The NuminaGroup

Turn Your DC into a Profit Machine.

A comprehensive guide to the latest lean processes, technologies and software available today

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Introduction

Costs increase and profits fall when bottlenecks and inefficiencies exist in DC operations. The best way to prevent these avoidable losses is by implementing lean automated processes. Combining pick, pack, and ship order fulfillment requirements into one continuous, unified process eliminates excessive labor costs, increases profitability, and reduces the order delivery window.

"Where to start?"

Do you improve picking or focus on the pack and ship area? The answer is yes, to both questions. To achieve the best outcomes, it's wise to review and consider all three processes – pick, pack, and ship - as one tightly interconnected holistic process.

Automating only one component of order fulfillment will not generate the full benefit of gains in efficiency and profitability; it requires all three functions of pick, pack, and ship in continuous harmony. The solution is to design a unified system that encompasses the entire order fulfillment operation. In this whitepaper, we'll cover key components of putting together a profit-driven plan.

Start with a Roadmap

Before you invest in a DC automation project, it is imperative to develop a design plan to act as your "Roadmap." The Roadmap includes an evaluation of the benefits that will be obtained with improved processes, better slotting, ergonomics, and a reduction in the number of touches. Non-value touches need to be eliminated throughout the pick, pack, and ship operation. **That's the first major component of the design.**

Next, compare the improved design to the current operation's key performance indicators and labor usage. This comparison will be used to calculate the advantages obtained through operational changes and leaner processes. The improved design plan, with the combination of enhanced lean process automation should yield far higher gains in productivity, especially in solutions that are holistic and implemented across the entire order fulfillment operation. Following are some key areas of focus as you put together your plan for improvement.

Identifying the "Golden Zone" of High Movers within your Slotting Strategies

A key first step in the design study is to perform a **product storage and slotting analysis.** Develop a few DC layouts comparing design models to maximize storage space and minimize replenishment labor. Storage improvements combined with picking operators traversing an "optimized path" will cut travel time. This early evaluation will help establish the right type of, ideal size, and quantity of storage racks/shelves.

It is also important during the design services phase to have a **detailed slotting study** performed, even more so if your operation is stocking and shipping thousands of SKU's. One option is to use a slotting software application that can accurately perform SKU velocity analysis to determine the highest moving SKU's and recommend ideal slotting positions for them in **"Golden Zones,"** along with an ideal A, B, C velocity storage and picking map.

The Golden Zone refers to the slotting position that is knee to shoulder height, along the shortest pick path to the pack area to eliminate wasteful picker "wander time." Most distribution operations have an 80/20 or 70/30 product profile in which the majority of the products shipped are from 20-30% of the total SKUs. This area provides big opportunities to create huge efficiency gains and profits.

The design study will also recommend improved practices, including how to manage and regularly perform slotting improvements (not just once a year!). Target your re-slotting audits to occur monthly, or at the very least, quarterly.

Improved SKU slotting yields instant efficiency gains. Benefits include picking and replenishment productivity boosts gained or achieved by identifying and grouping products with "like" order shipment profiles together, minimizing travel paths, and improving workplace safety by slotting high movers ergonomically.

Next Generation Multimodal Voice and Pick to Light Picking

With the slotting plan completed, you're already increasing efficiency and saving money. Now it's time to consider order picking improvements to continue the savings. **The goal is to take all unnecessary steps out of the pick and pack processes.**

Industry averages show that up to **50% of distribution labor is spent in order picking** and QC activities, so it's important to know the following:

1. Is picking a discrete pick operation - aka picking one order at a time?
2. Do you have Cartonization Logic to direct pick and pack into the shipping carton?
3. Where is the #1 bottleneck in your picking operation, especially during peak periods and peak seasons?
4. What is your yearly spend in picking and secondary QC labor?

If your picking process currently relies on paper or paper combined with outdated CE based wireless barcode terminals, it is time for an upgrade. You can significantly boost picking productivity with high performance picking technologies such as "pick to light," and "voice-directed picking." Combining both picking technologies in a batch cart operation boosts operator lines per hour pick rates by 100% or more in each SKU pick and pack application. Voice picking performance rates can provide 80+ lines per worker hour in productivity gains for a batch pick cart order picking application. Don't look for apples to apples comparisons, because you can't batch pick using an RF terminal.

