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WHITE PAPER

# How Warehouse Robotics Can Help Your Business Operate in a Socially Distant World

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# Introduction

After months of lockdowns and stay-at-home orders, businesses are doing what they can to reopen. While businesses are working to reopen, they must take special precautions to avoid exacerbating the spread of COVID-19.  For example, they must ensure the maximal distance between warehouse employees and operate at a limited capacity to avoid serving as an incubator for the SARS-CoV-2 virus. All of this poses a challenge to businesses – not to mention their customers – when trying to maximize throughput while also minimizing health risks.

In this white paper, we discuss how Warehouse Robotics has emerged as a tool to improve automation, increase overall efficiency, and reduce risks.  Robotics, combined with a modern Warehouse Management System or WMS, is a key method for changing warehouse operations to accommodate the current constraints and will remain useful long after the COVID-19 pandemic is behind us.  A modern WMS can enable automation in warehouses which can reduce the human footprint to allow businesses to reopen while meeting social distancing and low-occupancy guidelines.

Combined with a modern Warehouse Management System, warehouse robotics can be an exceptionally powerful way to maintain normal throughput while reducing the risk associated with running your warehouse.  Read on to learn more about warehouse robotics and how they can be used to drive innovative solutions for your business.  These high-tech strategies can help retailers continue to adapt and stay profitable without compromising either customers' or workers' safety.  Additionally, these technologies provide benefits such as improving efficiency, better management of turnover, improved inventory accuracy, and lesser change management and training.

# Benefits of a Warehouse Management System (WMS)

As an essential tool in reopening during the COVID-19 pandemic, warehouse robotics can cut down on human interaction and keep your staff and customers safe.  Vital to these robotics utilities is a modern Warehouse Management System or WMS.  The software that is used to manage the day-to-day happenings in a warehouse, WMS can streamline and improve warehouse processes.

# A Modern Warehouse Can Help Your Business Survive

A modern WMS is crucial; otherwise integrating your legacy WMS with robotics will prove difficult, if not impossible.  One benefit of a modern WMS that is gaining new appreciation is traceability.  Consider the hypothetical situation of a new viral outbreak at a warehouse or distribution center.  The transactional data found in the system would inform managers of who was working with the infected person, during what time.  The WMS could also potentially tell you whether the employees working during the infected person's shift were located next to each other.  Having the ability to track and maintain valuable information that is critical in the time of COVID-19 is only one benefit of a more modern WMS.  Additionally, these same systems have functionality that can be configured to limit the number of people within an aisle, which can help with social distancing efforts.  Some even offer additional features useful during the pandemic, such as 3D labor tracking that alert users when workers are too close to each other.

Modern automation technology is also now required to compete.  Previous generations of warehouse automation have required someone to touch physical buttons, often corresponding to different lights.  With the health-related risks associated with frequently touched surfaces increasing, the traditional button-press model of warehouse operations has run into some challenges during COVID-19.  Therefore, the old model of having many people touch different buttons in close proximity to each other – or even having a few people press the same buttons repeatedly – now carries increased health risks.

# “Dark Warehouses” Represent a Glimpse of the Future in Warehouse Automation

As distribution centers rely on technology to speed up product fulfillment, warehouse automation and robotics have come to the forefront.  As DCVelocity reports, equipment such as “self-guided forklifts, vision-guided robots, automated storage and retrieval systems (AS/RS), robotic palletizers, and high-speed conveyors” is being used increasingly in warehouse operations.  These forms of warehouse automation can help businesses reduce the human footprint in warehouses while preserving speed and accuracy to deliver the best value to consumers.  As shoppers continually want more, faster, and for cheaper, robotic warehouses can be one way to keep up with consumer demand.

Some warehouses will deploy one or many of the types of technologies to create a fully automated warehouse. These robotic warehouses are known as “dark warehouses” or “lights-out facilities” because they do not require as much lighting given the reduced number of people present.  Especially in the era of COVID-19, an automated warehouse can reduce the human footprint and help mitigate the spread of the novel coronavirus while allowing companies to operate, keep up with consumer demand, and adapt to the changing safety rules and regulations in the current pandemic.

