



Achieving Peak Performance with Warehouse Automation

Leverage process improvements with the right automation technologies to gain significant operational improvements:

- Lowered labor costs
- Increased productivity
- Optimized efficiency
- Improved accuracy
- Maximized profitability

The Challenges of Today's Warehousing

Distribution centers that rely on outdated paper-based picking will experience higher error rates, slower throughput, and missed deliveries. Manual processes are far too dependent on people to make critical operational and customer service decisions because there is too much potential for human-error. An automation boost can undo your reliance on manual operations and, therefore, improve order fulfillment accuracy and productivity.

In today's Internet-driven world, same-day priority shipment requirements are the norm for a large percentage of shipments. If your DC is missing deliveries and incurring high cost per order, you need to consider a process improvement upgrade and technology boost to meet today's customers' demands and gain a competitive edge.

Zebra Technologies' 2020 Warehousing Vision Study¹ points out that 75% of warehouses are facing increased shipping volumes and 72% will be carrying more SKUs within the next three years. A whopping 79% of warehouse executives say they'll need to expand the size of their warehouses, and 69% say they will have to increase the number of warehouses they operate. In addition, 46% of warehouse managers say that faster delivery to end customers is the number one factor that is driving their growth plans.

1. https://www.zebra.com/content/dam/zebra_new_ia/en-us/solutions-verticals/vertical-solutions/warehouse-management/visionstudy/2024/warehouse-vision-study-en-us.pdf

To keep up with all of these demands, warehouse managers must now find ways to increase their floor space utilization and get more productivity and efficiency in their current operation, or risk losing business and customers. It's a challenge if your DC is not equipped with lean pick, pack, and ship processes, and the warehouse team lacks the latest technologies to manage the order fulfillment operation. Inefficient processes create stress, lead to manual shortcuts, and require work-around processes. The challenge is becoming even tougher amidst a shrinking labor market with rising labor costs. Everyone on the warehouse team from senior management to frontline pickers and packers feel the pressure of a missed order delivery or, even worse, the cost of a shipping error!

Hiring and retaining qualified warehouse workers is becoming increasingly difficult, especially in a DC where managers are trying to increase productivity and throughput with inadequate automation technologies. Warehouse jobs with manual operations are harder and less attractive to the available labor pool. In fact, 60% of warehouse managers report that labor recruitment and/or labor efficiency are among their biggest operational challenges.

The answer? Join the growing trend of successful warehouses that are embracing automation and the latest technological innovations to address these challenges and gain a crucial competitive edge. Zebra's study found that 80% of organizations are planning to invest in new technologies to solve their toughest business challenges and be competitive. Investing in automation provides more productivity, more accuracy, and lower order fulfillment operating costs.

Warehouses that don't adapt will likely be left behind, struggling to retain customers and operate at lower profit levels due to excessive cost per order. Fortunately, there are viable and affordable technologies that can boost warehouse order fulfillment productivity and relieve the pressure of current and future order growth demand while dramatically improving the operation's profitability.

Transforming Productivity and Profitability with Warehouse Automation

Operator	Task	Operation	Area	Total	Duration	Rate	Standard	Progress
JXW13	palletPicking	palletPick	floor	122	0.4	316.0	150	210%
ACW1TEMP	putaway	cartonPutaway		3152	21.9	144.2	100	144%
MXP10TEMP	putaway	cartonPutaway		270	1.9	139.1	100	139%
NXM10TEMP	putaway	cartonPutaway		4821	36.1	133.6	100	133%
MXD1TEMP	putaway	cartonPutaway		3300	27.4	120.5	100	120%
RLA1TEMP	cartonPicking	cartonPick	floor	231	2.5	92.2	125	73%
JXB1TEMP	putaway	cartonPutaway		816	12.0	68.0	100	67%
BAB1TEMP	cartonPicking	cartonPick	floor	740	9.1	80.9	125	64%
MJM1	cartonPicking	cartonPick	floor	284	3.7	76.3	125	61%
MJM1	skuIntegrity	skuPick		278	4.7	59.0	100	59%

Showing 1 to 27 of 27 entries

RDS™ Picking Labor Tracking and Reporting Screen

The quickest and most effective way to boost warehouse performance and increase productivity, accuracy, and profitability is to define and implement low-touch pick and pack processes that use automation technologies to manage and enforce better processes!

For example, if your operation uses primarily discrete order picking, consider the advantages of batch order picking managed by mobile wearable computers. This improved process allows for the direct picking of a dozen orders at one time using a combination of voice and hands-free barcode scanning to more efficiently direct operator order picking. Pick by voice, operating on Zebra's latest generation of Android wearable computers, converts cumbersome, paper-based, and inefficient warehouse picking methods into lean, fast, hands-free, and easy-to-use automated and highly accurate processes.

