

# 5 Criteria for Benchmarking Order Fulfillment

White Paper

*How Does Your Current Order Fulfillment Process Stack Up? Benchmark Your Operations Against These Companies' Criteria for Success*



## Introduction

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There's always room for improvement in a picking operation—whether through faster throughput, optimized labor productivity, increased accuracy, improved space utilization or better accommodation of demand spikes.

Five different companies in five very different industries used one of these five criteria to justify integrating automation into its picking processes. Each invested in a low-risk automated storage and retrieval (AS/RS) system—such as horizontal carousels, vertical lift modules (VLMs) or vertical carousels—to address their unique order fulfillment opportunity. All found that their new system optimized their previous manual picking process for better handling, provided more benefits than expected and increased profits.

This white paper details the outcomes of five companies that invested in AS/RS technology, allowing you to benchmark your operations in an effort to:

- Address five challenges most commonly faced in order picking operations: Throughput, Labor Productivity, Pick Accuracy, Space Utilization and Seasonal (or Peak) Demand
- Outline the potential improvements from an investment in AS/RS technology
- Help you calculate your own potential results from a similar investment

## Benchmark Criteria # 1: Throughput

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*Are your pickers filling orders fast enough? How well does your current material handling equipment support your pickers' ability to keep up with order demand?*

Whether a facility's order pickers follow paper pick lists or use hand-held radio-frequency (RF) scanners to select items from static storage rack or shelf, keeping up with a growing inventory of stock keeping units (SKUs) and increased order demands can be a challenge.

That's because, in the typical manual distribution center, workers must still travel to the items. All that walking often accounts for as much as 60-65%<sup>1</sup> of a picker's shift. Further, in conventional operations pickers often fill just one order at a time.

Limited by paper pick lists and a lack of picking optimization software, they may visit the same popular SKU pick faces multiple times in a day. For a facility with static shelving or pallet rack, this translates into pick rates of approximately 50 lines per hour.

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<sup>1</sup> Lee Rector, "Warehouse Slotting," Toolbox.com SCM Blogs, accessed January 5, 2014, <http://it.toolbox.com/blogs/warehouse-planning/warehouse-slotting-6655>

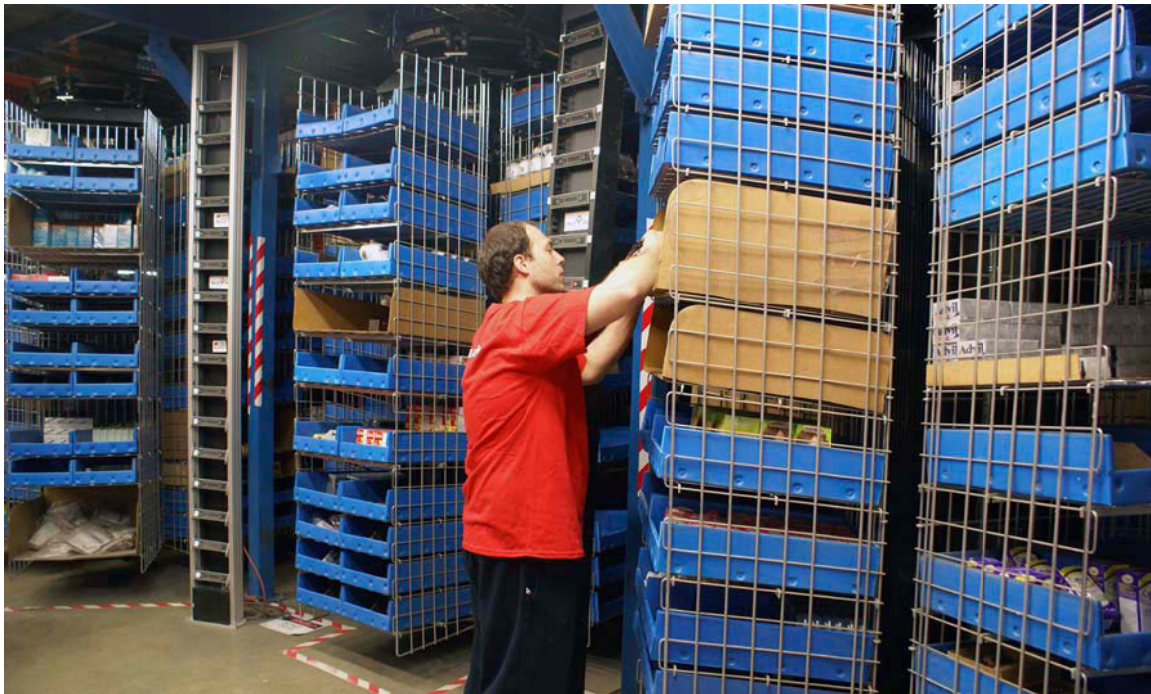
Alternately, an AS/RS such as horizontal carousels, vertical carousels and VLMs, facilitates batch picking. The batching process groups together orders with a common item, or items,<sup>2</sup> while integrated inventory management software sequences the picks to be completed in a single rotation, or cycle, of the unit.

