

Connecting Islands of Automation

White Paper

Connecting existing islands of automation for a more efficient order fulfilment process that meets rising customer service expectations.



Deployment of automated storage & retrieval (AS/RS) solutions has been delivering impressive improvements in labor or space savings within a facilities for decades. For certain, being able to reduce the number of workers needed for picking, or freeing up space by moving to high density storage are key areas of payoff, but the larger struggles for distribution center (DC) operations today tend to be around customer service expectations such as being able to process and ship item-level orders for next-day delivery.

Companies find themselves with several islands of automation, each providing the ROI to the intended area, but these disconnected islands make it difficult to meet bigger order fulfillment challenges. In short, connecting these existing islands of automation is the key to an efficient customer service process.

Companies see customer service expectations as one of the biggest challenges in logistics and supply chain execution. According to [MHI's 2015 Annual Industry Report](#)¹ supply chain professionals surveyed named customer pricing pressure, demands for faster response times, and rising customer expectations as three leading issues they find “very” or “extremely” challenging.

In this business climate, AS/RS solutions, including their software and system integration capabilities, can enable a smoother, more accurate customer fulfillment process. In this white paper, real-world examples of companies using AS/RS solutions including horizontal carousels and vertical lift modules (VLMs) will show how automation supports a connected response to rising customer service expectations.

To better integrate automation with other technology investments such as warehouse management systems (WMS) and enterprise resource planning (ERP) systems, software capabilities are increasingly important. Providers of AS/RS solutions need to have software and services capable of ensuring that AS/RS meshes well with other picking methods and systems for inventory and order management.

Through customer examples, this white paper will examine how AS/RS solutions function within a connected fulfillment process. More specifically, learn how solutions enable:

- Rapid processing and picking of next-day shipments, while still being able to closely monitor and add to shipments while they are in progress.
- Coordinating picking with host WMS or ERP systems so that picking from AS/RS can be consolidated with manually picked items from other zones.
- Integration with order requirements from host ERP or WMS systems to support batch or zone picking.

¹ 2015 MHI Annual Industry Report. Supply Chain Innovation: Making the Impossible Possible.

<https://www.mhi.org/publications/report>



Supporting A JIT World: Mazak

While most people think of Amazon or other major online retailers when it comes to efficiency in taking Web orders and processing them for next day shipment, the need to fulfill item-level orders for overnight shipping also is commonplace in business-to-business commerce and after-sales support.



Service parts organizations typically need to fulfill orders quickly, especially when the industry they service is just-in-time (JIT)-oriented, such as discrete manufacturers whose production lines rely on high equipment uptime. This world of JIT support is something that Mazak Corp., a leading producer of machine tools, faces every day at its Florence, Ky.-based North American Parts Center. More than 97 percent of the DC's orders are processed and shipped out for next-day delivery to help customers meet equipment uptime goals, according to Steve Trammel, North American Parts Center manager for Mazak.

To support this rapid order fulfillment, Mazak's DC uses 15 [Shuttle VLMs from Kardex Remstar](#) grouped into four pick and pass workstations. A motorized conveyor line connects each VLM workstation and zone. Orders are picked into totes which travel down the conveyor to the next zone that has items needed for that order before ending up in the pack/ship area.

Mazak's WMS integrates with the VLMs and constantly passes order requirements to the units, which visually displays pick/put information for the picker via a light bar called a [Transaction Information](#)



[Center \(TIC\)](#) at each VLM workstation. The WMS coordinates the zone picking while the VLMs' software ([Power Pick Global](#)) keeps track of inventory in the units and communicates inventory position back to the WMS.

The DC's order fulfillment process starts with customer orders coming into Mazak's order management/WMS via multiple means: via customers ordering on Mazak's service parts website, via phone, or via an email inbox for orders. As soon as an order is placed, the WMS allocates inventory to the order, and creates a pick slip and bar-code "license plate" for each tote orders will be picked into. The WMS instantly passes the order details to the Kardex Remstar Power Pick Global software that manages the VLMs, to systems in the packing area, and to the system of the overnight shipping carrier delivering the order.

