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Supply Chain Advisors LLC

The Picking Playbook

Batch Picking, Zone Picking or Cluster Picking… Which is Right for Your Distribution Center?



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Introduction

It's no accident that companies seeking to improve their distribution center's efficiency usually start by taking a hard look at their order-picking processes. While other areas of the distribution center may also have improvement opportunities, picking process optimization usually pays the biggest dividends. With the large headcounts in play as well as the potential to shorten order turn times, picking improvements can give you twice the bang for the buck.

There are a variety of different order picking methodologies which can be employed – Commonwealth Supply Chain Advisors defines 26 varieties which are especially worthy of consideration, but there are many other flavors outside of this primary list. The methodologies can be categorized into four major groups:

- Discrete order picking
- Cluster picking
- Zone picking
- Batch picking

The reader shouldn't be too hard on himself if these terms seem a bit confusing. Even experts are not always consistent in their definitions of these four groups (it's quite common for the terms cluster picking and batch picking to have quite different meanings depending on the opinion of the speaker).

This paper will explore the differences between these types of picking methodologies and provide some guidelines for readers who are endeavoring to determine the best pick methodology for their own operation.

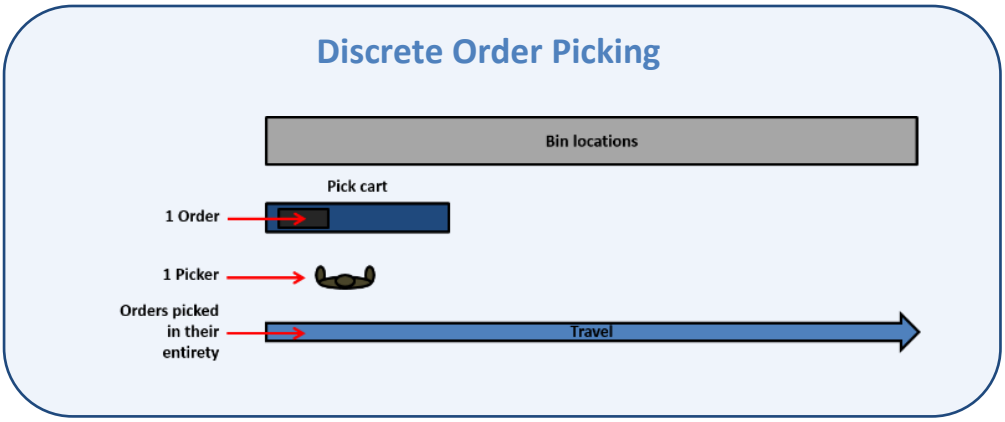
"Picking process optimization usually pays the biggest dividends due to the large headcounts in play as well as the potential to shorten order-turn-around times.

Four Key Pick Methodologies

Pick Methodology #1: Discrete Order Picking

One of the most common picking methods employed is discrete order picking. With this method, one order at a time is picked, start-to-finish, by one picker. Without a Warehouse Management Software (WMS) system, this may be the only method of picking that can be practically executed in some distribution centers. Discrete order picking is simple to learn and not very prone to error. For companies used to picking large-cube orders, this method may be very effective; there simply may not be a good way for a picker to transport more than one order around the warehouse at a given time. However, discrete order picking is colossally inefficient for small cube item picking. As an example, to pick five orders, each of which might fit in the size of a shoe box, a worker must make five separate trips around the entire warehouse. Walking is excessive, and labor costs are as well.

Figure 1: Discrete Order Picking



Advantages	Disadvantages
• Simple for operators • Less error prone • Little/no technology required • May be the only practical method to pick very high-cube items	• Very high levels of walking • Operators return to home-base after each order is picked • Each order requires a trip through the entire warehouse

Consider discrete order picking when the following operational characteristics are present:

- **Large orders:** A typical order has very large cubic dimensions
- **Pallet picks:** Full pallet picking is practiced
- **High accuracy requirement:** Order accuracy is mission critical (example: pharmaceutical applications)
- **Minimal technology:** The operation lacks a true WMS system with mobile devices