Multiples of the same SKUs are picked, then delivered to a nearby workstation for sorting into their appropriate orders for shipping. Because multiple orders can be filled at the same time, batching combined with AS/RS and pick to light technology can increase throughput by as much as 600%.

**Benchmarking Example:** At **Value Drug Mart's** central distribution center in Alberta, Canada, management was challenged by an inventory expansion of general merchandise required to satisfy the needs of their 32 retail stores' customers. The 85,000-square-foot facility's 60,000-square-foot warehouse manages 18,000 SKUs. Items were stored in multiple pick zones, including pallet rack, flow rack, standard shelving and bulk areas.

Adding more people didn't solve the problem, said Dwayne Bilawchuk, Operations Manager. "We were picking as fast as staff, shelving and technology would permit, but it wasn't fast enough," he said.

The company invested in six horizontal carousels with integrated pick-to-light technology. This automated picking system replaced two zones of static shelving averaging 50 lines per hour. Stacked and arranged into two zones of three carousels each, the lower carousel zone manages 3,100 general merchandise SKUs with an average pick rate of 350 lines per hour. The upper carousel zone manages 7,100 pharmacy SKUs and boasts a pick rate of 575 lines per hour.



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<sup>2</sup> "Batch Pick," MHI.org Glossary, accessed January 4, 2014, [www.mhi.org/glossary?q=batch&pb=1&fq=&sort=score+desc](http://www.mhi.org/glossary?q=batch&pb=1&fq=&sort=score+desc)

**Benchmark Your Operations:** Fill in the blue cells below with metrics from your current process to calculate your additional revenue opportunity from increased throughput via a dynamic storage solution (based on a conservative 400% increase in the number of line items picked per person per hour).

Benchmark Your Operations: Throughput		
	YOUR Current System	Possible Dynamic Storage Solution
Current Revenue Generated		Calculated Below
Number of People Order Picking		(Same as Current)
Sustained Number of Line Items Picked Per Person Per Hour		(Current x 4)
Sustained Number of Line Items Picked as a Company Total Per Year*	From Above ((People x Lines) x 8 x 240)	From Above ((People x Lines) x 8 x 240)
Average Revenue per Line Item Picked	Current Revenue / Lines	(Same as Current)
Possible Revenue Generated	Calculated Above	(Revenue x (Lines - Lines))
<b>Additional Revenue Opportunity per Year*</b>	<b>None</b>	(Current - Possible Revenue)
*assumes 240 single shift (8 hour) working days per year		

Email us for the excel file that will do the calculations for you: [info@kardexremstar.com](mailto:info@kardexremstar.com).

## Benchmark Criteria # 2: Labor Productivity

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*Do your current workers waste large amounts of time walking and searching for parts? Does your current facility layout contribute to slower picks?*

As “the most labor-intensive and costly activity for almost every warehouse, where the cost of order picking is estimated to be as much as 55% of the total warehouse operating expense,”<sup>3</sup> adding more pickers to fill more orders doesn’t make financial sense. Further, more workers can create more congestion in the aisles, slowing their productivity instead of speeding it up.

Implementing one (or more) automated horizontal carousel, vertical carousel or VLM system boosts picker productivity because stored items are presented directly to an operator. Travel from one pick face to another is completely eliminated with this “goods to person” picking method.

To further increase productivity, these AS/RS technologies have integrated, light-directed picking systems that illuminate the item’s location and pick quantity required. Instead of wasting time searching for a specific SKU at the pick face, the picker sees its location immediately, yielding more picks. All these functions increase productivity anywhere from 200% to 600%.