It is important to note that a completely “lights-out” warehouse could be a better option for certain types of warehouse operations.  For example, dark warehouses could be especially useful for environments dangerous for humans, such as cold rooms or freezers.  With a reliance on automation in a cold room environment, for example, humans do not have to work in the extreme cold.  An added benefit is that, since there is reduced traffic to and from the freezer room, climate control is easier.

However, businesses do not have to shift to a completely automated warehouse to reap the benefits of automation.  Warehouses seeking to update their processes and flow can opt to incorporate some aspects of automation to help them achieve their business goals.  The next sections discuss the different steps involved in warehouse flow, and how automation can help at each step to reduce physical human while helping to stay operational and productive.

# Automation Can Improve Every Step in the Warehouse Flow

As Tom Peters of Cyzerg Warehouse Technology writes, “Almost all quality improvement comes via simplification of design, layout, processes, and procedures.”  Automation can be one form of quality improvement for your company.

Let’s walk through the overall flow of a warehouse and talk about the robotic options available for each, and the improvements that the “new” -- automation -- offers over the “old” systems, especially in the era of COVID-19.

The main areas of the warehouse flow covered below are unloading, de-palletization, receiving, putaway, picking, packing, palletizing, loading, and conveyors.  We will discuss each of these areas; discussing improvements more automated, systems can add.  Improving these processes via automation can streamline operations; because of warehouse automation, companies can fulfill orders more quickly, improve the accuracy of those fulfilled orders while also reducing costs.

# Unloading

As part of the typical unloading process, a truck filled with goods backs up to the dock or truck doors and opens to make the goods accessible to the interior of the warehouse.  Pallets are then offloaded from the truck.  The unloading process is usually performed by operators on a forklift.  However, robotics can be used to reduce human intervention in the unloading process.

One option uses very large, industrial-sized robots manufactured by a company called Elettric80.  These automatic guided vehicles (AGVs) and laser-guided vehicles (LGVs) are self-driving and designed to be both safe and efficient.  Elettric80's AGVs and LGVs also offer reliability, speed, and flexibility to improve the accuracy of unloading and reduce both time and investment.  These self-driving unloading robots are fully customizable and can be used for many other warehouse applications.

Honeywell is another robotics company that offers automation solutions for the unloading process. Honeywell offers both a robotic unloader and a vehicle-mounted articulated arm loader/unloader. A few benefits detailed on Honeywell's site include an efficiency boost for downstream processes, advanced machine learning to help the robot perform better over time, minimal human intervention, and minimal changes to the downstream processes involved in the warehouse flow. While not as multifunctional as the Electtric80s robotic unloader, both robotic solutions drastically reduce the need for labor, increase productivity and can play a major role in your company's warehouse flow strategy during the era of COVID-19.

# De-Palletization

Once a shipment is unloaded at a warehouse, the next step is to remove the boxes from the pallets and, optionally, sort all of the boxes so that they can go wherever they need to go.  This step is often referred to as de-palletization.

Normally, this process requires manual labor; however, there are robotics solutions that can be used in this step.  Honeywell is one company that offers robotic de-palletization.  Depalletizing solutions can handle single cases, rows, or entire layers, using robotic arms designed to precisely move and place a wide range of products.

With the challenges of a pandemic, de-palletization robots can be a smart way to reduce contact between employees and limit risk.  People working together in a small space unstacking boxes, removing pallets, and sorting boxes could readily expose themselves to unnecessary health risk.  In addition to Honeywell, there are other company's such as Pickit and Qcomp,  that offer viable depalletizing robotics solutions that can assist with reducing health risks in your distribution center.