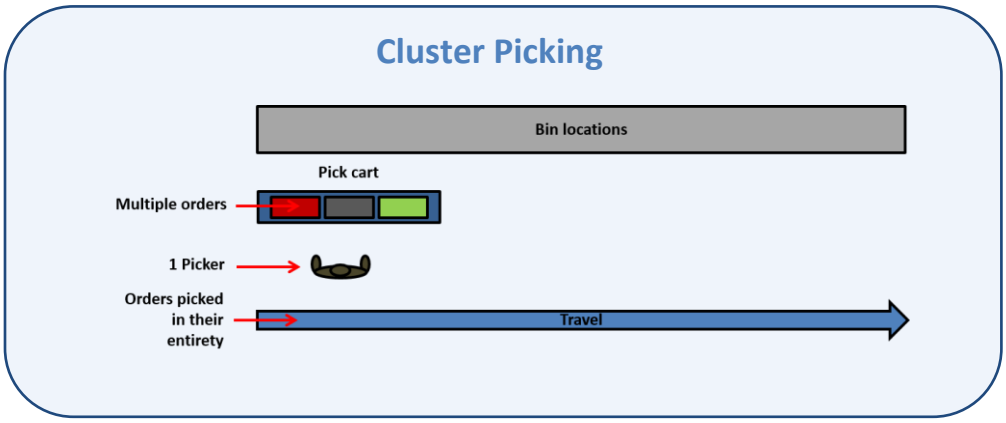
Pick Methodology #2: Cluster Picking

Moving from discrete order picking to cluster picking is one of the single greatest leaps forward in efficiency that a company can take in the distribution center. With cluster picking, multiple orders at a time are picked, start-to-finish, by one picker. As the orders are picked, they are placed in discrete, separate containers (note: this last step distinguishes cluster picking from batch picking, where orders are not separated as they are picked).

In the analogy mentioned previously, the same five orders now involve only a single trip through the distribution center. Cluster picking is much easier with a real-time warehousing system where pickers are directed in an efficient pick path, and are told exactly what to pick and where to put it. However, good results are still attainable with paper-based systems, using batch pick-tickets. Paper-based cluster picking is certainly more error prone than discrete order picking, so if automatic data capture like bar-code scanning is not used to ensure accuracy, then secondary checking will often need to be employed.

"Moving from discrete order picking to cluster picking is one of the single greatest leaps forward in efficiency that a company can take in the distribution center."

Figure 2: Cluster Picking



Advantages	Disadvantages
• Dramatically reduces walking • Possible to do on a limited scale without a high degree of technology • Each order is only touched once • Orders are ready to ship as soon as picking is done	• Hard to pick a large group of orders without real-time instructions • Orders may travel significant distances without any picks being performed • Travel distances are excessive in large warehouses with many SKU's • Increased likelihood of errors

Consider cluster picking when the following operational characteristics are present:

- **Small orders:** A typical order has very small cubic dimensions
- **Not too much ground to cover:**
    - The forward pick area in the distribution center is of a manageable size for a picker to walk from beginning to end. Or…

    - If used in conjunction with zone picking (see the next section), each pick zone is a manageable size for a picker to walk through

- **System direction:** A WMS system can direct the picking of many orders at one time in an efficient pick path
- **Automatic data capture:** Bar-code scanning or voice-directed-picking can be used to confirm both the items which are picked AND the containers that they are put into

The following material handling equipment is often used in conjunction with cluster pick processes:

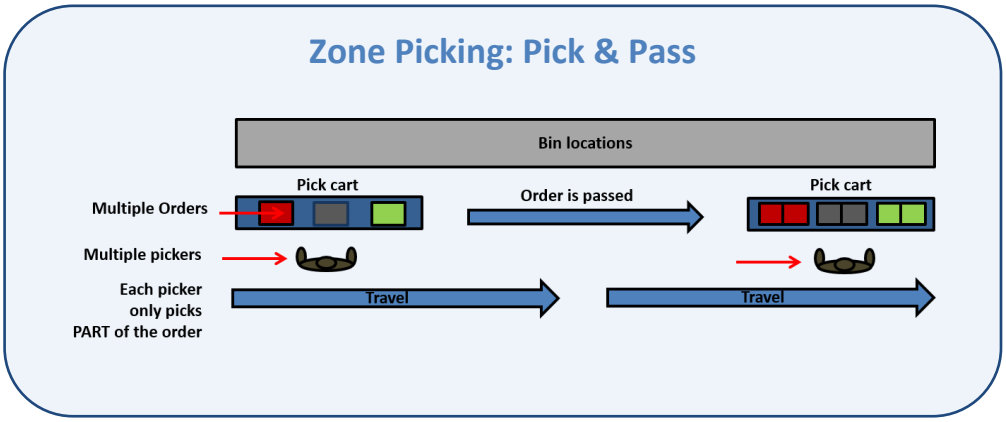
- Picking carts
- Double-length electric pallet jacks or carts
- Goods-to-man systems: Carousels, AS/RS system