In fact, an automated solution often allows just one worker to handle the picking assignments of multiple operators, enabling as many as two-thirds of a facility’s workforce to be reassigned to other, non-picking tasks—without decreasing productivity. Alternately, implementing these automated storage solutions can compensate for scarce or unreliable labor.

**Benchmarking Example:** When tobacco processing equipment manufacturer **Hauni**, in Richmond, Virginia, restructured its existing manufacturing facility to add value-added services, the facility’s parts stockroom had to reduce its floor space footprint by 60%.

The manually serviced stockroom housed \$14 million in parts inventory in floor-to-ceiling static rack and shelving, accessed by narrow-aisle, man-up forklifts. Averaging 628 picks and 278 puts daily (totaling more than 223,000 transactions per year), the crowded space required 17 workers who often put in extensive overtime to keep pace with the plant’s production schedule. “We were working an average of 3,200 overtime hours a year,” said Clarence Cox, Divisional Manager. “Money spent for overtime hours adds up quick.”

Although the company originally installed five VLMs with an integrated 18-position batch station solely to accommodate the space reduction, facility management noted a dramatic uptick in productivity almost immediately.

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<sup>3</sup> Martin Murray, “Order Picking in the Warehouse,” About.com Logistics and Supply Chain Guide, accessed January 5, 2014, [http://logistics.about.com/od/operationalsupplychain/a/order\\_pick.htm](http://logistics.about.com/od/operationalsupplychain/a/order_pick.htm)

Order volume and SKU count has remained the same, but the new system requires only nine workers who are picking 75% faster than before. In addition to picking the same number of orders in a quarter of the time, the department has done away with overtime almost completely, noted Cox.



**Benchmark Your Operations:** Using a standard 66% reduction in labor (similar to Hauni’s results), fill in the blue cells below with metrics from your current process to calculate your additional revenue opportunity via more efficient use of labor delivered by a dynamic storage solution.

<b>Benchmark Your Operations: Labor</b>		
	<b>YOUR Current System</b>	<b>Dynamic Storage Solution</b>
Cost of Employee per Year (Fully Burdened)		(Same As Current)
Number of People Order Picking		(People - (People x 0.66))
Total Labor Cost per Year	(Multiply Above)	(Multiply Above)
<b>Cost Savings per Year</b>	<b>None</b>	(Subtract Totals Above)

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## Benchmark Criteria # 3: Pick Accuracy

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*How accurate are your picks? How much money does a mistake cost your operation?*

Picking mistakes are the bane of every warehouse manager. Because it's not just the cost of the item that impacts the bottom line, it's also "the expenses associated with shipping the item back, processing it upon receipt, returning it to stock, and loss of customer satisfaction."<sup>4</sup> Further time is lost in correcting the mistake by picking, packing and shipping the correct item back to the customer.

An estimated 35% of facilities experience ongoing pick error rates of 1% or more. Although 1% sounds like a slim margin for improvement, it adds up quickly.

Automated horizontal carousels, vertical carousels and VLMs integrate advanced picking and real time inventory tracking technologies. Features, such as light-directed indicators that pinpoint the precise SKU location and quantity to be picked, increase picking accuracy up to 99.9%. The system negates human error and yields better inventory control. Not only do these devices dramatically reduce picking mistakes, but they also lead to happier customers who are more likely to buy again.

**Benchmarking Example:** The 6,900-square-foot maintenance stockroom for **Jazz Aviation**, in Toronto, Ontario, is responsible for around-the-clock repairs to the airline's fleet of 125 planes. That means the facility has to keep close watch over the 20,000 SKUs in inventory.

"Space is a premium, being next to an airport," said Mike Hauser, Stores System Manager. The stockroom had 200 bays of shelving with no floor space available, so adding more wasn't an option. Overflow bulk inventory was spilling into the hanger reserved for airplane maintenance, and was at risk of being misplaced or damaged.

Further, safety is the top priority at Jazz. The protection of inventory is crucial to keeping airplanes at peak performance. To secure parts and keep better track of them, the company consolidated half of its total SKUs into two VLMs.

Because they are enclosed with only one access point, the VLMs protect stored inventory. The system's integrated inventory management software ensures that all transactions are logged and traceable, keeping airplanes and passengers safe.

Every SKU received into inventory has a batch, or lot, number. The batch number must be traceable throughout the distribution channel, because it is crucial to know what part number and batch number was used in each airplane. Upon picking, the operator must pick a specific part and a specific batch number. This allows Jazz to trace what batch number is put into each order and used on each plane.