Voice picking, which combines voice commands with "hands-free camera" based barcode scan validation, is referred to as "multimodal" picking. This picking process yields 99.98% accuracy while lowering labor by 30 to 50%. It is faster and provides higher accuracy than voice only picking, providing picking rates of 230 to 350 lines per hour in a properly slotted high velocity SKU pick zone.

The newest generation of "multimodal voice" and "hands-free barcode scanning" can incorporate both pick-to-light and put-to-light technologies within the same application. Consider pick-to-light for the top 10% to 20% highest velocity SKUs, and also put-to-light for consolidating slow moving SKUs with high velocity SKUs.

Order Consolidation
Wall

Voice picking technology, combined with hands-free scanning, is ideally suited to direct picking in both pick modules with zone routing conveyor systems, or in a batch cart picking process. Both of these processes lend themselves well to voice directed pick and pack directly into the shipping carton, as opposed to picking to tote, which automatically creates a double touch.

Voice picking is highly flexible, and supports multiple picking operations including:

1. Pick to conveyor
2. Discrete orders
3. Batch Cart Picking

4. Mixed case pallet
5. Full pallet pick
6. Directing multi-zone consolidation for LTL
   and truck shipments

Voice is highly flexible, and supports multiple picking operations including mixed case pallet, full pallet pick, and consolidation for LTL and full trailer shipments.

A Low Accuracy Picking Process Costs You Money and Customers

Accuracy matters more than any other factor for customer acquisition and retention. An order fulfillment error conservatively costs a business $250 per incident, perhaps more.

Try tallying up the additional costs:

- Freight from reshipping
- Inventory adjustments
- Losses due to damaged product
- Restrictions on re-use of returns (in industries such as medical products, nutraceutical, pharmaceutical, health and food suppliers)
- Losing a customer forever

These all drive up the cost of a single error ever higher.

E-com and split case B2B each picking orders have the highest potential for picking errors and put your operation at risk to negatively affect customer experience and customer retention!

Remember, a single error can cause the loss of a customer. To minimize this risk, it's crucial for e-com success to close the pick & pack validation loop using the highest accuracy picking technology available, pick by voice. Voice technology eliminates sources of errors, and reduces secondary QC labor costs.

How Does Voice Work?

Voice picking technology utilizes voice commands to direct consistent and uniform practices across all the workers and includes built-in pick & pack validation practices. Voice directs operators to the right location and then validates the location and item quantity picking activities with barcode scanning validation. It results in an efficient, hands-free, eyes-focused operation.

The latest generation speaker-independent voice engine requires zero voice training, so new workers can be productive in a manner of minutes. Pick by voice directs SKU picking and scanning of SKUs, as well as lot/serial numbers in a "single pick-pack validation process." It also includes multilingual support, enabling workers to communicate in more than one language. This allows workers to log in and select their preferred language of choice.

Multimodal voice picking accuracy is extremely high at 99.99%. Some documented operations achieve even higher accuracy!

Voice Picking Technology:

- Eliminates errors

- Operates in a single touch pick and pack operation

- Reduces picking labor

- Eliminates the vast majority of secondary QC labor

- Reduces the internal costs of labor to resolve shipping disputes, costly time researching the issue, formulating a response, and reshipping an order due to an **avoidable** customer complaint

A Tier-1 voice picking system also measures SKU movement velocity in real-time and provides historical SKU velocity reporting analytics. This means SKU velocity can be used to re-slot picking zones based on their settable A, B, C movement. Picking with the right set of tools becomes a single-touch, pick-pack process with interweaved scan validation. It yields more than 30% productivity gains in most DC operations when compared to other picking methods resulting in **a very rapid return on investment.**

Smart Batch Picking

A batch picking process selects and executes picking of 15 or more orders at the same time, resulting in up to a **100% productivity gain** compared to a discrete order picking process. Voice picking software optimizes picking workflow by selecting and assigning orders based on the shortest travel path, cube of the orders, and groups orders with the same SKU picks on the same cart to increase the picking density.

What makes the batch picking *Smart*?

