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Looking Back on 10 Years of Distribution Center Automation at totes Isotoner

Innovated Split Cases Picking Design Approach Has Stood Test of Time, Now Becomes Mainstream; Learn how the System Evolved Over Time, and Why

SCDigest Editorial Staff

We often read stories about new automation systems – sometimes before they even go live – but few about systems that have been in place for many years. Here, at last, is a good opportunity to understand how automated systems can evolve over time, plus a few great ideas that you may be able to adopt to ensure your system stays healthy and productive for the long term.

During the summer of 1997, totes, the iconic maker of umbrella and other gear, announced it was buying glove and slipper maker Isotoner from Sara Lee. That would ultimately lead to an innovative, industry-leading plan that would consolidate three non-mechanized DCs into a single, new automated 450,000 sq. ft. facility located just north of Cincinnati. One key to the deal, in fact, was the perceived opportunity to drastically reduce distribution costs in the combined companies, especially on the Isotoner side, where distribution excellence had not been a strong focus.

Once the decision was made, the pressure was on. The DC had to be designed with an imperfect understanding of the Isotoner business, so flexibility was critical. There was also a factor of time. Both totes and Isotoner had hugely seasonal businesses – a significant portion of the volume came in the Christmas season. That meant a new DC had to be running by mid-summer 1998 – or a whole year more would pass before distribution strategies could really be achieved.

Finally, both businesses had a heavy piece-pick volume, and making that efficient would be key to overall system success.

One good indication of the success that totes Isotoner has experienced with the system over its 10 year history is that the start of the peak shipping system has been pushed forward about 4 weeks. This is due in part to the confidence that its customers have gained in totes Isotoner's ability to fill orders accurately and to ship on-time.

Here's the story of how totes Isotoner made it happen, along with some lessons learned along the way, and how this system, with some evolution, is still running strong 10 years later.

In an interesting side note, the project at totes was led on the vendor side by SCDigest Editor Dan Gilmore and Materials Handling Editor Cliff Holste, both working at the time for Forte Industries. They both recently went back to totes Isotoner 10 years later to see how things had worked out, and to talk to **Doug Baker**, in 1998 director of engineering and now VP of Operations for totes.

General System Overview

The new DC was outfitted with approximately 35,000 pallet positions, some 5000 case flow lanes for split case picking, a large value-added services area, and an automated shipping sorter with 29 divert lanes.

Looking Back on 10 Years of Distribution Center Automation at totes Isotoner (Con't)

Shipping was heavy LTL, but with strong use of truckload and parcel as well. Retail customer requirements mandated UCC-128 labeling on almost all cases, carton content labels on split cases, and EDI Advanced Ship Notices. Many items also required customer-specific price ticketing. Compliance-related fines had been a big problem at Isotoner – reducing those substantially was a key goal of the new system.

The DC required a new WMS, from Manhattan Associates, and comprehensive use of RF terminals. It included automatic print and apply for UCC-128 labels, using two labelers to provide redundancy in case one had mechanical problems or required a new roll of labels or ribbon, etc.

But the real heart of this system was the innovative design of the split case picking area.

Innovative Picking and Sortation System Design Has Stood the Test of Time, but Continuous Improvement is Also Key

To meet the heavy split case picking requirements, Holste designed an Automated Zone Picking system. Innovative in 1998, the approach has become more commonplace, but is still far from widely adopted despite the benefits over traditional pick and pass.


An Automated Split Case PickingSystem is at the Heart of the totes DC

The fundamental approach of the system was to route cartons to each zone for which picks were required. The cartons were automatically diverted left or right off the conveyor running through the middle of each pick module when those cartons reached the next zone for which there were picks.


Doug Baker totes>>Isotoner

In each zone, an operator could take one or multiple cartons (cluster picking). They would scan each carton in the "train" as they were moved along a static roller conveyor attached to the main powered conveyor line. The WMS would then direct the picking in location sequence for that zone, sequentially indicating how many of each SKU in the zone were required for each of the cartons in the group.

This cluster picking approach was key to improving split case productivity.

When the last pick for the last carton in the train was complete, the cartons were either closed (if all picks complete, as indicated by the RF terminal) and a carton content label printed in the zone and applied to the box. Cartons with picks in other zones, as well as closed cartons, were put back on the conveyor system.

Completed cartons moved via conveyor to the sortation system, while cartons with additional picks were then conveyed to the next zone for which they had picks. There were 24 split case zones, consisting of four modules, stacked two high (2 x 2), each with three zones on each side. A carton could make stops at several zones on the way to being completed.

The approach obviously required sophisticated functionality in both the WMS and conveyor control system to make use of the material handling design.

The system was designed for throughput: totes had the potential to process ***70% of its annual shipping volumes in just 100 days during the peak season of August to the end of October***.

While the split case picking system has survived 10 years, totes has made some changes based on insight from operations, which are discussed at the end of this article.

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Full Case Picking

The budget didn't allow for complete automation of full case picking, so a limited amount of double deep pallet flow racks were provided along a single conveyor line, designed for the highest volume SKUs. Other full case picks were made via order picker trucks and manually placed on a conveyor leading to the sorter platform.

