WHITE PAPER

Picking Methods and Technologies:

Making Sense of the Strategy and Technology Options



FORTE

Make Distribution Your FORTE

Introduction

By and large, a fast-growing company has made sound product development, manufacturing, marketing and sales decisions to achieve its current success. And chances are, that same company has achieved exceptional customer service levels with reasonable operating costs to sustain growth over the long haul. After all, the impact of deteriorating delivery capabilities can have a long-term detrimental effect on a company's reputation and brand value. Nevertheless, many fast-growing companies that have made such savvy decisions along their growth trajectory often make poor decisions or fail to make necessary investments at the distribution center operational level that ultimately erode their reputation for exceptional customer service.

Companies large and small, with varying sizes and numbers of warehouses, may face completely distinctive challenges, but in all cases, their issues become apparent when the limits of their current picking strategies or technologies, or both, have been exceeded. The key is understanding when it's time to stop relying on more people and overtime to get the job done and begin the process of evaluating improved technologies or more automated alternatives.

The key is understanding when it's time to stop relying on more people and overtime to get the job done and begin the process of evaluating improved technologies or more automated alternatives.

Distribution centers (DCs) of small, growing companies are often challenged to keep up with continually increasing throughput requirements, usually due to inefficient methodologies and technologies that are in place. Contrary to many companies' gut reaction to resolving bottlenecks in the operation, adding labor to the process isn't a long-term solution and can actually compound the operational inefficiencies. Instead, improving the process to increase capacities at constraining points increases productivity and enables the DC to support growing business levels going forward.

In larger facilities with more advanced picking processes, dissemination of information to the pickers in a timely and, most important, optimized fashion is critical to performance. Single-order picking, even in a well-designed warehouse using more advanced picking technologies, can seriously limit the productivity of the pickers and bottleneck the fulfillment process, causing ripple effects downstream to truck loading.

There's a point at which having pickers travel to the products, or person-to-goods picking, becomes problematic regardless of the picking technology or software deployed in the DC. In this scenario, automated storage and retrieval systems (AS/RS) come to the forefront as a logical and efficient option. This group of solutions is referred to as "goods-to-person."

With the myriad of advanced alternatives from which to choose, it is imperative that picking strategies be matched with the right technology and software that contribute to solving the DC's specific challenges. Implementing a solution that is too advanced wastes capital and can often limit efficiency gains, especially during off-peak periods. Similarly, deploying a solution that doesn't address all of the DC's specific challenges and requirements can cripple the DC at the busiest times and stunt future growth.

A host of considerations come into play that drive the optimal solution:

- SKU count, projected SKU growth and product mix
- Type of picking: full-pallet, layer, case, split-case, or a mixture
- Existing software systems (ERP, WMS, LMS, etc.)
- Current picking technologies
- Size and layout of the distribution center
- Order size and characteristics
- Current labor force, local labor pool, wage/benefits costs
- Breakdown of shipments: retail, wholesale, e-commerce

With the myriad of advanced alternatives from which to choose, it is imperative that picking strategies be matched with the right technology and software that contribute to solving the DC's specific challenges.

Picking Strategies

The pick methodology employed greatly impacts the maximum level of productivity achievable per worker. Each methodology has a base amount of time and effort required by the pickers. To a degree, technology and software can be applied to alter productivity, but there's an inherent productivity range to each methodology beyond which another strategy is required.

For most paper-based picking methods deployed in lower throughput DCs, the choice is between picking by product SKU and picking by product location.

Picking by SKU

In this strategy, a picker is given a printed pick list consisting of the SKU or product description, or both, with no indication of each SKU's pick locations. Pick aisles and shelves are labeled by product style, model number or a distinctive characteristic, and the SKUs are listed on the pick ticket in the same sequence they are slotted in the DC. The responsibility is given to the picker to know where the SKU is slotted, which causes new or temporary employees to be significantly less efficient than more experienced pickers, lowering overall productivity. This strategy also requires printing and transporting paperwork manually, which can lead to lost pick lists and errors. Typically, when picking by SKU, more than 50 percent of a picker's time is spent traveling to pick areas, between picks and from pick zones to packing or shipping areas.

