6 Steps

TO FLAWLESS FULFILLMENT

Best practices for integrating mobile, wireless and data capture technologies into warehouse management

ZEBRA

Contents

Executive summary

The warehouse is at the centre of your business. It's the key hub through which nearly everything in your business must pass – from raw materials and finished goods in a manufacturing plant, to pallets and cases in a distribution centre, to a wealth of products in a retail warehouse. But in today's highly competitive markets, there's something even more important that's dependent on more efficient warehouse operations: customer satisfaction. What is it that your customers want from your warehouse and logistics operations? Accurate, on-time and flawless fulfilment. Every time.

Mobility as catalyst

Today's forward-looking warehouse and logistics professionals are using wireless and mobile technology as the catalyst for driving flawless fulfilment. When mobility is extended throughout your warehouse, new levels of efficiency, accuracy and visibility can be achieved. Ponderous paper processes are replaced by real-time computerised forms on mobile computers. Barcode scanning, including 1D and 2D, enables checking and double-checking that the right items are being picked, packed and shipped. RFID provides automatic tracking of materials and assets without human intervention. You can move from automation in a single process to a broad integration of the latest technologies across all of your warehouse processes.

Enterprise Asset Intelligence

If assets are tracked, not just in the warehouse but throughout the supply chain then an even greater level of efficiency, accuracy and quality can be gained. By capturing data and turning it into actionable Insight through 'Internet of Things' (IoT) solutions and cloud technology, companies gain Enterprise Asset Intelligence™ – resulting in more informed decision making and more efficient and accurate performance.

The right devices

In the past, warehouse operations tended to look at mobile devices as one-size-fits-all. That's no longer the case. Today, with the proliferation of smarter, more productive mobile devices, the goal is to make sure employees are using the right device for the right task. Fixed and mobile printers enable assets and inventory to be efficiently tracked. Powerful, rugged single and multi-modal devices provide functionalities – from scanning to tag reading to voice picking and more – in a variety of form factors such as hand-held, vehicle-mounted, wearable and hands-free mobile units. Multi-modal technology is rising in importance, providing users with the ability to perform multiple tasks on one device; for example, units that combine scanning, voice and text, with the option of using voice-only, text-only or combination voice and text for input.

Six-step roadmap

The path to achieving flawless fulfilment begins by following the six critical steps outlined in this report. They will help you create a more collaborative information architecture that not only enables a leaner, more flexible warehouse operation, but a leaner, more profitable enterprise as well. Equally important, your enhanced warehouse mobility can serve as the foundation for more efficient enterprise-wide mobility.

Step 1.
Deploy industrial wireless solutions

Step 6.
Turnaround outbound handling performance

Step 2.
Improve staff communications and management

Step 5.
Upgrade inbound handling operations

Step 3.
Streamline order picking process

Step 4.
Advance inventory and storage capabilities

The negative impact of the fragmented warehouse

Whether you're a manufacturer, retailer, or distributor, your warehouse operations play a pivotal role in making your business successful. That's not a surprise. Your warehouse is a complex, multi-faceted central hub through which virtually everything passes: from raw materials waiting to be manufactured into finished goods, to finished product waiting for shipment to a distribution centre, retailer or end-customer. Warehouse operations affect virtually every business-critical issue, including inventory management, worker productivity, shipment accuracy, timeliness and, ultimately, customer satisfaction and ROI.

The reality is, too many warehouse processes are still pen-and-paper-based. Just as problematic is technical fragmentation, with technology available in only a few operations. The truth is, flawless fulfilment requires technical and operational integration across all your processes and workflows.

High-level operational issues	
Inaccurate information	The 'double-touch' of data – for example, collection of information by hand followed by re-entry into the computer – leads to high levels of errors in information.
Reduced productivity	Too many employees waste an inordinate amount of time completing paperwork, locating information on labels and re-entering data into the WMS, making it difficult for them to work at peak productivity.
Lack of visibility	Slower movement of information in and out of your business systems results in reduced inventory visibility and availability throughout warehouse operations.
Increased cost	The lack of real-time visibility into inventory can result in increased capital expenditures caused by the need to maintain higher levels of stock to prevent out-of-stock conditions.
Reduced customer satisfaction	Decreased customer service levels caused by inaccurate and late-arriving shipments lead to lower customer satisfaction and lost sales.
Longer cash-to-cash cycles	The slow movement of information caused by inefficient procedures and fragmented technology results in increased cash-to-cash cycle times.

## The positive impact of mobilising key warehouse processes

Without mobility to enable accurate, real-time processing throughout the warehouse, each and every warehouse function is adversely impacted. Mobile technology that automates and streamlines inventory, storage and logistics processes is key to providing flawless fulfilment. Following is an in-depth look at the essential steps that warehouses and distribution centres can follow – in sequential order – to achieve flawless fulfilment. Discussions focus on identifying key issues, how mobility addresses pain points, and the significant advantages the enterprise can expect to gain. The recommendations are based on best practices and the ability to deliver maximum business impact.