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<sup>4</sup> Hannah Kain, "Simple Fulfillment Errors Will Affect The Bottom Line," accessed January 5, 2014, <http://www.alom.com/resources/focus.asp?file=002.inc>.

To verify the pick based on the batch number, the operator scans the part before it goes into the order tote, ensuring they have picked not only the right part number, but also the correct batch number. Due to the batch picking and validation process, accuracy has increased to more than 99%.





**Benchmark Your Operations:** Fill in the blue cells below with metrics from your current process to calculate your additional revenue opportunity with an improved accuracy rate of 99.9% (similar to the increase at Jazz Air) delivered by a dynamic storage system.

Benchmark Your Operations: Pick Accuracy		
	YOUR Current System	Dynamic Storage Solution
Number of People Order Picking		(Same As Current)
Sustained Number of Line Items Picked Per Person Per Hour		(Same As Current)
Sustained Number of Line Items Picked as a Company Total Per Year*	From Above ((People x Lines) x 8 x 240)	From Above ((People x Lines) x 8 x 240)
Pick Accuracy (percentage)		99.9%  (Increase to 99.9%)
Mispicked Lines per Year	(lines per year x (accuracy - 1))	(lines per year x (0.999 - 1))
Cost Per Mispicked Item		(Same As Current)
<b>Additional Revenue Opportunity per Year</b>	<b>None</b>	From Above (Mispicks x Cost per Mispick)
*assumes 240 single shift working days per year		

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## Benchmark Criteria # 4: Space Utilization

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*Are you maximizing the use of your facility's floor space? Could you add revenue-generating activities without adding square footage?*

Although a warehouse may feel packed full of inventory, if static storage systems—like shelves, drawers, flow rack and pallet rack—are the only tools used to hold products, then the facility's full potential hasn't been realized. That's because AS/RS technologies, such as horizontal and vertical carousels and VLMs, utilize the building's height to store inventory overhead. Not only does this open up the footprint the static systems previously required, it also eliminates the aisles required to access them.

The value of the freed-up floor space depends on its repurposed use. Open space can be used to store larger volumes of the same SKUs, or to accommodate expanded inventory of new SKUs. Alternatively, the opened-up areas can be repurposed for other, revenue generating processes. Additional value-added services, such as light manufacturing for customization, kitting of related items, or enhanced quality control processes, can positively impact a company's bottom line.

To maximize every square inch of storage space within the automated systems, they are outfitted with tightly configured totes, bins, dividers, drawers and specialty holders. These components separate and organize the maximum number of stored items possible in each of the system's trays or bins. Additionally, integrated inventory management software dynamically manages the cube space within the automated storage system, keeping shelves tightly compressed.

**Benchmarking Example:** Railroad machinery equipment manufacturer **Plasser American Corp.**, in Chesapeake, Virginia, wanted to expand its production capacity in order to grow sales. To do so, the company sought to reallocate its existing manufacturing facility footprint by compressing its existing stockroom to free up floor space elsewhere in the building.

The original, 35,000-square-foot stockroom consisted of a two-story mezzanine bin system holding \$16 million-worth of spare parts. The 18,000 parts resided in 19,000 square feet of shelving, occupying 4,875 square feet of floor space.

To achieve greater storage density, the company installed eight VLMs to store 13,000 SKUs (due to their size, the remaining 5,000 items were better suited to bulk shelving). Each measures just over 9 feet wide by 10 feet deep, allowing the newly configured stockroom to occupy only 1,440 square feet of floor space—a 70% savings over the previous set-up.

Additionally, because workers no longer have to travel as far (or upstairs) to retrieve parts, two fewer people are required to service the area, bringing the total number of stockroom workers down to eight. "A mandated floor space reduction for a production expansion turned out to improve the overall efficiency of the stockroom; it's a win-win!" said Daniel Boone, Quality Manager.



**Benchmark Your Operations:** Fill in the blue cells below with metrics from your current operation to calculate your additional revenue opportunity with improved space utilization (a standard 75% floor space savings) delivered by a dynamic storage solution.