Location-based picking

Picking by location is the method in which the picker is provided with a location from which to pick a specific SKU. Location-based picking is advantageous in many instances because a picker with even limited experience can determine the specific location to which he is traveling by the location ID, minimizing travel time. This method enables product slotting to be independent of the SKU sequence, leading to the following options:

- Heavy, difficult-to-handle or fast-moving products can then be slotted in the easiest-to-access locations.
- High-volume SKUs can also be evenly spread throughout pick aisles in order to reduce labor congestion while enabling workload balance among pickers.

While more efficient than picking by SKU, a significant amount of the pickers' time is still spent in transit between pick locations. Building on the idea of location-based picking, warehouse management software can enable more advanced strategies:

- **Multi-order picking:** Multiple orders are picked in a single pass through a pick area and sorted to the order.
- **Batch or cluster picking:** Where multiple orders are picked into one tote/cart and then sorted into the respective orders at a later time.

Both of these methods can dramatically improve picking productivity by reducing overall travel, but they require advanced software.

Zone picking

Location-based picking opens the door to another, more advanced, picking methodology: "pick and pass," also called zone picking. In this scenario, the travel time of pickers is significantly reduced because workers are assigned to a specific zone inside the DC. Orders are moved through the warehouse from zone to zone, bypassing zones that do not contain SKUs needed for the order. As soon as all picking in one zone is complete, the order is passed to the next zone that contains required products.

To successfully deploy a zone-picking methodology, warehouse management software (WMS) or warehouse control software (WCS) capable of filtering pick tasks by zone, managing the picking activities and routing of order totes/cartons is required.

Picking Technologies — Person-To-Goods

When a paper pick system is replaced with an optimized location-based picking strategy and combined with the right picking methodology, pick rates can more than double and picking accuracy dramatically improves. In order to realize these efficiencies, many growing companies have introduced light-directed, voice-directed or radio frequency (RF)-directed picking, supported by WMS.

Pick-to-light system

Essentially, a pick-to-light system consists of a network of lights and displays integrated with pick location media. In the typical application, the picker scans a bar-coded tote or shipping carton, and lights below or above every location from which product needs to be picked for the orders are lit. In the small display window next to the lights, the unit of measure (optional) and quantity required for the order are indicated. The picker pulls the indicated quantities from the locations and pushes buttons next to each light to signify that the picks are complete.

Growing companies are good candidates for pick-to-light systems as extreme accuracy improvements, to more than 99 percent, can be achieved quickly,

Since the introduction of pick-to-light systems, many improvements have been made, including rail mounting that enables more lights and displays to be added without worrying about complicated wiring. Modular snap-on displays can be swapped or removed in less than a minute when a SKU is introduced to or deleted from the pick line. This flexibility is extremely valuable for seasonal or trendy products, allowing re-slotting on a continual basis.

Growing companies are good candidates for pick-to-light systems as extreme accuracy improvements, to more than 99 percent, can be achieved quickly, enabling staff previously tied to auditing and correcting orders to be redeployed more productively in other areas of the DC. Many companies find that the increased productivity and reduction in errors yield a payback within 24 months.

Voice-directed and RF-directed picking

Other person-to-goods location-based picking technologies such as radio frequency (RF) and voice recognition are viable options for growing companies.

Though RF terminals are a time-proven technology, there have been improvements in RF network speeds, greatly reducing the dwell time between completion of one task and visibility to the next task. Other significant improvements have been made in the terminal/scanner hardware, where wrist-mounted displays use a Bluetooth wireless connection and ring scanners that enable the picker to have both hands free to pick and handle product.