Step 1.
Deploy industrial wireless solutions

Warehouse and distribution centres are classic examples of dynamic industrial environments that present communications and technology challenges much more stringent than those of the carpeted space. Today's warehouses are bigger, taller and more densely packed than ever. There are more SKUs, shorter cycles, and a premium on fast, accurate fulfilment.
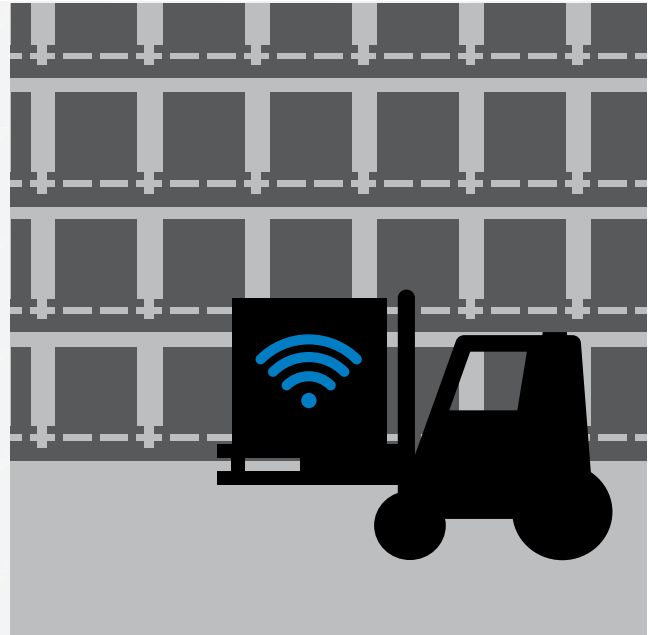
As companies strive to respond more quickly and accurately to customer demands, the value of efficient process automation and inventory visibility, storage, movement and control is hard to overestimate. As warehouse environments become more reliant on real-time communications technology to automate and streamline processes, the initial step towards achieving flawless fulfilment is deployment of a truly industrial-strength wireless and mobile solution.

Industrial wireless and mobile challenges

The nature of industrial environments is in a constant state of flux, requiring wireless networks to quickly adapt to changing dynamics. Inventory and equipment are continuously being shipped and moved, changing the physical state of the space virtually minute-to-minute. There is also their growing size, with structures getting bigger, taller and more dense, and often encompassing both indoor and outdoor facilities and hundreds of thousands of square feet that challenge coverage and connectivity. Equally important is the need for mobility. Industrial environments have never been more on the move – in terms of people, equipment, materials and merchandise – than they are today. Challenging warehouse environments need industrial-strength wireless networks to overcome numerous issues and pain points.

Step 1. Deploy industrial wireless solutions

Industrial wireless pain points
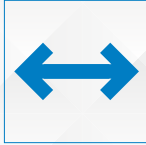
Sheer size

As warehouses increase in size, a lack of seamless nomadic communications with workers roaming the space can cause costly inefficiencies in virtually every function – from receiving to picking to shipping.

Downtime and unavailability

With automation and mechanisation so critical to warehouse process efficiency, unreliable technology leads to downtime that can wreak costly havoc in operations, customer satisfaction and ROI.

Bottlenecks and congestion

Older, outdated warehouse technology is too often unable to deliver the high levels of bandwidth needed to overcome efficiency-sapping operational bottlenecks.

Device proliferation

An inability to support today's wide variety of devices – laptops, handheld computers, tablets, barcode scanners, mobile printers, RFID readers and more – leads to unreliable communications and process automation.

Industrial wireless and mobile solutions

Industrial-strength wireless networks enable automation and mechanisation of labour-intensive processes such as receiving, put-away, storage, cycle counting, picking, packing, loading and shipping. They can also deliver high performance in difficult cold storage environments such as refrigerators, freezers and coolers. Industrial wireless systems deliver real-time access to the WMS, providing a robust and reliable user interface on a range of devices to enhance worker productivity.

They provide persistent connections on roaming warehouse equipment such as forklifts and crawlers, as well as connectivity for all handheld scanners and mobile computers in use across the space. The networks can also help assure efficiency with locationing capabilities that identify the presence of workers, assets and vehicles for optimal task management. The result is secure, streamlined end-to-end operations in warehouses and distribution centres, and throughout the entire supply chain.

Step 2.
Improve staff communications and management

Flawless fulfilment doesn't happen without everyone in the warehouse working together productively. This demands fast and efficient task management enabled by real-time voice and data communications between supervisors and employees everywhere in the facility. Managers can proactively direct work orders and assign tasks that are not currently driven by the WMS, as well as monitor the efficiency and progress of work as it is being performed.