Pick Methodology #3: Zone Picking

Zone picking involves multiple pickers each picking separate portions of the same order. It is often deployed in conjunction with cluster picking, where multiple pickers each pick separate parts of multiple orders at the same time. Zone picking works best when there are a variety of types of SKU's or very large SKU sets that orders can be drawn from. There are two flavors of zone picking:

- **Pick-and-Pass,** or sequential zone picking, involves one picker "passing" a group of orders to another picker who then performs additional picks for the same orders. The product is still placed in a discrete tote or carton that is handed off to multiple picks in sequence until the order is picked to completion. Pick and pass can be used with cart-based picking (the entire cart is passed to the next picker) or with conveyor-based picking. With the latter strategy, more complex zone routing can be employed, where totes can skip over zones where there are no picks for maximum efficiency. Zone picking must almost always be deployed with a real-time WMS

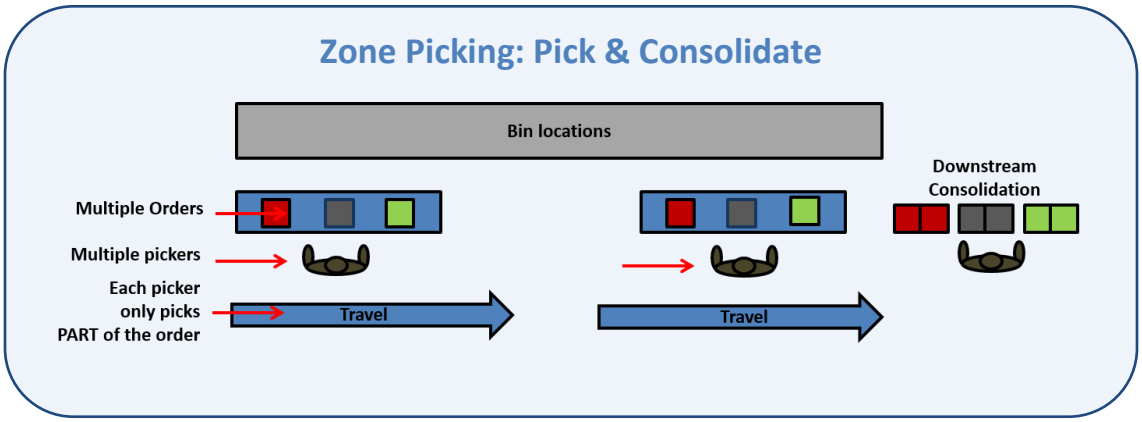
Figure 3: Zone Picking: Pick & Pass



Advantages	Disadvantages
• Reduces walking in larger distribution centers • Each order can only be routed to zones where there are picks • Orders are ready-to-ship as soon as picking is done	• Almost impossible to manage without real-time warehousing • Zone routing can only be done with complex conveyor systems • All of the SKU's in the order travel through the entire DC

- **Pick-and-Consolidate,** or simultaneous zone picking, involves multiple pickers picking parts of the same orders at the same time. The items are picked into discrete totes which must then be married up or consolidated in a secondary process downstream. This method is well suited for situations where the total cube of an order is fairly large, or where there is a wide disparity in characteristics amongst the various SKU's. For example, there may be some large, non-conveyable items on an order along with smaller conveyable items. Each type of SKU would be picked in its own zone and the entire order would be married up at the end of the process.