When a tote arrives at a VLM workstation, the operator scans the license plate and then scans a light on the batch station to associate the tote with corresponding picking information and lights on the VLM. The operator can pick eight orders simultaneously. The TIC bar clearly directs the operator as to the exact location of part to pick and displays the quantity to pick as well as the part number. When an order is complete the lights direct the operator to push the tote back onto the conveyor, where it either gets routed to packing, or into another downstream VLM workstation that has further picks for the order.

"Basically, we've created an efficient, high velocity system that enables us, within about 15 minutes of a customer placing an order, to email that customer a tracking number," says Trammel. "There are different systems interacting, but we view it as a total solution for the customer."

To allow for better visibility into the processing of orders within the DC and the VLM pick pods, Mazak worked with Kardex Remstar to create a Web-based monitoring function that shows where an order is at on the conveyor. Displayed on large flat panel monitors in both the order entry and stock room areas of the facility, the color-coded display shows where each order is, shows the tote number, as well as other information such as which orders still have picks left, and which are complete. This monitoring functionality allows Mazak to quickly add items to in-process orders if the customer calls back or comes back to the self-service parts ordering site to add a part, which is fairly common occurrence, says Trammel.

"The monitoring is a real benefit to us," says Trammel. "We might have 100 or more totes out in process at any time, so it's an internal tool that to be able to quickly see where that order is at in the stock room that we can add another part to it."

Use of the automated VLM's has yielded benefits in labor versus its past methods which relied in part on smaller, manually operated VLMs, and the manual carrying of goods to the packing area. The move to the Shuttle VLMs, zone picking, and the conveyor system allows Mazak to fulfill orders with five workers versus nine with the old methods, while helping it further increase the percentage of orders it is able to ship out to customers for next day delivery. In short, while the Shuttle VLMs have helped increase internal efficiencies in Mazak's stock room process, they also support superior customer service.

"Our customers are the top manufacturers in the world," says Trammel. "They typically run our machines as part of a just-in-time manufacturing environment, so minimizing downtime is critical to them. So for us, the ultimate reason we've improved our systems is so that we can process parts orders and ship them same day. It's a key part of the value we provide."

Integration with WMS: Kubota Canada



Much of the efficiency from AS/RS equipment comes from replacing substantial amounts of picker travel and handling with a high-density, "goods-to-person" environment in which one or two pickers at a workstation follow pick-to-light instructions to rapidly pick orders. Of course, in many DCs, goods from AS/RS zones need to join up with goods picked from other areas of the warehouse.

To get AS/RS zones working in concert with other zones of a DC, the key is software integration. For Kubota Canada's DC in Markham, Ontario, Canada, integration between its WMS and its [Shuttle VLMs](#) and [horizontal carousels](#) from Kardex Remstar support the multi-zone picking and order consolidation that are part of its "pick-and-pass" method of getting orders fulfilled efficiently.



Most of customers placing the orders are dealers of Kubota equipment, which spans a lineup of tractors, mowers, and utility equipment used by contractors, farmers, equipment rental businesses, and many other end users. "Our end customers typically want service parts the next day, because if their vehicle isn't working, they are losing money," says Rick Lackner, parts warehouse supervisor for Kubota Canada.

The different zones of Kubota's warehouse hold different sized parts that move at different order frequencies. A bulk picking zone holds larger parts such as transmissions, while a prime zone consisting of high-bay shelving holds items that are either too bulky or are too slow of a mover for the carousels or VLMs. The VLM zone uses four Shuttle VLMs that pick medium moving SKUs, while the carousel zone consisting of six horizontal carousels holds and processes faster moving SKUs. A WMS solution orchestrates the zone picking, taking in order information from an AS/400-based enterprise system.



The WMS is integrated with [Kardex Remstar Power Pick Global software](#) that manages the VLMs and carousels. The WMS coordinates the pick and pass process, taking in the order information from the enterprise system, managing priority codes for picks, and passing order information down to the VLMs and carousel zones for processing. A motorized conveyor connects the zones. Totes with a bar coded license plate that identifies each order are used to pick parts into at the VLM and carousel zones.