Equipping warehouse staff with access to instantaneous business-critical communications systems enhances productivity and provides a real-time coordination platform that can increase task interleaving and help you achieve flawless fulfilment.

Staff communications and task management challenges

To keep warehouse operations running smoothly and effectively, staff and managers need real-time access to business systems, such as purchasing and inventory, and business communications, including voicemail and email. Equally important, they also need the ability to coordinate work and monitor the performance of their employees in real-time. With a lack of mobile access to these tools, managers are forced to spend a large part of their day tethered to the desk instead of out on the floor, supervising employees.

When managers are not out on the warehouse floor, they are not available to support staff and resolve issues in real-time, or to spot productivity issues, such as a backlog in one or more functions. Warehouse efficiency is often reduced, customer service is compromised and warehouse personnel job satisfaction is often impacted leading to increased employee turnover rates.

Employees also struggle with coordination and communication within the warehouse or distribution centre, especially when exception-based scenarios complicate tasks that are typically very process-driven. Dealing with a mix of data-only or voice-only devices and networks within a warehouse creates communication silos, resulting in duplicated or disjointed work efforts.

Step 2. Improve staff communications and management

Communications and management points of pain

End of the page
Mobile solutions enable the immediate manager-to-employee-to-shipper communications that can raise efficiency, eliminate ineffective paging systems and keep everyone working as one.

Desk jockeys
Without mobile connectivity, warehouse managers find themselves tethered to their desktop computers, keeping them from more efficiently supervising directly on the floor.

Delayed reactions
Too often workers can't communicate with each other, supervisors, or managers in real-time across the warehouse floor due to a lack of integrated communications systems. This makes real-time issue resolution and higher levels of productivity more difficult to achieve

Snail's pace
Without high-speed mobile voice and data access across the broader warehouse employee base, procedures such as automation, cross-docking and task interleaving are unavailable, making processes less timely, less productive and more costly.

Mobile voice and data capture communications solutions

Mobility empowers your warehouse managers to get out of the office and back on the warehouse floor with the rest of your staff by enabling the extension of all the necessary desktop tools right to the palms of their hands. Utilising devices that have both voice and data capabilities and are built to endure the harsh environment of the warehouse, managers can access all business systems and workers with the push of a button. Now managers and supervisors can remain on the warehouse floor to protect productivity and throughput, yet maintain the real-time connection to co-workers, vendors, and associates needed to maximise on-the-job efficiency and effectiveness.

Employees can communicate with their own portable, handheld or wearable mobile devices, eliminating time lost walking to and from telephone stations on the floor or being distracted by loud and unintelligible overhead pages.

Physical cards can also be printed for permanent staff or contractors to enable identification, access control and even to track locations.

LEADING SOLUTION COMPONENTS

TC70 Handheld touch computer
Smartphone usability on the outside, pure industrial design on the inside. Great for managers and supervisors within your warehouse.

Workforce connect Push-To-Talk
Enables workers to use enabled mobile computers for 2-way radio style calls.

ET1 Enterprise tablet
Combines the sleek design and user friendly experience of a tablet with the enterprise features to enable warehouse managers to be productive away from their desks.

SB1 Smart badge
The affordable, wearable mobile device designed for task management and coordination within and across various teams in your warehouse.

ZXP Series 3 card printer
The ZXP Series 3 is an ideal solution for mid-volume card printing applications. It is fast, reliable and easy to use.

Step 3.
Streamline order picking processes

Warehouses are becoming larger with an increase in the number of items carried, both of which impact the achievement of flawless fulfilment. In Zebra Technologies's recent warehouse survey, more than half of respondents reported plans to increase the number of SKUs (54.2%), the volume of items carried (54.2%) and their annual inventory turnover (50.6%). In the next five years, almost 70% of respondents indicated plans to increase automated processes and 66% plan to equip staff with more technology. These initiatives are especially valuable for pick and fill functions where costs are high and errors can easily snowball into less accurate, less timely shipping and greater numbers of dissatisfied customers.
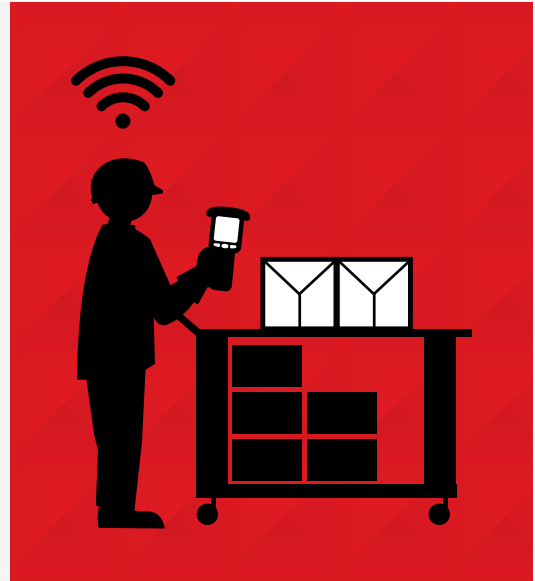
Pick and fill challenges