# Receiving

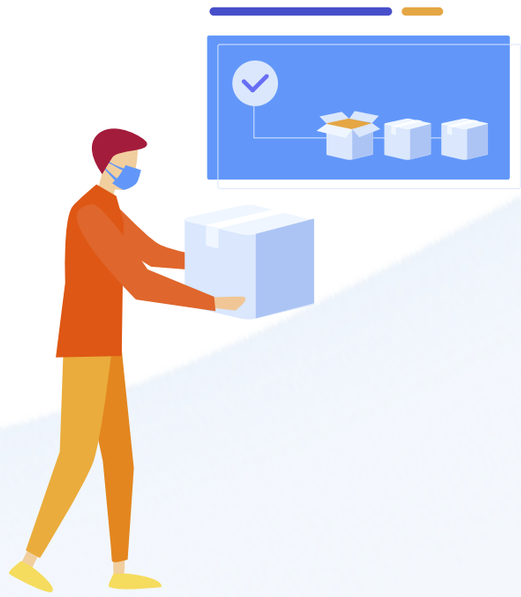
Receiving is the process of systemically and physically introducing new inventory into the warehouse or distribution center.  During this process, on-hand quantities at the warehouse are increased for each of the units that were just offloaded.  Operationally, this is usually accomplished by users holding mobile devices and scanning each box.  Of course, in the time of COVID-19, interpersonal contact should be limited at warehouses to avoid spreading the virus. The receiving area often has limited space which in turn limits the ability to socially distance while receiving the inventory, especially when trying to process unusually high volumes.

Automation can help warehouses operate efficiently using a reduced human footprint in receiving while still maintaining normal operations.  For example, if the depalletizer can put the boxes onto a conveyor belt, smart conveyor systems can read the labels on the boxes and notify your WMS system to increase the inventory counts automatically.

Robotics companies like TGW One-Touch offer robotic receiving solutions that not only decrease labor requirements, but they also increase throughput and inventory accuracy given human error is minimized or altogether eliminated with the reduction in the number of operators. Receiving robotic systems can be integrated with unloading robotics creating full end-to-end robotic automation.  Gap is an example of a retail apparel customer who can leverage these technologies to their advantage.

# Putaway

Putaway is the process of taking your newly received inventory from the dock and putting it into storage locations for safekeeping.  You can think of putaway as putting away new clothes you have just bought into your closet until you are ready to wear them.



In a warehouse, a putaway is typically accomplished manually.  People on forklifts, humans walking are usually moving the boxes from the Receiving area of the facility to an assigned location. This location is recorded in the WMS so that when an order is placed, the proper items can be correctly and efficiently located and shipped to their destination.

Putaway processes can be automated to reduce the risk of operators co-existing within areas. This type of automation is an advantage during the COVID-19 pandemic to minimize the spread of the novel coronavirus.  One example of a company with a very modern approach to putaway is Locus Robotics. Locus's Putaway functionality is a great choice for smaller, box- or container-driven putaway.  LocusBots are efficient, cost-effective, and can work to maximize worker productivity by moving inventory to the proper locations in the warehouse.  With these robots, there is no need for large teams of workers; decreasing teams decreases the likelihood of exposure to COVID-19 based on published guidelines.

One older, more conventional form of robotic warehouse management is called an automated storage and retrieval system (AS/RS).  AS/RS warehouses use system-controlled logic to automatically retrieve and store inventory in locations.  AS/RS warehouses can manage a large pallet or several cases of inventory for you.  While AS/RS wasn't previously cost-effective for smaller order fulfillment operations, advances in technology have made AS/RS one of the most popular and impactful options available for warehouse management and putaway.

Honeywell is one example of a company that offers an AS/RS system that is flexible to handle various applications, from e-commerce and omnichannel fulfillment to distribution centers, retail, and manufacturing.

# Picking/Packing

Once orders come down into the WMS system, they must be fulfilled.  The first step in order fulfillment is called picking. The manual picking process involves users traveling all over the warehouse, and possibly intersecting with each other at various times to pick items to fulfill orders to be shipped to the consumer.

Locus and other similar companies have innovative, robotic solutions to allow for zone-based putaway and picking. These picking solutions often increase UPH (units picked per hour) and lower CPU (costs per unit).  They also reduce human error and human contact on picking aisles.
Robotic solutions for picking are available from Kindred and Right Hand.

Kindred is another option that combines Artificial Intelligence with robotics for piece picking and requires very little human intervention during the picking process.  Once each order is picked and sorted, an operator retrieves the orders, placing them into separate bins, and takes each bin to be packed.