The WMS organizes picks into groupings of eight totes. The VLM zone is at the start point for the pick and pass process, so when the picker running the VLM workstation scans a group of eight totes, that scan initiates the process. The [pick-to-light](#) display for the VLM workstation guides the operator on what to place into each tote and when all the picks are exhausted, the picker is instructed to pass those totes via the

conveyor to the next zone, which is the horizontal carousel zone. The totes are scanned there, and thanks to the integration with WMS, the carousel system knows exactly which totes need picks and which can go directly on to consolidation.

At the same time picks are being processed in the VLM and carousel zones, the WMS is directing RF-based picking from the prime and bulk zones so that goods needed from those zones can be brought to consolidation on order picker vehicles at about the same time the totes from the carousel zone reach consolidation. At consolidation, a scan of totes coming down the conveyor from the carousel zone instantly reveals if the tote's order still need items from the bulk or prime zones, and these totes will be temporarily staged off to the side until the needed items arrive.

“With the integration we have, we can run things in parallel,” says Lackner. “Picks are going on in multiple zones simultaneously, but it functions as one coordinated process.”

The overall zone picking solution of a RF-based WMS integrated with the VLMs and carousels has allowed Kubota Canada to keep up with rapid growth. Sales for equipment have expanding, leading the DC to increase its number of SKUs from 74,000 in 2012 to 92,000 SKUs in 2015. Part inventory volume is up by more than 50 percent in this time span, says Lackner, as part of Kubota Canada's philosophy of always having parts in stock, even for older equipment.

“When you go out and buy a Kubota, you can be assured that in 15 or 20 years, that we are going to have a part to service your vehicle,” says Lackner. “We've been able to meet this goal and maintain our level of service during a time of strong growth, while having to add very little in labor resource, thanks in large part to our integrated systems.”

Orchestrating Fulfillment: Value Drug Mart

Value Drug Mart, an Canada-based association of pharmacies that is served by a DC in Edmonton, Alberta is another company benefitting from the goods to person efficiency of AS/RS, while also being able to coordinate picks from its automated zone with picks from the other zones in its warehouse.

There are 29 member shareholder stores under the Value Drug Mart banner, as well as 10 Apple Drugs stores, 10 Rxellence Professional Dispensaries, and over 300 affiliated stores—all serviced by the Edmonton DC facility. To efficiently fulfill orders for both pharmaceuticals and retail items for this customer base, Value Drug Mart relies on automated, [horizontal carousels from Kardex Remstar](#) that are integrated with a host WMS to manage inventory and consolidate orders in efficient batches to meet the multiple orders each store might place daily.

The 12 horizontal carousels that Value Drug Mart has in its DC today are arranged in “pods” of three carousels each. [Power Pick Global Inventory Management Software from Kardex Remstar](#) manages the carousels integrates with data from the WMS to batch the picks for multiple orders into efficient batches and send the picked totes to a consolidation area where they meet up with other items picked from other zones via other picking methods governed by the WMS, explains Dwayne Bilawchuk, operations manager.



The carousels are an efficient way to pick goods because they rotate to bring the goods that need to be picked to the picker, while Power Pick Global controls the carousels and manages carousel inventory, is smart enough to coordinate batch picking as order requirements come down from the WMS.

Pick-to-light displays from Kardex Remstar guide accurate pick and place movements for the pickers. That means pickers don't have to travel down aisles of shelving to pick orders, and with batch picking logic, the carousel only spins once to a location to retrieve items for multiple orders. "We looked at different technologies to help automate our picking, but I have yet to find a technology as efficient as horizontal carousels, especially for a unit pick facility such as ours," says Bilawchuk. "It's pick to light, and put to light, done in batches."



The automation journey for Value Drug Mart began over 10 years ago with two carousels and within a few short years, was expanded to six units. The six carousels are located on and under a mezzanine in a tower configuration, with the lower pod dedicated to retail or "front of store" items, and the second level pod handling picking of pharmaceutical items.