With manual and technically fragmented pick and fill processes, efficiency and cost-effectiveness are significantly compromised. The reality is, manual picking processes simply cannot be easily aggregated to maximise productivity and minimise cost. In addition, there's a growing need to capture new and additional information during picking, which can complicate even previously streamlined and automated picking processes. Within an order, workers are unable to identify that multiple items on the pick list are located in the same area. That costs time and effort. This is also true across orders; the linear nature of manual picking means processing must be done one order at a time. The result is costly, ineffective and inaccurate inventory visibility that can lead to higher carrying costs and shipment errors.

Pick and fill points of pain

Walking the walk
With legacy pick and fill processes, up to 70% of a picker's time can be spent walking. They must walk the aisles to locate the right product, wasting time and reducing productivity.

More volume, smaller orders
Overall, there is a rising volume of orders flowing through the warehouse, especially orders of smaller size and lesser value. This causes the relative labour expense for filling each order to rise, reducing already thin margins

Unknown errors
With manual processes and fragmented technology solutions, product cannot be automatically verified when picked. This can lead to unrecognised errors and inaccurate staging, packing and shipping.

Costly disappointments
Inefficient picking and filling operations cause inventory inaccuracies that all too often lead to costly out-of-stock, lost orders, disappointed customers and lost revenues.

Step 3. Streamline order picking processes

Pick and fill mobile and data capture solutions

The optimum solution is adding mobility and automation to picking operations, allowing the same number of workers to process more orders per day with fewer errors, thus improving customer service and reducing the cost of doing business. Deploying warehouse mobility in the pick and fill functions enables you to know what products are on your warehouse shelves and exactly where they are located. Mobile solutions also empower you to utilise hands-free and multi-modal technologies that go well beyond simple scanning functionality, enabling workers to utilise voice-guided direction with screen reinforcement and enter data by voice, scan or keyed entry.

When you add real-time access to your order and inventory business systems, you can automatically deliver electronic picking orders to a mobile device that not only provides the pick list but also the fastest route to the items and the ability to utilise task interleaving. Mobile data capture solutions enhance existing picking schemes such as pick-to-tote, pick-to-light and carousels, and can be used across different levels of picking, such as piece pick, case pick and pallet pick. Inventory accuracy is improved, too. When workers scan a shelf tag, barcode or RFID tag, they receive instant verification that the right item has been picked, and the item is instantly deducted from inventory. And if an item has a missing or damaged barcode, a mobile printer can be used for re-labelling at the point of picking

Results can be exceptional. Errors are significantly reduced through the automated capture of data and instant double-check for picking accuracy. Out-of-stock is eliminated through the ability to instantly deduct items from your inventory as they are picked. You gain the ability to deliver granular picking information that enables LIFO/FIFO for improved inventory management. You can also instantly store serialised product information with customer orders to allow fast location of products or parts that may have been recalled, reducing tracing, tracking and liability costs. When you have mobile access to product databases, you can leverage detailed information about specific issues with certain items, which can help power effective reverse logistics and reduce the cost of return and re-shipment resulting from delivery of wrong or damaged products.

LEADING SOLUTION COMPONENTS

TekSpeech Pro®
Boost the effectiveness of your voice directed and multi-modal picking, put-away, replenishment and other warehouse applications with TekSpeech Pro, our end-to-end voice-enabled solution.

WT41N0 Wearable terminal
A sophisticated, wearable terminal that boosts worker productivity with high-performance, hands-free mobile computing.

RS419 Wearable ring scanner
A sophisticated wearable ring scanner that maximises worker productivity in the most demanding environments.

MC3200 Series rugged mobile computer
The lightweight, rugged MC3200 is available in gun, turret and brick form factors. You also get the flexibility of choosing between Windows and Android Operating Systems.

VC70N0 Ultra-rugged vehicle-mounted mobile computer
Achieve new levels of productivity and throughput in your toughest warehouse environments.

QLn Series mobile printers
Drop-resistant and lightweight, the user-friendly QLn mobile printers help you print barcode labels, receipts and more, wherever and whenever needed.

Step 4.
Advanced inventory and storage capabilities

Key to achieving flawless fulfilment is real-time inventory visibility and control. To meet operational and financial requirements, companies must regularly conduct comprehensive inventory counts. When cycle counts are conducted manually, or with older or fragmented technology solutions, they can be extremely time consuming and often fraught with errors. That's beginning to change. In the Zebra Technologies warehousing survey, respondents noted a dramatic drop in use of manual processes, with pen and paper usage going from 41% today to a predicted 12% in five years. Tellingly, cycle count motivation is evolving from concern about compliance to WMS optimisation. In the survey, respondents reported that the top two cycle-count motivating factors are reduction of out of stock conditions and ensuring WMS accuracy.

