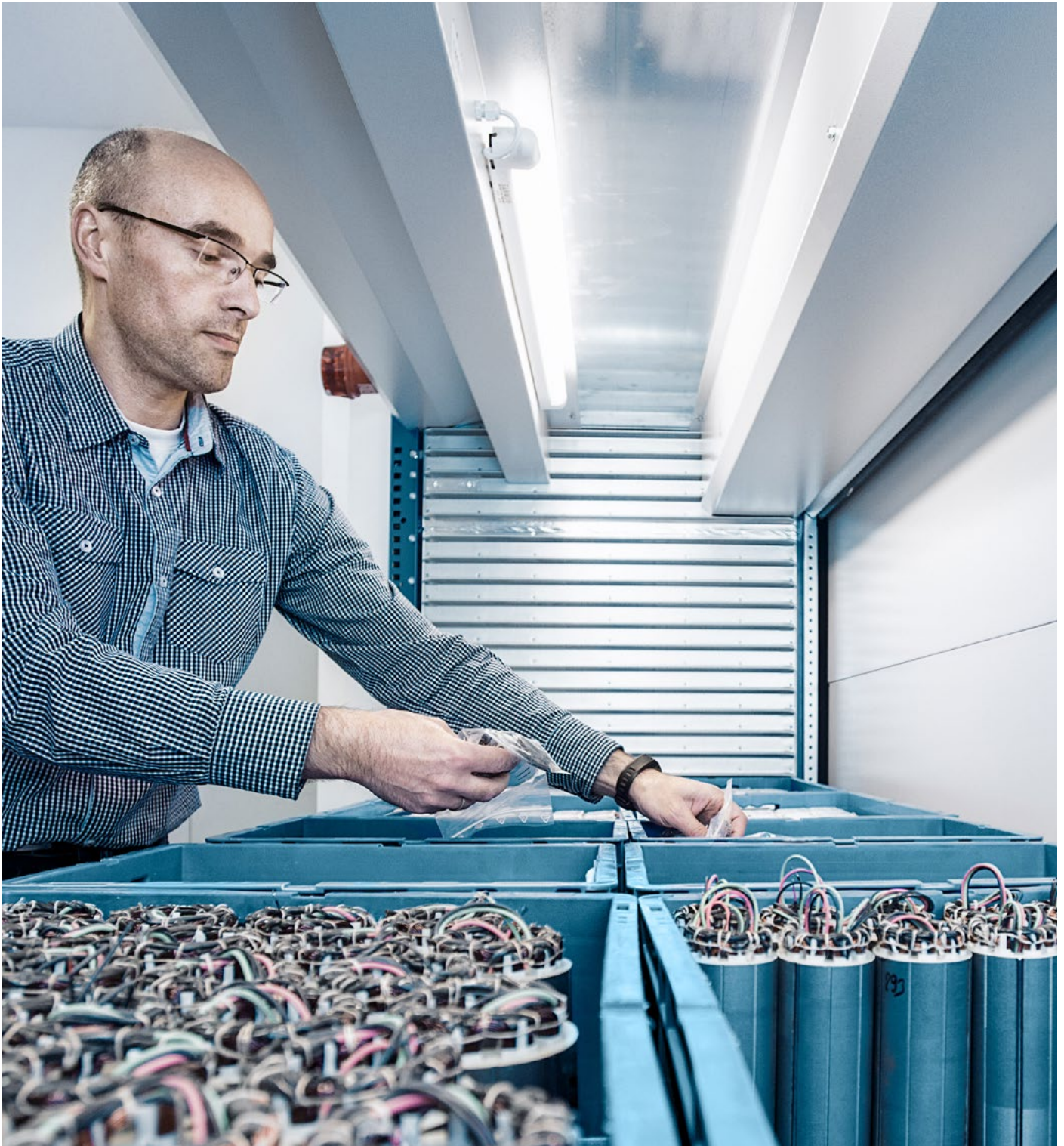


White Paper

Calculating the Cost of Accuracy





Order accuracy: What is a mispick?

Most order fulfillment operations manually selecting 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:



False article as a substitute or in addition to the correct products



Wrong quantity (short pick or over pick)



Omission error: an order line item has been forgotten



Condition error: damaged products or improperly labeled articles¹

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?

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 to ship it back, processing the item, returning it to stock and potential loss of customer satisfaction. Further time is lost in correcting the mistake by picking, packing and shipping the correct item back to the customer.

More than half of those surveyed experience a mispick rate over 3% while another 19% of facilities don't even measure mispicks.³ Although 3% 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 3% of those picks are incorrect, that translates to 180 mispicks. The cost of each mispick can average as much as \$25 apiece, or more. Therefore, 60 mispicks equal \$4,500 in lost revenue a day.



Distribution centers are losing an average of nearly \$390,000 per year due to mispicks



Cost of a picking mistake includes not only the cost of the item, but also the shipping, processing, returning and customer satisfaction



An estimated 50% of facilities experience ongoing mispick rates over 3%

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Reducing mispicks: Light-directed solutions boost picking accuracy

Automated, goods-to-person storage and retrieval systems (ASRS) —such as Vertical Carousel Modules (VCMs), Vertical Lift Modules (VLMs) and Vertical Buffer Modules (VBMs) —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, ASRS can be equipped with light-directed picking features which reduce 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 unit 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.

