

Calculating the True Cost of Accuracy

White Paper

Increase your operation's accuracy and reduce costs associated with errors by deploying automated, goods-to-person, storage and retrieval systems.



Order Accuracy: What is a Mispick?

Most order fulfillment operations utilizing operators to manually select required products to fill a customer order have experienced picking errors. That's because humans are prone to making mistakes.

Picking involves much more than grabbing an item off a static storage rack or shelf. In the typical manual distribution center, picking means an operator receives a paper list of instructions about what to pick and where, travels to the correct storage location, locates the correct item within that storage location, refers to the paper pick list to determine the number of items required from that pick face, picks the items, confirms the pick by marking the paper, then delivers the items for packing.

All of those steps are fraught with potential for error. Factor in increasing fatigue as an operator walks through a warehouse again and again throughout a shift, and the typically less-than-optimal lighting in most facilities, and it's easy to see why picking mistakes happen.

These picking mistakes, or mispicks, come in a variety of types. Among them:

- The wrong item is picked instead of (or in addition to) the correct one.
- The wrong quantity of items is picked, either too many or too few.
- An item is omitted, or not picked at all.
- The condition of the item itself is unacceptable, such as damaged or mis-labeled.¹

So, while most operations understand mistakes will happen, very few have taken the time to calculate the true cost of those mispicks, and how they impact the bottom line. This white paper outlines a calculation for estimating the true cost of mispicks in order fulfillment to an operation. It also presents technology solutions to improve pick accuracy, and shares a calculation for determining the savings they can deliver.

Doing the Math: How Much Does a Mispick Cost?

In October 2012, a survey of 250 supply chain and distribution managers across the United States, United Kingdom, France and Germany—conducted by research company Vanson Bourne—found “distribution centers are losing an average of nearly \$390,000 per year due to mispicks.”²

The cost of a picking mistake includes not only the cost of the item, but also “the expenses associated with shipping the item back, processing it upon receipt, returning it to stock, and loss of customer satisfaction.”³ Further time is lost in correcting the mistake by picking, packing and shipping the correct item back to the customer.

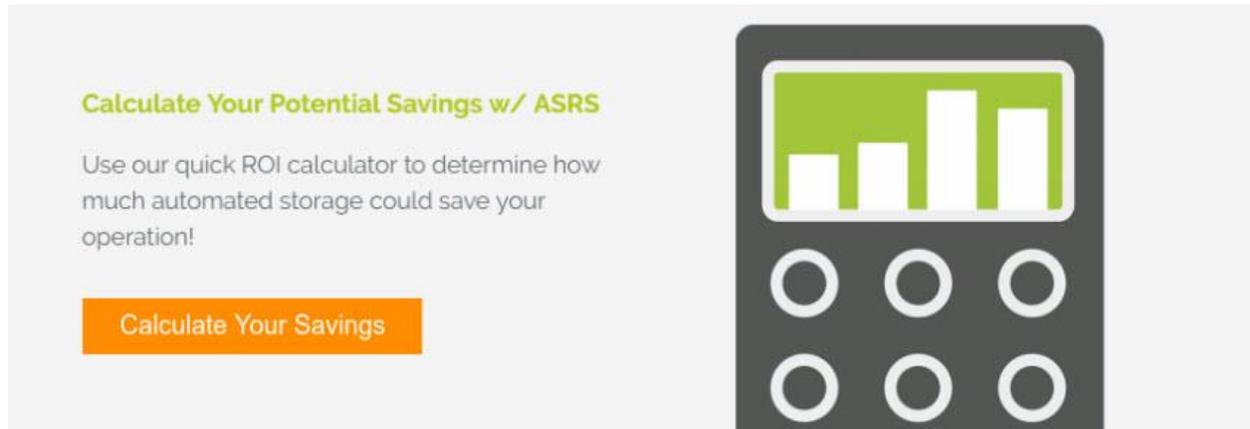
¹ Tobias Rammelmeier, et al. “Active Prevention of Picking Errors by Employing Pick-by-Vision,” accessed, January 2, 2018, <http://www.fml.mw.tum.de/fml/images/Publikationen/2011-06%20Active%20prevention%20of%20picking%20errors%20by%20employing%20Pick-by-Vision.pdf>

² “Inaccurate order picking costs companies \$390K each year: study,” accessed June 4, 2019, <https://www.canadianmanufacturing.com/manufacturing/innacurate-order-picking-costs-companies-390k-each-year-study-91496/>

³ Hannah Kain, “Simple Fulfillment Errors Will Affect The Bottom Line,” accessed June 4, 2019, http://www.alom.com/wp-content/uploads/2014/03/ALOM_SimpleShippingErrors.pdf