Cycle counting challenges

For such an important aspect of efficient warehouse operations, inventory counts in many companies are stuck in the warehousing dark ages. When performed manually with pen and paper, or with isolated and aging technology, cycle counts can take anywhere from days to even weeks to complete. The long time frames and the high labour costs of outdated inventory counting processes work against the need for maintaining accurate, real-time WMS visibility and availability. The fact is, in too many warehouse and distribution centre operations, significant pain points still exist.

Cycle counting points of pain

Errors of your ways

Manual and low-tech cycle counts are costly, time consuming and error-prone. They are a major cause of the lack of accurate, real-time inventory visibility, availability and control.
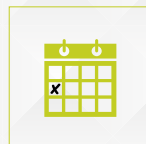
Days late, dollars short

By the time manual and other low-tech cycle counts are completed – often days or weeks – thousands of picks and putaways have taken place, resulting in inventory inaccuracies that can decrease sales and customer satisfaction.

Out-of-balance sheets

The absence of accurate, real-time visibility into inventory and storage affects your inventory's valuation, which ultimately adversely affects your company's balance sheet.

Letter of the law

Accurate inventories are necessary for you to meet increasingly stringent regulations. The alternative is the high cost and major disruption of being forced to shut a warehouse down to do a complete physical inventory.

Step 4. Advanced inventory and storage capabilities

Cycle counting mobile and data capture solutions

When cycle counting personnel are armed with real-time access to the inventory database and advanced mobile data collection capabilities, cycle counting efficiency and accuracy are dramatically improved. Workers now utilise powerful new mobile devices, such as durable and economical handheld computers and tablets for more intuitive cycle counting and direct WMS interaction. Counts that may have taken three or four weeks in the past can now be completed in less than half a day, especially since these functions are increasingly interleaved with other types of work orders. The new level of cost-efficiency in cycle counting activities enables enterprises to take cycle counts more regularly and routinely. The resulting new level of visibility into inventory data provides a number of benefits. Better trend analysis for improved buying practices. More accurate data within your WMS and fewer out of stock conditions. Reduced inventory stocking levels. Decreased capital expenditures for holding inventory. And reduced inventory space requirements.

Mobile asset tracking solutions

Wireless and mobile solutions can completely automate the asset tracking process and provide up-to-the-minute information on the location, status and condition of totes, pallets and more through advanced data capture. When RFID tags are placed on all of these assets, they are automatically tracked as they move through the warehouse and onto the truck, and can easily be associated with a specific customer order.

The result is fully automated, accurate and cost-effective tracking of your assets with virtually no manpower required. And the assets remain in your inventory for an extended period of time, reducing your total cost of ownership (TCO) and improving your return on investment (ROI).

LEADING SOLUTION COMPONENTS

RS507 Hands-free cordless imager
This rugged scanner boasts advanced ergonomics and Bluetooth cordless capability, allowing unparalleled comfort and freedom of movement.

Workabout Pro 4
The flexibility of the Workabout Pro™ 4 enables you to supply one device to meet many requirements.

MT2000 Series handheld mobile terminals
Combines advanced 1D/2D barcode, DPM and image capture with the ability to key in and view data – plus 802.11a/b/g and Bluetooth connectivity options.

MC9200 Mobile computer
With the rugged Zebra Technologies MC9200, take efficiency and accuracy to the next level in your most demanding environments.

Material Flow Suite
A complete solution that leverages real-time barcode, RFID and location information to optimise material flows.

Step 4. Advanced inventory and storage capabilities

Cold chain storage solutions

The cold chain is a harsh, demanding environment. Goods must be shipped under the strictest conditions and you need to manage fluctuating temperatures and humidity levels throughout the supply chain. That's easier said than done, especially when cold chain and dry goods are part of the same facility.

Differences in processes, workflows and technical maturity between dry goods and cold chain areas can lead to numerous issues, including inefficiencies and lack of standardisation that often result in errors that impact downstream customer service and satisfaction.

Cold chain points of pain

Extreme difficulties

Extreme cold temperatures in freezers and coolers can make it difficult for either employees or technology to put away, pick and count inventory with a high degree of accuracy. This can lead to costly out-of-stock, lost orders, lost customers and lost profitability.

Out in the cold

Cold chain operations can be hard on technology that's not industrial strength. Freezing temperatures and condensation caused by temperature fluctuations can result in unreliable operation in non-ruggedised mobile devices.

Cold hands, bad data

Even under the best of conditions, manual processes are prone to error. In the cold chain, it's even more difficult to enter data accurately while wearing gloves or with freezing fingers.

Historical inaccuracies

Stringent safety regulations demand that companies keep accurate historical records. The lack of accurate, real-time data in the cold chain can result in an unreliable food temperature history.