- Optimized Order Release - The Batch Cart is constructed with orders based on **Delivery Prioritization**, carrier cut-off times, or customer specific rules to improve service levels

- Selects orders based on the shortest travel path for both carts and fork trucks

- Groups like-SKU orders on the same cart to reduce location visits and increase picking density

- Cart Build Workstations - select and assign a dynamic group of 15 or more orders using the above parameters to direct the operator cart building
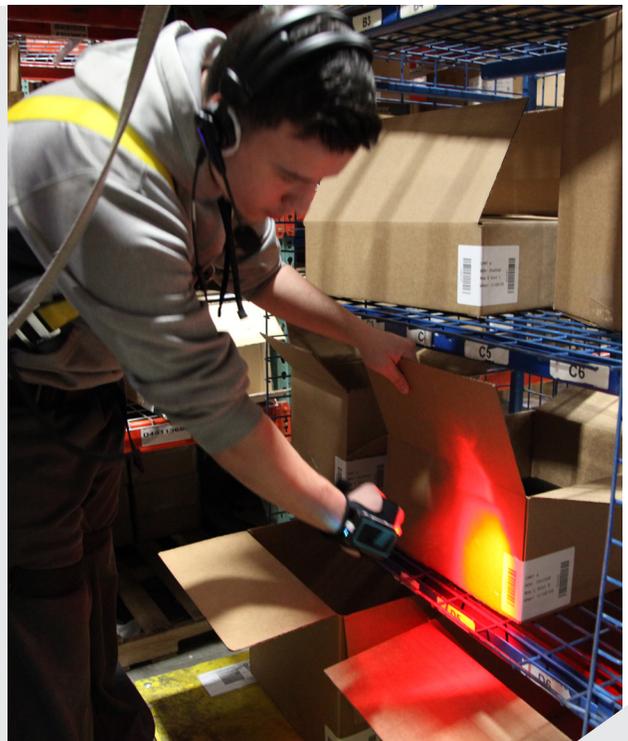
Looks at dimensions of products and stack-ability to determine Carton size and selects the optimal shipping carton so a picker becomes a mobile packer, and orders no longer get double touched.

Mobile Robots Are Ready to Report for Duty and Create Profit

Autonomous mobile robots (AMRs) also referred to as Collaborative Mobile Robots or cobots, are quickly evolving into powerful mobile machines ideally suited to work alongside operators to assist and increase productivity in order fulfillment operations. Cobots really excel within each and case SKU picking, and shelf or slow-moving SKU replenishment tasks.

Recent innovation in vision capabilities using an array of complex sensors allow very accurate aisle movement with excellent object and people detection. AMRs with industrial-hardened high performance computers, provide self-contained intelligence and pre-developed industry standard Web Service interfaces to receive and return positional movement, and transmit real-time feed-back commands.

AMRs differ from their "big brothers" automated guided vehicles (AGVs) because of their smaller size, improved autonomy, and adoption of more advanced guidance technologies originally developed in the self-driving car arena.
AMRs are nimbler and can navigate independently in order-picking aisle spaces, in cooperation with picking operators.
This makes AMR's easier to incorporate in highly productive processes such as batch picking.

Combining Batch Picking and AMRs Accelerates Order Fulfillment Performance

AMRs are increasingly being combined with best of breed software to operate and make decisions in real-time. This enhances the productivity of the batch pick cart in zone to zone travel assignments. The AMR and voice pick operators work in partnership. The batch cart picking operators receive a voice command to direct them to each pick location, perform pick validation, and put required items to the order's shipping carton, or tote using hands-free barcode item/lot SKU scan validation.

While picking operators focus on picking, AMR carts are directed to move autonomously to the order pick locations within zones, reducing unnecessary walking for workers and completely eliminating cart pushing, so more valuable time is devoted to order picking. An order picking solution that uses independent, low cost pick carts and AMRs to automatically pick-up and transport carts to each required pick location boosts efficiency and optimizes the performance of both pick operators and cart movement.

Numina Group's RDS™ Batchbot™- Voice Directed AMR Batch Cart Order Picking Solutions

Combining the advantage of voice-managed smart batch cart picking processes and a self-navigating fleet of AMRs significantly reduces the total quantity of collaborative robots needed at a DC by over 50%. Additionally, the batch cart surface area is 250% larger than the surface area of antiquated 4 tote collaborative robots commonly deployed using Generation 1 capabilities.

The latest generation AMRs have a dynamic range of perception and are easily trained to operate in ever-changing warehouse environments, moving from point to point in the most optimized travel path. Combining batch cart voice picking with AMR technology is an innovative automated approach that provides a cost-competitive alternative technology compared to the use of conveyor systems for order picking. At cart pick completion, the AMR delivers and drops off the batch cart at an automated pack and ship conveyor line to free up the AMR so it can immediately start the next batch order pick cycle.