Then there are companies like Right Hand Robotics that offer a range of solutions. These solutions include goods-to-picker, which would require operators to pack, and then there is automated packing, where good are picked, sorted, and packed by robotics.

Once goods are picked, box erectors can be useful for packing as they reduce human involvement in putting together cardboard boxes.  Box erectors are huge machines that literally take flat corrugated cardboard and build the box for you.  While simple, this use of technology is valuable as it reduces the amount of touches that a box will have, which can reduce the spread of COVID-19. Box erectors also minimize labor costs and increase the output speed of readily available boxes for packing.

Another automated addition that can be made to improve efficiency within packing automated speed packing.  There are a variety of speed packing offerings based on need and capital investment. In some set-ups, operators place items in a topless box. The box travels by conveyer into the speed packer machine where the box is fitted for a lid based on contents, sealed with glue, then labeled and sent to shipping.  In other installations, products are placed in the box by the machine, properly closed, sealed, and taken to shipping by the conveyer.

These speed packing machines are being used in consumer-packaged goods, retail, and a host of other types of warehouses. Depending on the automation type, they can be used for single-line consumer orders or full case packing.  The use of speed packing machines increases throughput and reduces labor costs in the packing area.  Reduced labor costs mean fewer operators in the area and thereby human interaction is decreased.  Social distancing is a challenge in most traditional packing lines and as noted this automation will reduce the number of operators.

Companies such as A-B-C and Combi Packaging Systems and a host of other companies offer a variety of integrated packing robotic solutions, with each minimizing the need for human interaction and thereby reducing the likelihood of spreading COVID-19.

# Palletizing

Palletizing is the task of stacking boxes and other shipping containers onto a pallet for transport. When larger quantities need to be shipped, you may not be able to ship it via a parcel service such as FedEx, UPS, or USPS.  Instead, you will need to put it on a truckload shipment and likely palletize it.

The palletization process typically involves workers bending down and picking up boxes, creating pallets consisting of shipping containers (boxes, totes, etc). This action is repeated depending on the size of the order.  Automated palletizing using robotics not only reduces human interaction, it can also handle tasks that may prove to be tough for operators (i.e. heavy boxes or pallets), thus increasing safety and minimizing risk.

There are many options for automation in the palletization process, which allows you to build multiple pallets simultaneously with increased efficiency over a manual process.  Honeywell, a company mentioned earlier in Depalletizing, offers a variety of palletization robots. Honeywell's options include lower speed, floor-level palletizers, palletizer hybrids as well as high-speed palletizers with multi-layer accumulation zones and optional stretch wrappers.

Conveyco is another company whose offerings include palletizing robots and other automated solutions.  Their solutions are tailored to the specific requirements of your operation, including manual, semi-automatic, conventional, robotic, and hybrid solutions.  They also offer material handling systems, conveyor systems, and automated warehouses.

Automated palletization solutions can reduce human interaction, reduce labor needs, physical stress, and help reduce the spread of COVID-19 in your warehouse.

# Loading

Loading is one of the final steps in order fulfillment.  In the loading process, large pallets containing boxes, are put on trucks and shipped out to their final destinations. Companies such as Elettric80, Honeywell, and Conveyco have robotic solutions for loading. As with other automation, they provide predictability, reduce labor cost, and increase efficiency. With reduced labor and fewer operators at the loading dock, you will reduce human interaction and the potential to spread COVID-19.