Here are a few key stats on improvements we've consistently seen among warehouses that have implemented the latest pick-by-voice solutions:

- 99.98% to 99.99% order fulfillment accuracy
- 30% to 50% better productivity
- 150 to 500 picks-per-hour picking²

These results are among the many reasons why so many warehouse managers are now investing in automation. In fact, 61% of warehouse managers say they will rely on a combination of workers and technological automation and augmentation by 2020.

The key to getting improved results is understanding what processes and technologies will be the best fit for the operation. Here's a quick overview of several warehouse automation technologies that our engineers at Numina Group consider, evaluate, and "test fit" to the DC operation prior to deployment in order to ensure a project's success.

Real-Time Voice-Directed Picking Processes



RDS™ Voice Suite (Real-time Distribution Software) is a family of software modules, including order release, cartonization, and several advanced picking processes that together provide the tools to implement lean, highly productive, voice-directed automated order fulfillment operations. The voice engine is speaker-independent and operates at near real-time on mobile wearable computers such as Zebra's WT6000, equipped with the hands-free 5100 camera-based ring scanner, wireless headset, and the latest Zebra 4400 head-up visual display. RDS™ Voice Suite directs workers across multiple processes including receiving, picking, kitting, and replenishment tasks in a faster and more accurate method.

More efficient voice-directed processes can be bolted on to virtually any existing WMS or ERP, many times with minimal changes to the business system's logic, by reusing the existing warehouse location and inventory management data. This greatly simplifies the warehouse.

The order release module selects groups of orders based on priority and optimizes a worker using a cart, AGV or fork-truck travel path. The voice application provides sequential instructions that guide the worker to the correct warehouse location, instructs the picking duties, and uses the barcode scanner to validate each step. This reduces worker travel distance and increases warehouse picking density.

2. Numina Group multi-year data collected from customer use cases.

This hands-free, automated, and error-proof process improves accuracy by up to 99.99% in picking, kitting, receiving, and replenishment applications. It also increases productivity rates by 30% to 50% or better in the same areas.

Additionally, RDS™ Voice includes a labor tracking and reporting module, with a toolset that measures worker productivity across different tasks and tracks labor to settable work standards.

RDS™ Voice provides a number of crucial advantages for today's busy warehouses:

- Real-time automated warehouse operations
- Optimized order releases with order prioritization
- Synchronized picking across multiple warehouse zones
- Cartonization logic to direct the pick and pack to the right size shipping carton
- Integration with virtually any WMS, ERP, or cloud software application
- Up to 99.99% improvement in accuracy
- 30% to 50% better process productivity
- More efficient picking, kitting, receiving, and replenishment
- Ability to capture SKUs, lots, and serial numbers
- Worker productivity tracking by task and work zone
- Manufacturing and kitting modules
- Speaker-independent voice technology for easy implementation

Pick-To-Light Automated Order Picking

Another key picking technology for boosting warehousing productivity is RDS™ Pick-to-Light picking and Put-to-Light order consolidation, essentially a sort-by-light technology.

Pick-to-Light, or PTL, is a network of displays referred to as “pick tags,” which display and illuminate each pick shelf, carton flow, or pallet storage location and quantity during the picking process. PTL is primarily used for the highest volume area, moving SKUs into the high mover pick zone.

The pick tags are mounted on new or existing warehouse rack and shelf channels, and the operator, using a wearable ring scanner, scans the order within a pick zone. Each activated position display has a color indicator energized as well as the alpha-numeric display to direct the operator to pick and confirm each pick task. Picking performed directly to the order's shipping carton or to high-velocity, dense, slotted SKU positions, such as carton flow and pallet pick zones, can obtain up to 500 lines-per-hour picking rates. PTL is used in kitting and order picking using either a cart or a gravity conveyor.

The operator scans the order identifier in each zone to energize the pick tags at each pick zone. The operator performs the pick and acknowledges the completion of the item and quantity picked by pushing the color indicator button at each activated location. The picker walks in pick-sequence order, pushing the carton or tote on a gravity conveyor or cart to each illuminated pick tag. On completion of the last pick in a zone, a zone activity display can be used to display to the operator that the zone picking tasks are complete, signaling the operator to push the carton onto the powered transport conveyor.

Pick-to-Light is significantly faster than paper picking, averaging 350-500 lines per man hour, depending on item sizes. It's ideal for high-density and less-than-case picking applications.