An estimated 35% of facilities experience ongoing mispick rates of 1% or more. Although 1% sounds like a slim margin for improvement, it adds up quickly, as illustrated here:

A facility picking 250 lines per hour, averaging three SKUs per order, and running one 8-hour shift per day picks 6,000 items daily. If 1% of those picks are incorrect, that translates to 60 mispicks. The cost of each mispick... can average as much as \$100 apiece, or more. Therefore, 60 mispicks equal \$6,000 in lost revenue a day.⁴



Reducing Mispicks: Light-Directed Solutions Boost Picking Accuracy

Automated, goods-to-person storage and retrieval systems—such as [horizontal carousels](#), [vertical carousels](#) and [vertical lift modules \(VLMs\)](#)—deliver items directly to an operator, eliminating walk and search time, as well as fatigue. In addition to delivering the items directly to the operator, automated storage and retrieval systems can be equipped with light-directed picking features which negate human error by helping operators with four basic functions:

1. Picking a specific or active item
2. Putting an item in an active order or location
3. Communicating a message such as a quantity or description of the item
4. Completing the pick and moving on to the next pick

[Light-directed picking technologies](#) have evolved into complete message centers that communicate to the operator the precise area within the carrier of the item to be picked, display the part number or description, pinpoint the exact location, direct either picking or storage, and indicate the required quantity. Not only do these devices dramatically reduce picking mistakes, but they also lead to happier customers who are more likely to buy again.

⁴ Ibid.

To increase picking accuracy up to 99.9%, the following light-directed technologies can be added to automated storage and retrieval systems:

Transaction Information Center: Applied to vertical carousels and VLMs, this dynamic pick-to-light system displays discrete item identification in 1/10-inch increments. The module displays descriptions, quantities and other messages to help an operator select the correct item and amount for order fulfillment.



Light Pointer: Used with VLMs, this system deploys an LED or laser light mounted on a slider that moves horizontally on a guiding system within the access opening of the storage and retrieval unit. Software-driven, the light pointer also swivels to project the light beam in the depth direction of the machine to illuminate any position within the storage tray. The light spot identifies the precise location of the item to be picked or replenished, eliminating search time.



Position Indicator Light Bar: Incorporated into the access openings of both vertical lift modules and vertical carousels, these LED lights illuminate in alignment with the position of the required item where it is stored in the tray.



Light Tower: When integrated with horizontal carousels, this unit houses picking display modules in extruded uprights (towers). The displays indicate the active carousel, shelf level, cell location and quantity to pick. Software-driven, a single light tower serves two horizontal carousels working together in a picking pod.



Put/Batch Lights: Used with both horizontal and vertical carousels, as well as VLMs, these light-directed picking modules direct an operator to put or store items in a specific or active location when replenishing stock. They can also be used for order consolidation, batch picking and sortation at workstations located near the automated storage and retrieval units.



TABLE 2: Light-Directed Picking System Add-Ons That Dramatically Reduce Mispicks

	Capabilities			Integrates With		
	Picking	Putting	Message	Horizontal	Vertical	VLM
Transaction Information Center	x	x	x		x	x
Light Pointer	x	x				x
Position Indicator Light Bar	x	x			x	x
Light Tower	x	x		x		
Put/Batch Lights		x	x	x	x	x

In addition to these light-directed technologies, automated storage and retrieval systems can also incorporate radio-frequency (RF) scanners for barcode verification of picked items, voice-directed picking modules that give verbal commands to operators wearing a head-set, or scales that verify the correct number of small parts have been picked based on their weight.

See the Savings from Fewer Mispicks

Increasing pick accuracy, even by less than a percent, will not only contribute to a dramatic reduction in picking mistakes, but it will also result in tremendous cost savings, as shown in Table 3. Further, customer satisfaction will improve, likely leading to an increase in repeat purchases.

Just how much cost savings can result from using automated storage systems that incorporate light-directed picking technologies? Table 3 shares two examples of the cost savings that can be gained by reducing pick error from 1% to 0.1%. Reducing the mispick rate even slightly yields a 90% cost savings.