Voice technology is increasing in popularity and shares many of the same benefits as pick-to-light technology. Pickers wear wireless terminals with a headset and microphone that communicate to a voice server via a wireless network. The workers receive picking instructions through speech synthesis, and they verbally confirm their actions back to the system. The following benefits are achievable through the deployment of voice technology:

- Hands-free operation lets pickers use both hands for picking and handling product
- Users can wear gloves in cold/frozen DC environments
- Eyes-free operation reduces accidents

- Order-picking accuracy to more than 99 percent
- Order-picking productivity increases up to 20 percent
- Multilingual speaker-dependent systems can be "trained" to recognize a user's individual speech pattern, dialect or language

Voice-directed and RF-directed technology can be used in any of the person-to-goods picking strategies to increase efficiency. The improvements in communication of tasks to the pickers are independent of the methodology and yield increased productivity regardless of pick methodology employed. With deployment of voice-directed and RF-directed picking, sufficient equipment to cover the number of workers on the largest shift is required, plus a small pool of spares. Accordingly, there will be unused investment in equipment with highly seasonal businesses.

LEVERAGING PARETO'S LAW

When thinking about moving to any form of picking technology, it's not an all-or-nothing question — not all SKUs are created equal.

A common rule known as Pareto's Principle, or the "80-20 Rule," can often be productively applied to a company's picking operation. This rule refers to the fact that 20 percent of SKUs, referred to as the "vital few," typically generate 80 percent of order lines (trips to the pick locations). Taking advantage of this principle, DC managers can often put these fast movers in a small, separate area equipped with some form of advanced picking technology. More basic picking strategies or technologies may prove sufficient to pick the remaining 80 percent, known as the "trivial many."

There are techniques to installing an automated picking system to reap productivity enhancements while cutting the investment requirement. For example, in areas where slow-moving items are located, a light module can be used to direct picks for all items in the bay. This approach saves money by requiring fewer light modules than SKUs.

Targeting the vital few in this fashion can increase efficiency for the most profitable products without the full investment of bringing picking technology to the entire DC.

Pick-to-conveyor system

In person-to-goods picking, installation of a well-designed conveyor system can prove beneficial for ergonomics and picker productivity. The pick-to-conveyor system can be deployed for case picking and for split-case picking.

Case-pick applications are usually simpler and less expensive as they typically consist of a single lane of powered conveyor running through a pick module or zone. Most case picking is done in batch mode, with one pass through a zone to pull cases for multiple orders. The cases are placed on the powered conveyor and transported by the conveyor to a sorter, at which the cases are sorted to separate lanes for each order. The benefit of being able to pick at extremely fast pick rates needs to be evaluated along with the need to handle each case a second time to remove it from the sort lane to place it on a pallet.

Split-case pick applications usually comprise three lanes of conveyor, a center powered takeaway conveyor with gravity roller conveyor on each side. Pickers move totes or shipping cartons along the gravity conveyor, picking the appropriate SKUs to the tote/carton, using voice, RF or light technology and can pick single orders or multiple orders in each pass through the pick zone. When a tote/carton is complete for that zone, the picker pushes the tote/carton onto the powered takeaway conveyor.

Split-case picking conveyor systems often employ zone-routing technology, which offers additional productivity benefits. Totes or cartons only enter the zones from which product is needed to fill the order. Zones with no picks required are bypassed, so the pickers in that zone are not required to handle the tote/carton. To enable this bypassing, sophisticated controls and WCS software are needed.

Depending on throughput levels and other factors, early out lanes and recirculation can be incorporated into split-case conveyor systems, to enable totes/cartons with no more picks required to exit the pick module and transport to the sorter or other modules. Recirculation allows zones or modules to be bypassed when bottlenecked and returned when the zone has capacity.

Picking Technologies — Goods-To-Person

In the highest throughput DCs, with increasing numbers of pickers in the pick aisles and zones, traffic can become congested. In operations where such a bottleneck is limiting productivity, adding labor to the mix only worsens the congestion with minimal increased capacity gains. These situations are where goods-to-person options should be considered.

Myriad types of automated systems have been developed to automate the process of delivering the goods to the picker, but the basic idea behind them is the same: Use automation to eliminate picker travel while increasing productivity and order quality.