Cold chain mobile and data capture solutions

Utilising refrigerator- and freezer-compliant mobile devices and networks that can withstand low temperatures and condensation improves traceability capabilities, enhances order accuracy and speeds shipping times in cold storage environments. With reliable operation, regardless of the dramatic temperature swings, workers can quickly and efficiently enter data – even with gloved hands – by using large keys and an easy-to-use touch-screen on ergonomically designed handheld mobile computers. Additional mobility options include freezer-rated wireless equipment that allows cold chain operations to shift from batch to real-time. Plus, the addition of hands-free technology and voice or multimodal picking helps improve safety and comfort while handling cases in cold storage. Workers are able to enter, collect and use reliable data in real time, accurately monitoring and documenting perishable food and pharmaceutical temperature history throughout the cold chain.

LEADING SOLUTION COMPONENTS

VH10f Vehicle-mounted computer
Get maximum productivity and flawless fulfilment in your most challenging environments with the VH10.

OMNII XT15f Series
The Omnii XT15f, uniquely adaptive by design – is designed to work in –30ºC temperatures.

Step 5.
Upgrade inbound handling operations

Receiving and sortation are critical steps in assuring flawless fulfilment. They're critical because issues in receiving all too often morph into other issues throughout the warehouse management process. To streamline inbound operations, today's warehouses must be able to manage two growing trends. First, their systems must be prepared to take advantage of increases in the number of incoming items that have barcodes.

In a recent Zebra Technologies study, respondents predicted that the percentage of barcoded items will grow from about 67 percent today to almost 84 percent in the next five years. Second, they need to respond seamlessly to shifting supplier requirements, some of which the survey identified as the increased use of Advance Ship Notices (ASN), RFID systems, GSDN data and GS1 standards.

Receiving and sortation challenges

Overall, the goal is to make sure workers at the receiving dock are enabled with real-time access to inventory, accounting and order systems. When workers can quickly scan an item barcode or access an ASN, shipments can be automatically identified and reconciled. With an increasing number of returns pressuring inbound receiving processes, streamlined reverse logistics are becoming more important and widespread. In addition, many companies need their receiving processes to help assure compliance with today's increasingly stringent track and trace regulations, to capture OS&D (overage, shortage and damage) issues and to provide evidence of supplier noncompliance with standards and requirements.

Step 5. Upgrade inbound handling operations

Receiving and sortation points of pain

The paper chase
Pen-and-paper and other manual and fragmented technology processes result in lost time, reduced accuracy, decreased productivity and lower ROI.

Poor visibility
Slow and inaccurate receiving and put-away are barriers to real-time inventory visibility and control, as well as to effective cross-docking, task interleaving, traceability and tracking processes.

Slow dock-to-stock
Delays caused by pen and paper processes and isolated technological solutions reduce inventory control, lead to false out-of-stocks and lost sales.
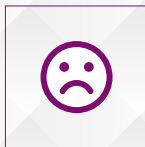
Many unhappy returns
Increasing return rates and inefficient reverse logistics result in slow return of product to inventory, delayed customer credit processing and decreased customer satisfaction.

Receiving and sortation mobile and data capture solutions

At the receiving dock, mobile processes empower workers to be more accurate and more productive. A simple scan of a barcode, RFID tag or RMA label enables incoming shipments to be identified and verified in real-time. It also allows returns to be quickly validated and updated, with automatic issue of any customer credit due. Orders are delivered right to the worker, enabling accurate staging of shipments for put-away or cross-docking, and streamlining the handling of any errors in the shipment.

At the same time, velocity and productivity in the receiving and sortation functions increase because the same workforce can process more shipments, reducing dock-to-stock cycle times. This increased inventory visibility allows you to intelligently direct put-away or conveyance for items that are low in stock first, reducing costly OOS impact on the order fulfilment process. Returned items are automatically noted in the inventory systems and instantly available for fulfilment of new orders. Real-time visibility into the order system also enables more efficient cross-docking, reducing handling time and costs for incoming shipments. If an item is received with a damaged barcode or without a barcode then a fixed or mobile printer can be used to print the required label and ensure onwards visibility through the supply chain.

LEADING SOLUTION COMPONENTS

LS3578-ER Rugged barcode scanner
A cordless Bluetooth®-enabled laser scanner that reads 1D barcodes from near or far.

MC9190-Z Handheld RFID reader
A high-performance, industrial-grade RFID handheld reader that delivers best-in-class RFID read range and accuracy. Rugged, reliable and ergonomic, it excels in demanding environments.

RS507 Hands-free cordless imager
This rugged scanner boasts advanced ergonomics and Bluetooth cordless capability, allowing unparalleled comfort and freedom of movement.

ZT400 Series industrial printers
The ZT400 Series is designed for durable, reliable printing in tough environments. Loaded with advanced features, RFID capabilities and Zebra's Link-OS environment, the ZT400 is ideal for the receiving dock.

