 4
- Installation and commissioning of new SICK Scanner equipment for Induction Platform 1 & 2
- Commissioning of new SICK Scanners, provided by L.L.Bean, for Induction Platform 3 & 4 with new software
- Installation, field-wiring and commissioning of new Power Panel, RIC-4 box Panel and XF1 & XF2
- Modification and re-commissioning of 228 existing Double/Double chutes
- Installation and commissioning of 128 new Double-Level chutes
- Installation, modification and commissioning of four (4) No-Read chutes
- Removal of current Power Panel, XF1 & XF2 and field-wiring

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