Benchmark Your Operations: Space		
	YOUR Current System	Possible Dynamic Storage Solution
Revenue Generated		(Same As Current)
Space (Square Feet) of Warehouse or Distribution Facility		(Same As Current)
Revenue per Square Foot	From Above (Revenue/Space of Facility)	From Above (Revenue/Space of Facility)
Space (Square Feet) of B & C Movers in Warehouse or Distribution Area		(B&C Space - (B&C Space x 0.75))
Recovered Space (Square Feet)	None	From Above (Current B&C Space - Possible B&C Space)
<b>Additional Revenue Opportunity per Year</b>	<b>None</b>	From Above (Revenue per Sq Ft x Recovered Space)

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## Criteria # 5 (One Last Consideration): Seasonal (or Peak) Demand

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*Do your inventory storage practices—both equipment and labor—flexibly accommodate spikes in demand?*

Most warehouses experience peaks and valleys in demand throughout the year. For retailers, order volumes typically spike around the end-of-year holidays.

To handle the additional number of orders, “many retail distribution centers must hire additional seasonal employees during their peak period. But competition for seasonal warehouse and DC employees is increasing... Investing in higher levels of material handling automation will allow companies to reduce, although not eliminate, their dependency on the ever-shrinking seasonal labor pool.”<sup>5</sup>

As discussed above, utilizing automated horizontal carousels, vertical carousels or VLMS allows fewer pickers to fill more orders per shift without additional labor.

Likewise, with the increasing impact of e-commerce, many operations experience daily spikes due to shipping deadlines. “If your service-level agreement is that you will pick and ship anything that drops into the warehouse management system by 3 p.m., you better understand the order flow on a minute-by-minute or hourly basis.... When you get that granular, you’re going to find that what happens at 1 p.m. is different from what happens at 3 p.m.”<sup>6</sup>

The same AS/RS technologies can accommodate spikes in demand that routinely occur during a shift, because their integrated control and inventory management software interfaces with a facility’s warehouse management system (WMS). The combined data yields information that balances order flow with worker availability and material handling systems.

Still other businesses that utilize promotions, such as limited-time discounts, to generate additional sales—particularly of excess inventory or products that are approaching an expiration date—will experience an uptick in order volume shortly after the deal is announced. Their peaks might be associated with a certain family of products, or items that are related in their use. For slow- to medium-velocity movers, automated storage systems accommodate order spikes by delivering the products to the pickers and reducing travel times.

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<sup>5</sup> Matt Kulp, “Material Handling Equipment for Multichannel Success,” CSCMP’s Supply Chain Quarterly, Accessed February 23, 2014, [www.supplychainquarterly.com/topics/Logistics/20140110-material-handling-equipment-for-multichannel-success/](http://www.supplychainquarterly.com/topics/Logistics/20140110-material-handling-equipment-for-multichannel-success/)

<sup>6</sup> Bob Trebilcock, “Looking Ahead to a New Year in Materials Handling,” SupplyChain247.com, Accessed February 23, 2014, [www.supplychain247.com/article/looking\\_ahead\\_to\\_a\\_new\\_year\\_in\\_materials\\_handling](http://www.supplychain247.com/article/looking_ahead_to_a_new_year_in_materials_handling)



**Benchmarking Example:** At wholesale beauty supply distributor **Aerial's** 95,000-square-foot warehouse in Marinette, Wisconsin, a variety of targeted sales promotions can often create 50% spikes in shipping volumes over its standard 1,200 daily orders in any given week.

Initially, Aerial picked complete orders from shelving and flow-rack to cart. However, pickers struggled to keep up with the volume jumps and support a corporate policy requiring all orders received by 2 p.m. be shipped out the same day.

To deal with these occasionally wild pick volume swings, the company converted from a manual inventory storage system—static shelving and flow-rack holding 7,000 SKUs (5,000 classified as slow- to medium-moving products that either took a long time to pick or turned less quickly than others)—to automated horizontal carousels. Slow- to medium-mover SKUs now reside in the carousels, accommodating both current demand and projected growth.

Additionally, the company transitioned from a picking process that relied on a single operator picking a complete order, to batch picking in multiple zones using a pick-and-pass methodology between carousel pods and workstations. The entire system now processes up to 13,000 lines per day.

“We put in the carousels to eliminate labor, floor space and time,” explains Brenda Beyer, Director of Logistics. “The entire automated system has really helped increase our efficiency and productivity. We used to have 28 people picking orders. That number is down to 12 with automation. We've eliminated workers walking up to 10 miles a day, allowing us to pick three times faster, plus we can handle a 50% spike in orders.”