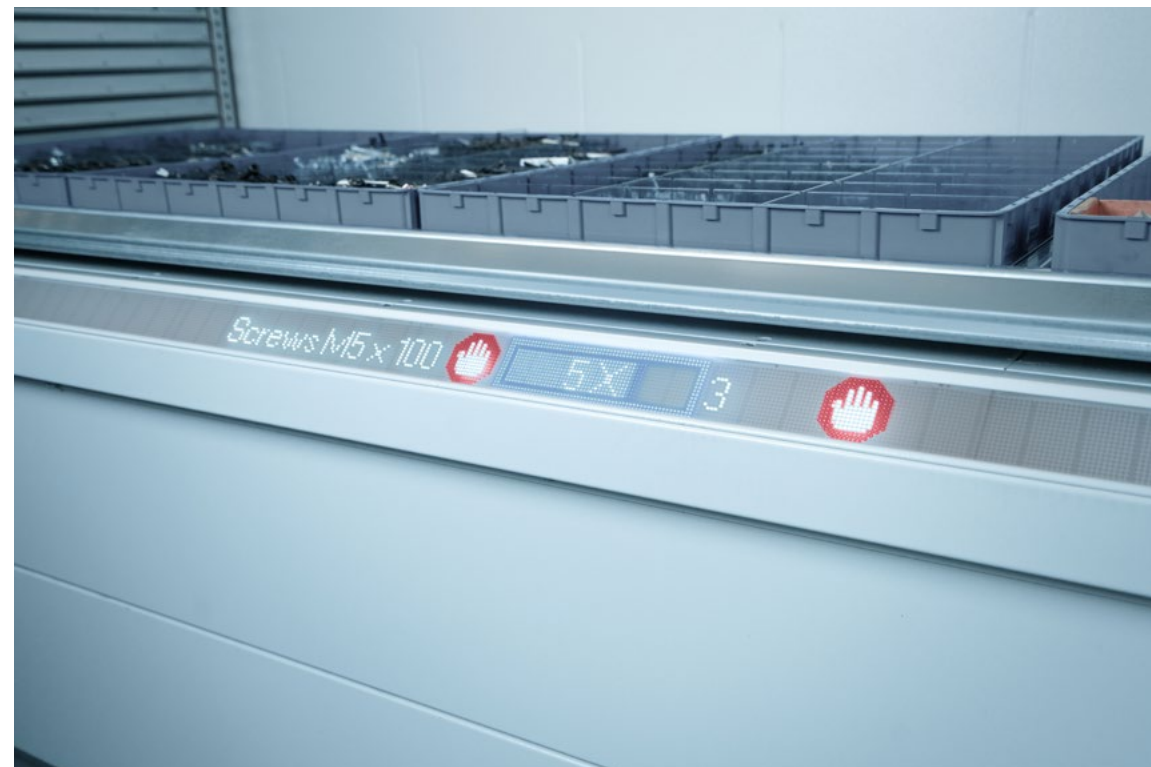


Light-directed technologies

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

Display LED-Navigator

Integrated with VCMs and VLMs, this dynamic pick-to-light technology displays information for the operator. It uses light as a communication tool to provide part descriptions, quantities and other messages to help an operator select the correct item and amount for order fulfillment.



Light pointer

Used with VLMs or VBMs, this system deploys an LED or laser light mounted on a slider that moves on a guiding system within the access opening of the 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 or tote. The light 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 Carousel Modules, 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 HCMs, 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 HCMs working together in a picking pod.



Horizontal Carousel Modules with Light Towers

Put/Batch lights

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 ASRS.

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.

Light-directed picking system add-ons that dramatically reduce mispicks

	Capabilities			Integrates With		
	Picking	Putting	Message	VCM	VLM	VBM
Display LED-Navigator	×	×	×	×	×	
Light Pointer	×	×			×	×
Position Indicator Light Bar	×	×		×	×	
Put/Batch Lights		×	×	×	×	×

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. 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? The table below 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.

Calculate the savings from fewer mispicks

	1% mispick rate	0.1% mispick rate
Lines per Hour	250	250
Average SKUs/Order	× 3	× 3
SKUs Picked per Hour	= 750	= 750
One 8 Hour Shift	× 8	× 8
SKUs Picked per Day	= 6,000	= 6,000
Mispick Rate	× 1%	× 0.1%
Mispicks per Day	= 60	= 6
Average Cost of a Mispick	× \$25	× \$25
Total Lost Revenue per Day	= \$1,500	= \$150
Working Days per Year	× 260	× 260
Total Lost Revenue per Year with 0.1% Mispick Rate	= \$390,000	= \$39,000
Savings per Year Between 1% and 0.1% Mispick Rate		\$351,000 90% Cost Savings

Integrate inventory control software

To achieve the highest degree of picking accuracy, integrating inventory management software with an ASRS 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.





Use barcode scanners

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 and 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.

Increasing accuracy with ASRS

Jazz Aviation

The 6,900 sq ft 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 must keep close watch over the 20,000 SKUs in inventory.

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 Vertical Lift Modules Kardex Shuttle. Integrating inventory management software ensures 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 Carousel Modules integrated with pick-to-light technology. Stacked and organized into two zones of three HCMs 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 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, 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, 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 Kardex Shuttles.

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

About Kardex

Kardex is a global industry partner for intralogistics solutions and a leading supplier of automated storage solutions and material handling systems. The Group consists of two entrepreneurially managed divisions, Kardex Remstar and Kardex Mlog.

Kardex Remstar develops, produces and maintains dynamic storage and retrieval systems and Kardex Mlog offers integrated materials handling systems and automated high-bay warehouses.

The two divisions are partners for their customers over the entire life cycle of a product or solution. This begins with the assessment of customer requirements and continues through planning, realization and maintenance of customer-specific systems. It ensures a high level of availability combined with low total cost of ownership and operation.

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