

Super-Streamlining Automated Piece Picking In DCs

Jim McMahon

A new generation of ASRS, like AutoStore, provide more than high throughput and cost-efficient distribution for automated piece picking, they also deliver a higher density of storage capacity and more modular flexibility.

Many high-throughput retail distribution centers face a growing logistics challenge—the need to prepare small-quantity, mixed-SKU orders of small items to ship and arrive on schedule with near zero tolerance of errors, while dealing with a continually growing variety of SKUs, and increased order complexity. Fueled by shifting demographics; niche retailing; new channel formats like the Internet; faster product introductions; and shorter product life-cycles, small-quantity, multiple-SKU orders are rapidly replacing single-SKU pallet orders and becoming increasingly difficult to handle with conventional manual and automated storage and pick systems. Sometimes comprising thousands or tens-of-thousands of different SKUs and in an assortment of packaging styles, a retail DCs inventory needs to be stored, picked, and shipped with a high level of efficiency to optimize labor usage and minimize operational costs.

Improving On Mini-Load ASRS

Conventional mini-load automated storage and retrieval systems (ASRS) of various configurations have been used for some time for case picking, and more recently to store and pick small-quantity orders of small-sized items. They can be ideal when inventory and throughput find a good balance, delivering a vast improvement over hand picking in retail distribution centers.

Initially focused around case handling, mini-loads have evolved into piece-picking, making goods-to-person picking more flexible and affordable. However, these piece-pick mini-loads have been somewhat limited in their efficiency by several factors including: a) their proneness to single-point system failure; b) design inflexibility to easily expand as DC volumes increase—particularly with the capability to independently scale throughput and inventory, both at the time of the initial investment and over the life of the system; and 3) orders must be stored and retrieved sequentially instead of simultaneously. These conditions have made them somewhat lacking in speed and efficiency for optimum handling of orders on a high-throughput basis.

Some recently introduced alternatives to mini-load ASRS designs for piece picking, however, have overcome these deficiencies, significantly increasing speed of order processing, without losing the level of accuracy that is expected with ASRS. But the newer systems provide more than high throughput and cost-efficient distribution,

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they also deliver a higher density of storage capacity, and more modular flexibility.

One of these systems that clearly embrace this new generation of piece-picking ASRS is AutoStore*. Introduced and manufactured by Jakob Hatteland Logistics AS in Norway, and distributed in North America by Swisslog, AutoStore is a streamlined, high-performance alternative to traditional mini-load ASRS. (*The AutoStore logo is a registered trademark of Jakob Hatteland Logistics AS). AutoStore provides the speed and accuracy needed for high-throughput goods-to-person picking and replenishment of small-quantity, mixed-SKU items for retail markets, combined with extremely high-density capacity, and the flexibility to adapt to existing building layouts.

Optimizing System Reliability

AutoStore is composed of a three-dimensional grid system of self-supporting bins that are moved to pick stations by independently-operating robots. The number of bins installed is determined by the distribution center's immediate requirements—the system's flexibility allows for easy expansion of bins to accommodate growth.

Each robot has two sets of wheels that enable it to move along perpendicular axes. This makes it possible for all robots to reach any position, and any bin on the grid independently. This virtually eliminates the possibility of single-point system failure providing near 100 percent system availability. If one of the robots needs maintenance, for example, then its tasks will automatically be taken over by other robots deployed in the system.

An AutoStore installation can accommodate almost any number of robots depending on required throughput, each equipped with a lift for picking up, carrying, and putting bins that are stored in the grid. The robots communicate via wireless controls to the DC's WMS and pick stations through a standard interface (API).

When a robot delivers a bin to a pick station, the worker picks the required number of units and the robot returns it back to storage. The new bins are thereby delivered back-to-back and the operator rarely has to wait for a bin. Picking and putting can be executed simultaneously. A variety of work station configurations can be developed to allow batch picking based on orders or SKUs.

A port is used to get goods out of the grid. This brings the bin out to the operator who can then carry out the desired task—picking, putting or inventory check—before the bin is returned to the grid.

The AutoStore system holds approximately 30 minutes of live picking tasks in its queue at any one time, and continuously optimizes the delivery of bins to pick stations. Any order can be redirected to any one of the pick stations at will as the need arises. An operator HMI panel on each pick station displays the pick status information for any order.

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Configuration Flexibility

Another key capability of the AutoStore system is that it provides exceptional flexibility, and can be adapted and expanded as needed. It is not restricted to one size or form. The system can easily be adapted to fit different building heights, span multiple levels, and even surround obstacles in the warehouse, such as pillars or walls.

For example, installation could easily be extended for a DC in the future, without interfering with its throughput. Additional storage space can be added by simply extending the grid without interfering with ongoing DC operations.

To increase capacity, the number of robots can easily be expanded, or the number of picking stations increased.

Another flexibility of the system is that it automatically optimizes the storage position of goods in the grid by keeping the more frequently requested products higher up for faster access times.

Maximizing Storage Density

Those piece-picking ASRS systems that are the most efficient have achieved a high density of space utilization. This means they have a space configuration that allows for the maximum number of bin positions to fit into the system.

AutoStore stores goods with minimum space requirements, using the available storage space to the maximum. The bins are stacked on top of each other, which makes it a very compact solution. This results in up to 60 percent better utilization of space than any other automatic storage systems, and 300 percent better than in conventional rack systems. In typical installations, up to 87 percent of the available cube space can be utilized for storage.

Increase In Efficiency

The system will reconfigure the position of SKUs based on those used most. AutoStore always picks from the top, so if one bin is used very often it will just stay on the top. And the bins that are seldom used sink to the bottom. 90 to 95 percent of what is picked most often is in the three upper layers. This provides automatically more efficiency because of minimal travel distance for the goods.

DCs that have installed AutoStore have reported a reduction in man-hours. Goods-to-person and ergonomic workstations increase picking rates as much as 200 percent.

Some DCs are showing a 30 percent efficiency increase for the entire DC operation after the system has been up and running.

Fast and efficient delivery is one of the strongest competitive advantages in any market, and super-streamlined small-order distribution will help define retail

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success in this era of global reach and niche retailing.

With the emergence of AutoStore, a new level of flexibility and efficiency above and beyond the capabilities of conventional automated and manual small-order pick systems has been realized. Design flexibility, optimized space utilization, improved productivity, increased accuracy, and reduced labor needs are the key benefits of this new breed of automated mini-load storage and retrieval system.

AutoStore enables a truly streamlined capability for high-throughput retail DCs that handle a high volume of small-order SKUs. There is no question that this technology has set a new benchmark for improving the efficiency within these DC operations.

About Swisslog

Swisslog (www.swisslog.com [1]) is a global provider of integrated logistics solutions for warehouses, distribution centers, and hospitals. Its comprehensive services portfolio ranges from building complex warehouses and distribution centers to implementing Swisslog's own software to intra-company logistics solutions for hospitals. Swisslog's solutions optimize customers' production, logistics, and distribution processes in order to increase flexibility, responsiveness, and quality of service while minimizing logistics costs. With years of experience in the development and implementation of integrated logistics solutions, Swisslog provides the expertise that customers in more than 50 countries around the world rely on.

Jim McMahon writes on logistics automation. His feature stories have appeared in hundreds of industrial and high-tech publications throughout the world and are read by more than 5 million monthly. He can be reached at jim.mcmahon@zebracom.net [2].

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