G-series desktop printer
Meet your labelling needs with these versatile and compact desktop label printers. Space saving, feature-rich and user friendly, these thermal label printers are a smart choice.

Step 5. Upgrade inbound handling operations

Put-away and replenishment points of pain

Inventory on idle
Product sitting on a dock or misplaced in inventory is more than simply idle; it's also unavailable, which can mean lost sales and dissatisfied customers.

False out-of-stocks
Put-away errors and delays can create inventory inaccuracies, which can result in erroneous OOS situations, unnecessary product replacement costs and lost sales.

Clogged aisles
Slow, inaccurate manual processes and the limited throughput of older technology can cause congestion in your aisles, wasting time and decreasing productivity.

Equipment misuse
Poor visibility and inefficient management of material handling equipment (MHE) like fork lifts and crawlers reduces MHE availability and productivity, and increases maintenance costs.

Put-away and replenishment mobile and data capture solutions

With immediate access to the WMS, workers can quickly scan a barcode or shelf tag (or read an RFID tag), ensuring that the item is put in the correct place and via the most efficient route. This helps reduce OOS situations, and enables warehouse workers to increase throughput by being able to process more put-away orders every hour. The system also provides a record of the placement of the shipment so you know the exact location of all inventory to a highly detailed level. This real-time visibility provides the information required to implement first in/first out (FIFO) or last in/first out (LIFO) inventory management, which can have a significantly positive impact on the company's profitability analysis and tax liabilities. In addition, the solution improves MHE utilisation through reduced travel time in the warehouse aisle, which reduces wear and tear and maintenance requirements for the vehicles.

Real-time visibility can also support and automate lean replenishment techniques. Material Flow Replenishment can eliminate the need for manual and labor intensive processes by delivering real-time data from the factory floor to help you quickly respond to changes in inventory, production status and customer requests.

LEADING SOLUTION COMPONENTS

VC70N0 Ultra-rugged vehicle-mounted mobile computer
Achieve new levels of productivity and throughput in your toughest warehouse environments.

VH10 Vehicle-mounted computer
Get maximum productivity and flawless fulfilment in your most challenging environments with the VH10.

DS3500-ER Series
Developed to enable both 1D and 2D barcode reading, the DS3500-ER Series offer the scanning range, rugged design and speed that will make a difference in your business.

Material Flow Suite
A comprehensive manufacturing execution management solution that optimises material flows and streamlines the entire replenishment process.

Step 6.
Turnaround outbound handling performance

Packing, loading, staging and shipping are the equivalent of the 'last mile' in flawless fulfilment. In today's hyper-competitive marketplace, these functionalities are key to turning around warehouse and distribution centres to streamline delivery, enhance competitive advantage and increase customer satisfaction and loyalty. Whether you're shipping to a manufacturer that needs raw materials for just-in-time production or a retail customer waiting for delivery of her holiday gifts, the importance of timely, accurate deliveries cannot be overstated.

Packing, staging, loading and shipping challenges

When real-time information related to these crucial last steps in the order fulfilment process is lacking, you face a number of potential complications. These include delays in order turnaround time and shipping due to a number of issues, such as inaccurate product and customer data, inefficient packing and loading dock operations, and poor carrier and container utilisation. All too often, the results are pain points that include higher shipping costs, reduced customer service and satisfaction, an increased number of returns and, ultimately, lost sales and revenues.

Step 6. Turnaround outbound handling performance

Packing and shipping points of pain

Sluggish turnaround
In last-mile operations, when cross-checking to confirm that the right items are in the shipment must be done manually, turnaround times are slower and can cause significant shipping delays and lead to carrier detention charges.

Change resistance
Manual processes often result in an inability to dynamically modify shipping orders to accommodate last minute changes and emergency orders from customers.

Impacting packaging
In the packing functionality, the lack of real-time pre-packing information can easily result in orders that are incomplete, inaccurate and packed in the wrong size cartons or containers.

Inefficiency ripples
Inefficiencies in processing while paperwork and data are manually entered into the system cause delays and errors in manifest creation and shipping that can easily ripple into customer dissatisfaction.

Packing, loading and shipping mobile data capture solutions

When real-time information in the warehouse packing function is integrated tightly into your staging and delivery functions, you can realise major benefits in your shipping and delivery operations. Mobility can streamline these final stages of order fulfilment, ensuring that the right order contains the right products, and is shipped to the right customer at the right time via the right method of shipment. It provides a final cross-check to ensure that the order is correct, properly addressed and scheduled for the proper shipment method, complete with on-the-spot printing of all necessary paperwork. In addition, in the event that any items that were back-ordered have now arrived in the warehouse, the packer can receive notification, enabling full completion of the shipment prior to leaving the facility. Finally, fixed printers or heavier duty automatic label machines can be used for ensuring onwards visibility through the supply chain.