Pick-to-Light operations in pick modules are best deployed in dense-storage pick zones using a combination of pallet flow, carton flow, and walk-back shelving matched to the SKU velocity movement. This helps minimize picking labor and reduce travel and walk time, taking wasted steps out of the order fulfillment process.

Similar to RDS™ Voice, RDS™ Pick-to-Light integrates easily with an existing WMS or ERP system, mapping pick-to-light displays to the current or new storage map locations. It can also be deployed as a complete order fulfillment software automation module that provides a complete pick, pack, and ship order fulfillment operation for controlling the entire picking process.

In all, RDS™ Pick-to-Light delivers an array of performance benefits for warehouses:

- 350-500 picks per hour with a single mobile solution
- Highest productivity of any industry picking method
- Automatic retrieval of orders, item locations, and quantities
- Accurate direction of pickers to the correct items and locations
- Verification of correct picks with mobile barcode scans
- Easy integration with existing WMS/ERP systems
- Simple operation with minimal training required
- Labor tracking and reporting module

Pick-to-Light Packing Automation

RDS™ Pick-to-Light technology can also be deployed for order packing automation. It is well-suited for directing value-add processes at an operator pack station.

After picking is completed, the order is transported on the conveyor system to the packing area. A pick-to-light shelf adjacent to the pack station can contain 20 or more shelf positions that have preprinted document inserts, special labels, promotional items, or coupons.

The operator scans the order barcode and the pick-to-light display, or a series of the displays at each shelf is illuminated to direct the operator to insert the items required for the order. The operator then places each product in the carton and presses the acknowledgement indicator button to confirm the pick and placement into the order carton.

Put-to-Light for Put Wall Order Consolidation

Distribution centers well-suited to order zone picking are also ideal environments for a put wall order consolidation process.

Put walls incorporated into the right order fulfillment application can reduce travel times across multiple zones and result in higher order fulfillment productivity with extremely high accuracy due to the secondary scan and put validation step.

Orders that pick complete in each zone can be a picked-to-carton process, directed by RDS™ Voice, RDS™ Pick-to-Light, or RF terminals. Any order that requires products from multiple zones is picked to a tote and directed to the put wall order consolidation area.

Put walls are a sort-by-light operation used to direct the operator who is equipped with a hands-free ring scanner at the order consolidation put wall. The operator scans an item's UPC or Lot ID barcode, which energizes the shelf put-to-light display and then puts the item into the proper shelf position. The operator can either push the activity location indicator button to acknowledge the put or scan the shelf location to verify the put confirmation.

The operator continues the item-scan and put-confirmation actions and when the put of the last item associated with an order is confirmed, the display changes color to indicate the order is complete. Then, a second display on the backside, (pack side of the shelf wall) energizes to display the order's required carton size and alerts the operator that the order is complete and ready for packing.

The pack operator is also equipped with a hands-free wireless scanner and flat-panel workstation display to direct the order pack and ship operation. Packing stations can include a scale and a Zebra printer for printing the shipping label and packing slip.

The workstation display directs the operator and generates the order-packing sheet and carrier shipping label. To further streamline the pack and ship operation, we'll consider an automated conveyor pack line with an inline scale, dimensioner, semi or automatic tapers, and print-and-apply labeling. With this solution, you can automatically apply a shipping label or a combination pack slip/shipping label, eliminating 40 seconds of manual labor by automating the manifesting and shipping operation.

Recommended Mobile Hardware

RDS™ Voice, RDS™ Pick-to-Light, and RDS™ Put-to-Light applications get an additional boost in productivity when the operator is equipped with either a Zebra TC52 or WT6000 Android mobile computer and wearable ring scanner for directing order picking, put wall order consolidation, sort by light or pick and sort with the latest HD 4400 heads-up display.



- **Zebra TC52 Touch Mobile Computer**
Apps, voice, data, and mobile productivity in an easy-to-use Android touchscreen device



- **Zebra Headsets**
Rugged corded and Bluetooth headsets for maximum comfort and unbeatable durability



- **Zebra WT6000 Wearable Touch Mobile Computer**
Warehouse mobile computing, voice, and data in a comfortable, wrist-worn touch device



- **Zebra HD4000 Head-Up Display**
Rugged and comfortable head-mounted display for hands-free, directed-action workflows



- **Zebra RS5100 Bluetooth Ring Scanners**
Wireless, single-finger scanner for fast, hands-free, and accurate bar-code capture



- **Zebra Industrial and Mobile Printers**
Fast, high-quality, and reliable printing of labels, pack slips, and more

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