On the lower range of the technology spectrum, goods-to-person systems include horizontal/vertical carousels and A-frame systems. At the other extreme, complete racking systems with robots capable of three-dimensional travel and controlled by tightly integrated advanced optimization software deliver totes or pallets to stationary pickers who select the appropriate quantity of each SKU. At the pickers' workstations, light or voice technology can be incorporated to expedite the process of sorting picked products to the appropriate order carton.

Myriad types of automated systems have been developed to automate the process of delivering the goods to the picker, but the basic idea behind them is the same: Use automation to eliminate picker travel while increasing productivity and order quality. These systems require the most advanced software and control systems to operate at their peak efficiencies and entail a significant investment, but they can provide exceptional productivity and a strong ROI under the appropriate DC operating parameters.

Picking and Software

Regardless of the advanced picking strategy being considered, software plays a critical role. From enabling more effective person-to-goods methodologies to the most advanced goods-to-person technologies that can be deployed, software is a major enabler.

From enabling more effective person-to-goods methodologies to the most advanced goods-to-person technologies that can be deployed, software is a major enabler.

To step beyond the simplest single-order, person-to-goods picking strategies, more advanced warehouse software can be deployed to drive substantial operational improvements — specifically in productivity and order quality. Software can support more effective slotting of product for both ergonomic and efficiency gains, and it can provide the basis for enabling multi-order and batch-pick methodologies.

On the lower end of the technology spectrum, systems such as pick-to-light, voice-directed and RF-directed picking require integration with a robust warehouse management system (WMS). The WMS typically provides workload balancing to analyze the workload within zones and allow adjustment of picking assignments or the sizes of pick zones, or both, when necessary. The WMS packages operate in real time and transactions are immediate, giving the DC management team exceptional visibility to order status and workload within the DC.

In automated facilities, WCS software routes the movement of cases/totes/cartons throughout the DC and directs robotic systems in every aspect of the operation, orchestrating the system to ensure that picking is done as efficiently as possible at all times.

Picking Right

It should be clear that the list of options for structuring picking operations — considering the available picking strategies, picking technologies and the related software — is long and complex. Similarly, the number of factors that feed into any decision to move to advanced picking is immense. With the scarcity of capital in today's business climate and the importance placed on ROI, it's essential that companies think strategically about their moves in the DC. The silver lining for DC operators and logistics managers is that there's often much more life in an existing DC than companies might otherwise think — even in DCs working well beyond current capacities. With the right strategy, technology and software choices, both throughput and accuracy can be greatly improved to help move businesses to the next level of growth.

The silver lining for DC operators and logistics managers is that there's often much more life in an existing DC than companies might otherwise think — even in DCs working well beyond current capacities.

Why FORTE

Single-Source Accountability

Whether we're helping you develop a strategic plan, design and build a distribution facility, or optimize a distribution operation through performance metrics and analytics, FORTE provides a true single point of contact responsible for the complete performance of your distribution network. No finger pointing. No fragmentation of responsibility. No multiple suppliers for technical support. You have performance goals, and it's our job to make sure they're met on an ongoing basis.

Total Objectivity

We don't manufacture equipment. We don't develop WMS software. We don't have commercial arrangements with any suppliers for expected volumes of business. We're simply interested in delivering the most efficient distribution solutions at the lowest total cost. Our client-side service approach means our only allegiance is to our customers. So with every engagement, you know we'll choose the most appropriate level and blend of technologies integrated into an effective operational system.

Expertise

Our team is deeply rooted in the hands-on implementation of distribution center design and warehouse automation. FORTE's engineers and technicians integrate today's best practices in supply chain management and distribution center operations while developing next-generation technologies. As a result, our solutions employ the best combination of practical advice, data-driven analysis and technology-enabled systems. With FORTE, you get:

- More accountability than a consultant
- More experience than a systems integrator
- More objectivity than a manufacturer

That's why the world's fastest-growing companies are making distribution their FORTE.