Coordination with the dispatch function ensures that the shipment is properly staged for loading on the right truck in the right order. Packing material costs can also be controlled. Your business system can automatically determine the right size carton for the shipment, removing guesswork and eliminating the use of excess amounts of filling materials. Worker productivity is increased as the same staff can ship more orders in a day. Shipping and delivery times are improved, as is vehicle utilisation as trucks are fully loaded with the right contents. Driver productivity is also improved thanks to accurate order staging and loading that reduces dwell time at each stop. And because more customers are likely to receive shipments within the promised time frame, customer satisfaction and retention are maximised.

Yard Management
Yard Management Systems are designed to optimize yard operations, especially for yards that require fast throughput. This is accomplished through faster gate transactions, efficient parking assignments, fewer yard moves and greater door turns. A scheduling system is used for planning expected arrivals and departures whilst an execution system responds to unplanned events based on business rules that are configured for your particular operations. The combination of effective planning and exception handling allows the Yard Management System to direct the right trailer to the right door at the right time.

LEADING SOLUTION COMPONENTS

Yard Management System (YMS)
A complete solution including yard management and visibility server software, RFID sensors and tags that leverages real-time location information to optimise yard management.

MK4000 Micro kiosk
With the largest and highest resolution screen, this Micro Kiosk supports the richest applications for employees without consuming valuable surface area at packing stations.

DS9808 Hybrid presentation imager
Hybrid design delivers dynamic, high-performance hands-free and handheld data capture of 1D/ 2D/PDF417 barcodes, images and signatures.

MC9500-K
Raises the bar for premier rugged mobile computing, incorporating breakthrough ergonomic design and features, perfect for use in a warehouse, at the dock, in the yard, and out on the route.

ZT400 Series industrial printers
The ZT400 Series is designed for durable, reliable printing in tough environments. Loaded with advanced features, RFID capabilities and Zebra's Link-OS environment, the ZT400 is ideal for the receiving dock.

G-series desktop printer
Meet your labelling needs with these versatile and compact desktop label printers. Space saving, feature-rich and user friendly, these thermal label printers are a smart choice.

ZE500 Print engines
The next generation of Zebra print engines designed for easy integration, maintenance and operation in automated labelling applications.

Warehouse mobility: the foundation of flawless fulfilment

The warehouse is at the very heart of your business operations. Poorly managed warehouses can actually become cost prohibitive, significantly impacting the cost of doing business – and general profitability. Through mobility, real-time warehouse data can be leveraged to enable a new level of information collaboration throughout the enterprise, and most importantly, flawless fulfilment.

The value of mobility in the warehouse function is clear. You are able to automate and streamline processes, enhance flexibility to respond to customer demand, and better manage the risks of managing a lean warehouse. Processes across the warehouse are streamlined, reducing cycle times. Worker productivity is increased, reducing the cost of labour across the warehouse operation. Orders are fulfilled more accurately, improving customer service and enhancing customer satisfaction and loyalty. The cost of sales attributed to movement through the warehouse is reduced. The right set of data is available in the right place at the right time to enable the most efficient next action, and the most effective business decisions.

Bottom line, leveraging mobility in the warehouse and beyond can yield highly beneficial results, including reduced costs, improved quality, better customer service, higher margins and greater profitability – delivering real business advantage.

Complete warehouse solutions from Zebra Technologies

When it comes to warehouse communications and mobile data capture requirements, Zebra Technologies delivers. Our complete array of rugged industrial-strength mobile devices is designed for the rigours of everyday warehouse use, including barcode scanners and handheld, vehicle mounted and wearable mobile computers capable of voice-directed, multi-modal and text-based applications. In addition, our award-winning next generation industrial wireless networking equipment, supporting services and software management tools are built to overcome the unique challenges of warehouse and DC mobility. All this when coupled with Zebra's fixed and mobile printer portfolio delivers visibility not just in the warehouse but across the entire supply chain. Zebra Technologies's deep knowledge and experience in equipping workers across the supply chain with reliable, business-critical two-way radio communications systems.

Zebra Technologies also offers the right experience, the right partners and the right services. As a global leader in the manufacture of all things wireless and mobile for the warehouse, we offer an unparalleled depth of proven innovation for this market. Through countless deployments in some of the world's largest enterprises, including our own warehouse and manufacturing operations, we offer a wealth of understanding of the needs in the warehouse and beyond. Zebra Technologies is uniquely positioned to deliver a broad spectrum of professional and consulting services to further automate your warehouse operation and achieve an attractive ROI. In addition, our robust global partner channel brings the development and integration services you need right to your door, as well as leading applications and complementary products.

Most of all, by selecting and deploying Zebra Technologies solutions and supporting services, you will achieve lean technically enabled warehouse operations.

For more information on how Zebra can help you achieve flawless fulfilment, please visit us at: **www.zebra.com/warehousing**

ZEBRA