# Conveyors

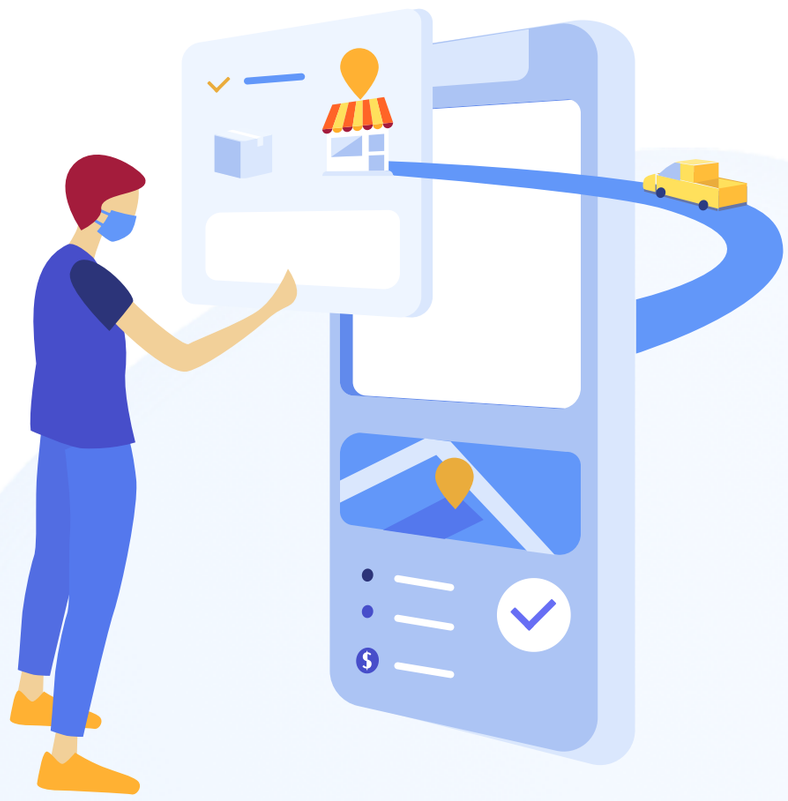
Product flows require conveyors to shuttle inventory and boxes around.  This is a very common way to move inventory around the warehouse for storage or for shipping.  This is a great way to reduce touches and congestion within the warehouse by automating the flow of inventory movement.  Companies such as Dematic, Honeywell, and others have automated conveyor systems to help with warehouse operations.  Conveyor systems can boost throughput, improve order accuracy, help automate end-of-line palletizing operations, and can be integrated with warehouse execution systems to improve and streamline other automated processes.

# Robotics Companies with Warehouse Automation Solutions

We've mentioned a number of robotics companies that can help you automate your warehouse.  Let's discuss a few of these companies in detail:

# Locus Robotics

Locus Robotics (https://locusrobotics.com/) is a company that has built autonomous robots that can travel around the warehouse from aisle to aisle.  The robots (LocusBot) move around the warehouse, and can travel near workers, who can then walk up to them, and put in the units needed to transport. One major benefit of the Locus Robotics autonomous warehouse management tools is that they allow users to man specific zones by themselves, without other workers nearby.



Another benefit of Locus Robotics is that the robots provide huge productivity efficiency gains.  The robots are assigned containers using an algorithm that minimizes travel time, so their performance is optimized and, in some ways, can surpass that of human workers.

Locus Robotics is great as a “robotics as a service” vendor.  Companies don’t have to buy the robots or have to maintain them; companies simply use the cloud-based system and then rent the robots and return them when completed.  There is a very low barrier of entry, which makes these robots an ideal choice for companies who want a simple, streamlined solution.

## Kindred Robotics

Kindred Robotics (https://www.kindred.ai) is another company in this space that combines autonomous learning with “advanced robotics, integration consulting, and remote piloting services to ensure peak performance” of warehouses. In early 2020, Kindred Robotics’ struck a deal with Gap, Inc. and these robotics services are currently being rolled out by the major apparel maker.

## Right Hand Robotics

Right Hand Robotics (https://www.righthandrobotics.com) is another robotic system that can give companies an edge.  Right Hand Robotics offers simple-to-integrate, adaptable solutions that reduce the cost of e-commerce order fulfillment.  Right Hand Robotics handles “loose” or “pieces” (instead of boxes or cases).  They have a variety of robotic arm solutions for warehouses.

## Honeywell Intelligrated

Another major player in warehouse automation is Honeywell Intelligrated (https://www.intelligrated.com).  Honeywell Integrated makes robots that can load and unload trucks, as well as build and deconstruct a pallet of cases.  These robots are “manufactured with the technology to be helpful additions to the workforce.”

# Elettric80

Elettric80 was established in the 1980s and specializes in the development of automated logistic solutions for daily consumer goods manufacturing companies in the beverage, food, tissue sectors, and other diversified areas. In 1992, BEMA was founded to develop robotic systems in synergy with those of Elettric80.