Figure 4: Zone Picking: Pick & Consolidate



Advantages	Disadvantages
• Reduces walking in larger distribution centers • Each order can only be routed to zones where there are picks • Orders are ready-to-ship as soon as picking is done	• Almost impossible to manage without real-time warehousing • Zone routing can only be done with complex conveyor systems • All of the SKU's in the order travel through the entire DC

Consider zone picking when the following operational characteristics are present:

- **Variety of SKU's:** The overall group of SKU's to be picked consists of items with a variety of sizes, shapes, climate requirements, or other handling characteristics which require them to be stored in different mediums or different areas of the warehouse

- **Lots of ground to cover:** The forward pick area in the distribution center is too large for a single picker to easily walk through, or the pick area is spread across multiple vertical levels of the facility

- **Lots of slow moving SKU's:** Pickers would have to walk past many, many SKU's in order to access the items which are required to fill a typical order

- **Conveyors:** A conveyor-based picking system is in use

- **WMS:** A real-time WMS system is in use to direct the process

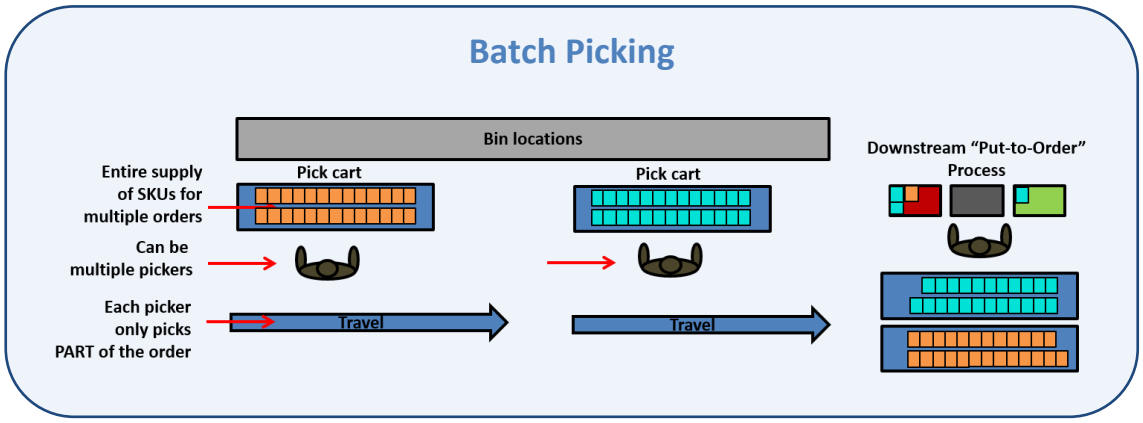
The following material handling equipment is often used in conjunction with zone pick processes:

- Conveyor-based pick modules
- Voice-directed picking
- WMS

Pick Methodology #4: Batch Picking

Batch picking involves picking the entire quantity of a SKU which is required for multiple orders, and then sorting it to those individual orders in a secondary process. Batch picking works best in a "few-to-many" environment, when there are a small number of very fast moving SKU's which are required for a large number of orders. For instance, a picker may pick an entire pallet of product, bring it to a sorting area, and then perform a "put" process and distribute the items to each of the outbound orders. Batch picking can be used in conjunction with other forms of picking as well. For example, a picker can perform a cluster pick – picking ten orders simultaneously into discrete containers – and then drop those orders at a "put" station where a few fast moving SKU's are put to the orders.

Figure 5: Batch Picking



Advantages	Disadvantages
• Reduces walking in larger distribution centers • Each order can only be routed to zones where there are picks • Orders are ready-to-ship as soon as picking is done	• Almost impossible to manage without real-time warehousing • Zone routing can only be done with complex conveyor systems • All of the SKU's in the order travel through the entire DC

Consider batch picking when the following operational characteristics are present:

- **Few to many:** A small number of fast moving SKU's are required to fill a large number of orders
- **Retail stores:** Orders are being picked for retail stores where each store orders a similar mix of SKU's
- **High head-count:** Significant levels of labor are employed in the distribution center, helping to justify the use of batch-pick automation technology