Due to rapid growth for Value Drug Mart, fueled in part by a successful "Back to School Solutions" program that has grown to over 6,000 school kits, Value Drug Mart needed to be able to efficiently handle many more orders for front-of-store items. To meet this need, in 2014, Value Drug Mart acquired six more Kardex Remstar horizontal carousels, arranged in a second tower of one pod on the ground level and one above on the mezzanine level.

Before implementing horizontal carousels, Value Drug Mart used paper pick lists and manual picking processes from shelving to fulfill items now picked from the carousels. The carousels have increased the picking productivity by 90 percent, and also reduce the square footage that used to be devoted to shelving by nearly 60 percent.

However, the carousels have done more than bring an isolated efficiency gain. Via integration to the WMS, and support for batch picking within Power Pick Global, the carousels support efficient order flow and consolidation. The customized WMS manages wireless, radio-frequency (RF) based picking from the other zones of the warehouse that hold bulk goods, cases, and pallets. Pickers using RF units bring goods to the consolidation area via lift trucks or carts, while a motorized conveyor brings picked totes from the carousels to the consolidation area.

"I often refer to what we do here with order fulfillment as looking like an hourglass, because we can take multiple orders from a customer during the day, narrow that down to what for the purposes of picking is essentially one order, but still generate an invoice for every order the customer places," says Bilawchuk.

Power Pick Global controls the inventory levels on the carousels, with reorder points coordinated with the WMS. If a customer ever places a big order for an item that exceeds the amount in the carousel, Value Drug Mart can use the WMS to trigger a "hot-shot" replenishment process to quickly add more of

that item to the carousel. The integration between the two systems is reliably flat file data transfer. Reports can be run periodically to ensure the inventory levels in the two systems match up.

With this reliable integration between WMS and the horizontal carousels, Value Drug Mart has been able to take on more business without scrambling to add more labor or space. The efficiency of the carousels also have allowed Value Drug Mart to significantly reduce labor costs through attrition. In 2007, the DC needed 80 full and part-time workers to fulfill orders and run the DC under its more manual processes and strict order picking, but today with carousels, pick/put to light, and batch picking, 30 full and part-time staff are able to keep pace with fulfillment needs.

Customer Service Focus

Ultimately, connecting AS/RS solutions to a host WMS or ERP system is being looked to as a means of accelerated order fulfillment. The goal is getting more product out the door quickly and accurately to satisfy customer who increasingly have come to expect next-day delivery.

For example, Schrauwen, a Belgian wholesaler of sanitary and heating supplies, recently deployed [six horizontal carousels from Kardex Remstar](#) to ensure fast picking of small parts, replacing a static shelving system. The carousels and software from Kardex Remstar integrate with Schrauwen's ERP system, allowing orders to be efficiently processed. [Pick-to-light and put-to-light systems](#) combined with batch picking operations allow 20 orders to be picked at the same time by one carousel workstation operator. In general, two operators work on the orders, but in peak times the number of operators can increase up to six.

With this solution, Schrauwen can process 2,000 order lines per day and prepare customer orders for around 100 deliveries per day, performed by nine company trucks, including special night delivery. At Schrauwen, the goods-to-person principle has resulted in a substantial increase in picking speed, while helping the company meet its goal of getting orders out to customers for next day delivery.

In sum, the point efficiencies of AS/RS offer real payback, but at the same time, AS/RS software integration helps companies meet more strategic goals around customer fulfillment, without having to ramp up the labor force.

As Value Drug Mart's Bilawchuk observes, the horizontal carousel pods in its DC have set a foundation for highly efficient picking, even in the face of continued growth.

"We're happy with how well this technology has fit in with Value Drug Mart's operations," says Bilawchuk. "We are well positioned to carry out more business efficiently. If we are approached with another big program or with continued growth, or take on new products, we're confident we can do that without really batting an eye. The systems and processes we have in place now can be ramped up to handle more growth without having to add a lot of labor."

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