



Two years ago, growth in its bath and plumbing products business threatened to clog operations in Liberty Hardware's California DC. But since the company moved to a high-speed automated facility, orders now flow freely.

LIBERTY HARDWARE'S BUSINESS MODEL MAY BE BUILT AROUND GETTING THE right tools and hardware into the hands of customers, but a few years back, it nonetheless faced a hardware issue of its own. Sales of the company's products—cabinet pulls and hinges, builder's and bath hardware, and hooks and wall plates—were taking off. But Liberty's West Coast distribution center lacked the automated material handling equipment it would need to keep up with growing order volume.

At the time, the Winston-Salem, N.C.-based company was serving West Coast customers out of a cramped 60,000-square-foot facility in Southern California. The DC relied strictly on manual processes, which meant its labor requirements were high and it suffered from the usual inefficiencies associated with manual distribution.

As the building's lease expiration date drew near, Liberty Hardware had to decide whether to move to a much larger manual facility or take the plunge and invest in an automated operation. Automation made more sense over the long term, but it wouldn't be an easy road. At the very least, Liberty would have to design a material handling system, choose the equipment, and, perhaps most daunting of all, justify the project to its parent corporation, the giant home improvement and building products conglomerate Masco Corp.

As it turned out, however, Liberty had no difficulty getting corporate sign-off on the initiative. In fact, Liberty's status as a Masco subsidiary proved to be an advantage. Like Liberty, a number of other Masco subsidiaries were operating their own DCs in Southern California or hiring third-party service providers to handle their distribution. When it looked at Liberty's proposed facility, Masco saw an opportunity to consolidate the operations of several of its subsidiaries at a single site.

In 2006, the company opened a new 460,000-square-foot facility in Ontario, Calif. The DC



handles distribution not just for Liberty but also for three other Masco companies: BrassCraft, which distributes plumbing supplies like brass fittings, valves, and water connectors; Delta Faucets, which makes faucets for residential and commercial use; and Alsons, which makes shower heads and other bath and kitchen fixtures for the do-it-yourself retail market. Liberty's products account for about 60 percent of the facility's total order volume, BrassCraft's for another 30 percent, while the remainder consists of Delta's and Alsons' goods.

A model for success

When Liberty and its sister companies began planning for the new joint facility, they didn't have to start from scratch. In 2001, Masco had built a 600,000-square-foot automated distribution facility in Winston-Salem, N.C., to serve customers in the eastern part of the country. The design had worked out well, and Masco decided to duplicate its basic plan for the new West Coast DC.

"We wanted to better serve our customer base on the West Coast and felt we had experience and a good model from our East Coast facility to create a bigger, better facility there," says Tom Turner, Liberty's vice president of global logistics. "We knew that the automation would help us keep our costs down."

Not only did Liberty model its new DC on the Winston-Salem building, but it also used most of the same vendors and suppliers. They included Tom Zosel Associates, which designed the material handling system, and Dematic, which supplied the majority of the systems and provided integration services. (The equipment supplied by Dematic

includes some 10,000 linear feet of roller conveyors, a sliding shoe sorter, and a warehouse control system that interfaces with Liberty's Manhattan warehouse management software.) By using the same suppliers, Liberty was able to get the new facility up and running quickly.

A quick startup was important to Liberty. The leases on several of the previous buildings would run out before the new DC's material handling systems would be ready for operation. That meant the tenant companies would have to start shipping orders from the unfinished facility, which would require careful planning and coordination. As an interim solution, Liberty and its sister companies ended up using a portion of the building to distribute products via manual procedures, while the automated systems were installed alongside. Once those systems were completed, distribution was switched over to the automated system. Almost immediately, Liberty saw a marked increase in the volume handled and speed of processing. It also noticed a reduction in product damage.

Turning on the faucet

The new building features three pick modules, where the majority of customer orders are filled as full case picks. More than 85 percent of the products shipped from Ontario are picked within the modules, with the remainder picked directly from the reserve storage pallet racks. Each of the three-level modules is equipped with a conveyor that starts on the bottom level and winds its way up to the second level and then on to the third. This design allows products to be picked directly to the belt.

Two of the modules contain carton flow racks on the bottom level and pallet flow racks on the upper two levels, while the third module is completely outfitted with carton flow racks. Products from the various brands are intermingled within the modules but are picked in waves and shipped separately by brand. The system has the flexibility to wave orders by customer, but typically waves are built according to ship date.

Processing begins when products arrive in import containers or domestic trailer loads. Once palletized, most of these receipts first go into reserve storage (the reserve storage area has 35,000 pallet positions). When needed to fill orders, the products are transferred to the modules' flow racks. The warehouse management system and warehouse control system work in tandem to direct the flow of products throughout the building.

Workers pick individual cases from the flow racks using bar-coded shipping labels, which are produced by printers

located within each of the modules. As they select items, the workers apply the labels to the cases and then deposit the cases directly onto the conveyor belt. The conveyors carry the cases through a merge point and then past five-sided fixed scanners that read the labels' bar codes and feed the information to the warehouse control system. The WCS then works with the warehouse management software to update inventory and determine where to send the product once it enters the next system, a Dematic RS-200 sliding shoe sorter that can perform up to 150 sorts per minute.

Based on the cases' destination information, the block-shaped "shoes" slide across the conveying surface to gently push cases to one of 22 diverts, where automatic pressure accumulation conveyors hold the products until they are ready to be released to shipping docks. The cases in each accumulation area are then palletized, stretch wrapped, and loaded onto outbound trucks.

About 350,000 cases are shipped from the facility each month, although during peak periods, monthly volume can run as high as 440,000 cases. About 80 percent of the orders go out to big box retailers and mom-and-pop hardware stores; the rest go to wholesalers that supply building contractors.

Engineering in flexibility

Although it used the Winston-Salem facility as a model when designing the Ontario DC, Liberty did make a few changes. Many of those modifications were aimed at accommodating products of a wide range of shapes and sizes. Items flowing through the facility weigh anywhere from less than a pound all the way up to 60 pounds.

For example, when it came to the DC's conveyor systems, Liberty chose rollers that are based on two-inch centers rather than the usual three-inch centers. The closer spacing of the rollers allows small-

er, lighter-weight packages to travel on the conveyors more easily.

In addition, the sorter shoes in Ontario glide on interleaving extruded aluminum slats instead of tubes. This virtually eliminates the chance that a small carton will jam the system.

The Ontario facility also boasts some energy-saving features that are not found at its East Coast counterpart. Its roller conveyors are equipped with photo-eye accumulation and designed to operate quietly while conserving energy. About



300 feet of conveyor can be powered with only a three-horsepower drive. If there is no activity for 15 seconds, the conveyor shuts down to further reduce energy consumption.

The Ontario facility was also designed with growth in mind. Two additional picking modules can be added as needs dictate.

Right tools, right outcome

As for how it's all working out, Liberty says the new facility is everything it hoped for. Since the company moved into the building in 2006, its overall distribution costs have dropped and its labor requirements have been reduced by 40 percent.

Efficiency is up as well. "Our turnaround time on orders is excellent now, less than 48 hours," says Turner. "Our accuracy is extremely good too—at 99.9 percent—and we have kept our labor and overtime in check as well. This facility has been very successful in terms of what we expected." □