TABLE 3: Calculate the Savings from Fewer Mispicks		
	Example 1	Example 2
<i>From Table 1 Above: Lost Revenue per Year with 1% Mispick Rate</i>	<i>\$405,600</i>	<i>\$1,560,000</i>
Now, let's calculate the cost of 0.1% Mispick Rate		
Lines per Hour	65	250
Average SKUs/Order	x 3	x 3
SKUs Picked per Hour	= 195	= 750
One 8 Hour Shift	x 8	x 8
SKUs Picked per Day	= 1,560	= 6,000
Mispick Rate	x 0.1%	x 0.1%
Mispicks per Day	= 1.56	= 6
Average Cost of a Mispick	x \$100	x \$100
Total Lost Revenue per Day	= \$156	= \$600
Working Days per Year	x 260	x 260
<i>Total Lost Revenue per Year with 0.1% Mispick Rate</i>	<i>= \$40,560</i>	<i>= \$156,000</i>
Savings per Year Between 1% and 0.1% Mispick Rate	\$365,040 90% Cost Savings	\$1,404,000 90% Cost Savings

Want Even Greater Accuracy? Integrate Inventory Control Software

To achieve the highest degree of picking accuracy, integrating [inventory management software](#) with an automated storage and retrieval system enables smart functionality such as inventory monitoring. In addition to keeping track of the contents stored within the machine, the software also interfaces with a facility's warehouse management system (WMS) and enterprise resource planning (ERP) systems. This function allows managers to closely monitor stock levels in real time—and potentially eliminate physical counts—for better inventory control.

For example, in systems equipped with an RF barcode scanner, the operator can be required to scan each picked item. The data captured by the scanner is relayed to the inventory control software, which verifies that the picked part is the same one required by the order. This barcode recognition feature can also be used when replenishing inventory in the system. During restocking, the operator scans both the item and its destination to verify placement into the correct storage location. Adding scanning to a storage and retrieval system ensures additional accuracy in order picking and SKU replenishment, significantly reducing mispicks.

Likewise, for operations that stock a few high dollar value items, or regulated products requiring tighter control, the software can be configured to require a barcode scan only when triggered by certain parameters. Qualifiers can be limited to certain transactions, product types or item storage locations, selectively boosting accuracy and control without sacrificing pick speed.

For facilities requiring an operator to match part numbers or pick items from a specific batch, lot or serial number—visual verification can be tedious, time consuming and error-prone. For these applications, barcode scanning can be used to verify with the inventory management software the correct item has been picked, saving time, ensuring accuracy.

Finally, in highly regulated industries such as medical device, healthcare and pharmaceuticals, the same software functionality can be leveraged for its track-and-trace capabilities. That's because the software maintains a record of the item, the date it was picked, the operator who picked it and the order it fulfilled. Should a defect be identified, or a recall required, the software can quickly determine the locations of both stocked and shipped products.

Examples of Increased Accuracy from Automated Storage Systems:

Jazz Aviation



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.

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. The VLMs' 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.

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%.

Value Drug Mart



To reduce labor requirements and speed picking productivity, Value Drug Mart in Edmonton, Alberta (Canada) replaced two zones of static shelving with six horizontal carousels integrated with pick-to-light technology. Stacked and organized into two zones of three carousels each, picked items are batched into orders, with a batching station that accommodates simultaneous fulfillment of up to 10 orders.

Holding more than 10,000 total SKUs, the lower carousel zone manages 3,100 general merchandise items with an average pick rate of 350 lines per hour, while the upper carousel zone manages 7,100 pharmacy items with an average pick rate of 575 lines per hour. Each zone is picked by a single operator working a 5-hour shift, reducing the total man hours for picking from 36 to 10 hours a day.

Because accuracy is extremely important to the company, a fixed-position scanner (similar to a retail check out scanner) is mounted at each end of the batch station. Before each item is placed in the order tote it is scanned for accuracy verification. The scan helps Value Drug Mart maintain near perfect pick accuracy.

Christie



At projection technology manufacturer Christie's worldwide manufacturing center, in Kitchener, Ontario (Canada), the company custom builds systems for cinemas, education, media, government and more. Its manufacturing process is based on Kaizen Lean Manufacturing tenets. When the company wanted to improve production capacity by doubling its inventory of sub-assembled projectors, it switched from a cart-based storage system to two VLMs.

In addition to recovering 70% of floor space, doubling capacity and cutting labor requirements in half, the company was able to leverage the VLMs' inventory management software to ensure strict adherence to a first-in/first-out (FIFO) picking strategy. When a projector is received into the VLMs' inventory, it is stored by both serial number and date.

Previously, it took one of four workers dedicated to the process as long as 20 minutes to locate the required sub-assembly unit by visually checking each item's serial number. Now, the VLMs' software automatically locates and delivers the correct sub-assembly in less than a minute. As a result, projectors are retrieved 90% faster with half the number of employees.

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To learn more about how automated storage systems can improve your accuracy and increase your profits by nearly eliminating mispicks, contact your Kardex Remstar representative today.

About Kardex Remstar

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