As they neared the sorter, an automatic label print and apply system handled UCC-128 labeling (split case cartons already had a UCC-128 applied as part of the picking process, and entered from a different merge point onto the sorter).

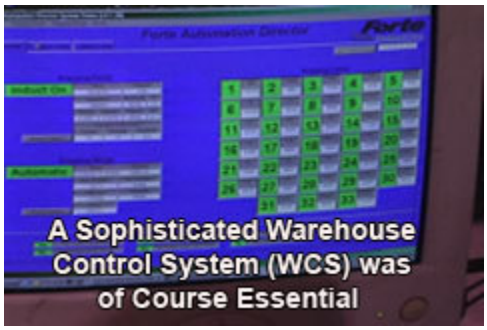
A scanner read each carton's I 2 of 5 case bar code, and the conveyor control system looked up the customer distribution for that SKU, printing the correct label format and data for each carton.

Sortation System

The WMS logically pre-built the pallets based on carton cube, and the conveyor control system sent the cartons to the proper divert lane according to this pallet distribution. Two of the diverts were devoted to small parcel shipments and went straight into dropped parcel trailers, but most were used for LTL and some truckload pallet building. In some cases, especially for the company's own outlet stores, the WMS allocated full pallets and directed them straight to staging lanes.

Cartons that required customer-specific price ticketing flagged by the WMS and sorted to a special area near the divert lanes, ticketed, then placed back onto the sorter for the final divert.

The system employed "wave overlap," a fairly common practice today, but still rare in 1998. There were a given number of pallet building locations at the end of each divert. As pallets were "closed," and the position freed up, cartons for the next wave would start being diverted to that lane, even if the other pallets being worked on were still for the previous wave.



This approach, which required some modifications to the WMS and conveyor control system, significantly reduced the down time experienced in most sortation systems at that time due to the requirement to completely clear a wave off the sorter before releasing cartons from the next wave.

System Improvement over 10 Years

Baker said that it took them 2 to 3 seasons to learn how to use the system to its full potential. At that point, they began to make subtle operational changes to enhance system performance and to accommodate new products and customer order profiles. In addition, totes Isotoner has made various upgrades to the system based on advances in equipment design, controls and software technology, including upgrading the WMS and the Forte conveyor control system.

For example, the original design spread the highest moving SKUs, such as a basic black umbrella, over several split case picking locations, because of concern that in peak season there would be too much congestion at those locations.

Experience proved that congestion was not a major issue, so a change was made to slot even high volume SKUs in a single location, in some cases, using many lanes of the carton flow rack. In parallel, the rack labeling in split case was changed to an innovative color scheme that lets pickers know about how many lanes there are for that location (one to a dozen or more).

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In the split case area, completed cartons were originally "closed" in the split case zone by pickers. Baker said that this sometimes led to confusion as to which carton content's label was the right one for each carton (multiple labels could have printed out for different closed cartons) and disrupted the picking flow. So, completed cartons are now sent via the sorter to the ticketing area for closure (dunnage, sealing, labeling).

In 1998, "wearable" RF terminals/scanners were still fairly dicey technology. Today, they are mature and proven products. That led totes to switch from confirming cartons onto a pallet at the end of a divert, using a stationary scanner and terminal screen, to use of the wearable RF scanning devises, allowing greater operator mobility and flexibility.

Finally, totes decided to let pallet builders at the diverts decide how to create the pallets, rather than having the WMS pre-build the pallets. This reduced occasional problems with cubing data that led to bad pallet builds (too big or small), but was primarily done so that a pallet did not have to wait at the divert missing cartons. While the system always had the flexibility to close an incomplete pallet, the new approach makes such problem resolution a little easier, Baker says.

The basic layout and system design of the system, however, proved successful and capable accommodating the changes in totes' business and volumes over 10 years.

"It's hard to benchmark, but from what we know we still have a competitive advantage in distribution costs and customer service," Baker said.

One good indication of the success that totes Isotoner has experienced with the system over its 10 year history is that the start of the peak shipping system has been pushed forward about 4 weeks. This is due in part to the confidence that its customers have gained in totes Isotoner's ability to fill orders accurately and to ship on-time. Every year this provides a huge savings in the cost of temporary labor for totes, while reducing inventory costs for their customers.


A High Speed Sorter Feeds 29 Divert Lanes

Baker also said that the flexibility of the system has been critical in several areas. Confidence in the system's capabilities was an important factor in additional company/brand acquisitions that totes has made since the original Isotoner merger in 1998. totes Isotoner has also developed a robust e-commerce channel that was just being considered in 1998 and that the system also now well supports.

"The system has been able to easily absorb the capacity and "uniqueness" of these new companies" and the e-commerce business," Baker added, as well as the near constant changes in retailer and other customer requirements over the past decade.

"It's hard to do, but you want an automation system that is "Built to Last" for the long haul, longer than the average life expectancy," says Holste. "You combine that with smart management that looks for ways to make the total system improve and adapt over time, and the next payback from the initial investment is simply very high."