# QComp

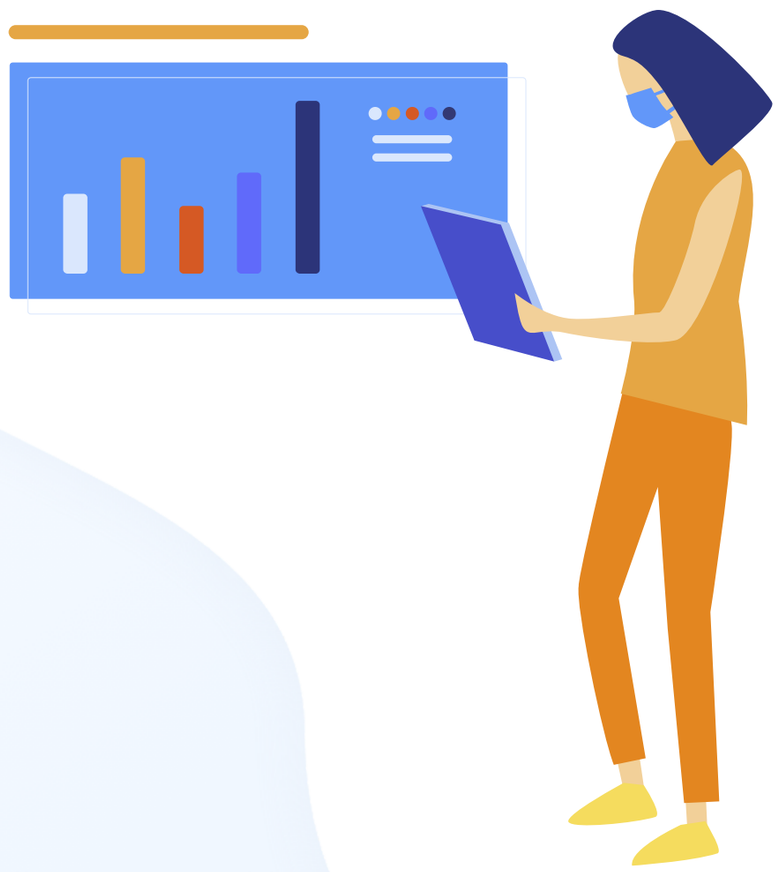
QComp Technologies provides robotic packaging systems, material handling systems, and automation line integration.

# Pickit

Pick-it was founded in 2016.  The solution contains a 3D camera and 3D picking software ready-to-run on a dedicated industrial processor. The Pick-it application was highlighted here for depalletizing capabilities however, it is capable of addressing several automation needs.

# TGW One-Touch

TGW was established in 1969. TGW develops all components of its solutions in-house, including the software, control system, robotics, and mechatronic modules, including everything from goods receipt to storage and order picking to goods issue.



# Conveyco Technologies

Founded in 1979, Conveyco offers material handling technology that includes AS/RS, Pick to Light, Software, AGV's and Carousels.

# A-B-C Packaging

In 1940, A-B-C Packaging Machine Corporation's founder designed box makers and sealers that automated the packaging line.

# Combi

Combi is a manufacturer and provider of case erectors, case sealers, packers, and robotic packaging systems.

# Dematic

Provider of storage and material handling technology such as robotics, palletizing/depalletizing as well as AGV, and conveyor systems, to name a few. In addition to hardware, Dematic also provides software and services.

# KNAPP

KNAPP brings software, robotics & handling, storage, picking, work stations, conveyors and sortation to warehouse logistics.

# Beumer Group

Beumer Group offers intralogistic solutions for conveying, loading, palletizing, packaging, and sortation.

# About Veridian

Veridian (http://veridian.info) specializes in the implementation of fulfillment systems.  We help the companies of all sizes implement Warehouse Management and Order Management software systems. Preparing for the future can be overwhelming with so many technologies available.  Let Veridian help your company accelerate to the next level with advanced robotics and systems.  *Navigate to the website and speak to an expert today.*

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