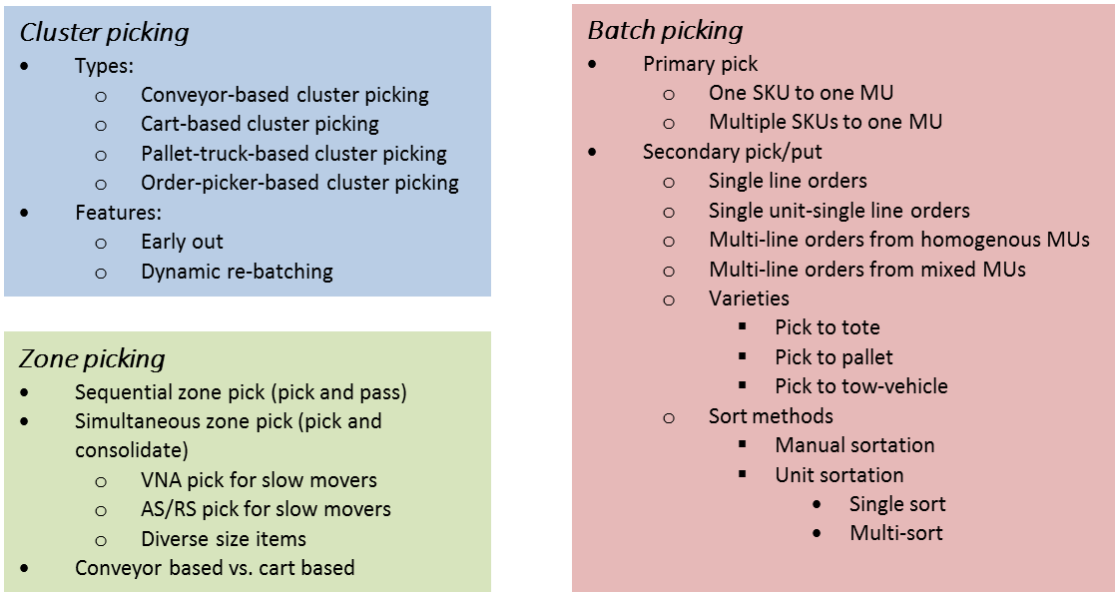
The following material handling equipment is often used in conjunction with batch pick processes:

- Unit sorters: Tilt-tray, bomb-bay, or cross-belt sorters
- Put-to-light systems
- Put walls

Pick Your Flavor

The four basic pick methodologies discussed above can be deployed in countless different ways in the distribution center. Figure 6 below illustrates some of the more common "flavors" of picking which are often used:

Figure 6: Additional Picking Methodologies



Conclusion

Whether you are designing a distribution center from scratch or simply looking for some "quick-hits" to improve labor efficiency, start with picking. Outbound labor per unit is higher than inbound labor per unit, and greater returns will be achieved by optimizing outbound labor than inbound.

Additional Resources

Whitepaper: Selecting the Right WMS

Whitepaper: Distribution Center Design Series - Part I - Developing a Storage Design Tool

Whitepaper: Distribution Center Design Series Part II - Developing a Throughput Design Tool

Article: A Tier 1 Warehouse Management System – When to Consider…and When to Be Cautious

Article: Material Handling System Simulation: A Valuable Tool for Distribution Center Design

Article: Gathering Cube Data on SKUs

Article: Very Narrow Aisle Rack in the Warehouse: When to Use It, When Not to Use It

About the Author: Ian Hobkirk



Mr. Hobkirk is the founder and president of Commonwealth Supply Chain Advisors. Over his 20-year career, he has helped hundreds of companies reduce their distribution labor costs, improve space utilization, and meet their customer service objectives. He has formed supply chain consulting organizations for two different systems integration firms, and managed the supply chain execution practice at The AberdeenGroup, a leading technology analyst firm. His career has provided him with a broad perspective on how to solve supply chain problems without automatically resorting to expensive technology. Mr. Hobkirk has authored dozens of white papers on supply chain topics, and his opinions have been featured in publications such as The Wall Street Journal, Supply Chain Management Review, DC Velocity, Modern Materials Handling, and The Journal of Commerce.

About Commonwealth Supply Chain Advisors

Commonwealth is a distribution-focused supply chain consulting firm that provides companies with the technical expertise and objective guidance required to design, implement and operate successful distribution centers. The firm is recognized as one of the "Top 100 Great Supply Chain Partners," by SupplyChainBrain, for consistently making a significant impact on its clients' supply chain efficiency, customer service and overall performance.

Commonwealth is based in Boston and works with clients across the globe. For more information, visit www.commonwealth-sca.com or contact Jennifer Thomas at (617) 948-2153.