Numina's RDS™ Batch-bot batch picking process is leaner, less restrictive and has a faster ROI than small capacity collaborative robots or a conveyor system installed in the pick zone aisles, while also eliminating wasted operator walk time and the fatigue and potential injury that results from pushing carts. Numina's RDS™ batch-bot can handle carts with up to 600 lb. loads, so picking 15 or more orders at one time or moving goods from receiving to put away is not a problem, but a problem solved!

It's Time to Increase the Flow in Pack and Ship

Once the picking and transport technology is defined, the focus moves to the "bottleneck" associated with an outdated or out grown manual pack & ship operation. If your operation is labor-intensive, there is technology available that will **reduce 70 to 100% of the labor in the packing and shipping processes.**

During the design process, review the current pack & ship processes and answer the following questions:

1 Have you missed shipment deadlines or carrier cut-off times due to inability to complete orders in time?

2 Are you relying on multiple operators performing the same repetitive tasks of selecting and building cartons, weighing, printing, hand applying labels, printing and inserting packing documents, void fill, and taping /sealing at each workstation?

3 Are you out of floor space and relying on temporary workers during holiday or peak shipment periods?

4 Do you have customer complaints due to missing items, wrong packing sheets, or missing documentation on shipments?

An optimized pack & ship area combines minimal conveyor blended with several automation technologies to eliminate duplicate handling associated with manual operations in an ergonomic manner. Packing and shipping becomes a continuous flow process with cartons transported to operators throughout the pack process.

Depending on order volume, even a smaller DC operation with 750 to 1,000 orders per day can easily justify a 4-5 user Batch Cart voice picking system, including a single automated pack line that consists of as little as 20' to 30' of powered conveyor.

The automated pack line incorporates an in-line weight and vision audit scale, an auto pack sheet print, fold, and insert station, an operator at a semi-auto void fill machine, and a semi-automatic or fully automatic adjustable taper/sealer to pack and seal cartons at rates of 6-12 CPM.

The pack line allows a single operator to perform what is typically the task of 2-3 people in a manual packing process. During the design, the pack area is scaled to the quantity of lines required based on peak shipment periods and processes.

At the exit of the taper, invest in the lowest cost and most proven robot for the distribution industry, print and apply label applicators! Print and apply labeling of compliance, packing slips/sheets, carton content, return labels, and shipping labels eliminates unnecessary manual touches and fully automates manifesting and shipping.

Print & Apply labeling systems can consist of single applicator or multiple applicators working together to process from 15 to up to 60 CPM while auto-applying 1-3 labels in both outbound and in-bound receiving applications.

Use a _camera-based multi-sided barcode scanning system_ and an in-motion weighing/dimensioning system to capture the data required to rate shop, label, transport, and sort to the required carrier shipping lanes or LTL pallet build area.

The savings in labor costs and CPM throughput obtained with an investment in pack and ship automation results in a rapid payback.

Manually Applied Pack Sheets are a Time Wasting, Inefficient, and Error Prone Thing of the Past.

Shipping Label   Removable   Packing Sheet

If you are required to put an 8.5" x 11" customer specific packing sheet, and/or both the pack sheet and a retailer compliance 4" x 6" label applied to the outside of the carton, consider automating this process. One-Step-Plus Print and apply labeling technology auto applies a full 8.5" x 11" packing sheet, shipping label, and ASN/Compliance labels in the correct position.

Numina Group's One-Step Plus™, an auto labeling technology, eliminates the labor of folding and inserting the sheets into a plastic pouch and also eliminates the equivalent work of 6 (Yes, Six!) or more operators. What has been a manual, error prone, labor intensive bottleneck, can now be fully automated, eliminating 45 seconds of labor from each shipment.

Conclusion

This guide is for DC managers who know their operations can be improved for greater profitability and would like to know about latest trends and technologies. However, we recognize that warehouse operations vary greatly, and many questions need to be answered to create the most optimal DC operational improvement plan for your company. If you have questions about developing a DC roadmap, how to choose the right technologies, and how to benchmark metrics for improvement, we're here to help.

Numina Group Delivers Proven Results

Numina Group is a leading warehouse automation system integrator. We consult with clients to provide process improvement assessments, and automation recommendations that will improve warehousing and order fulfillment productivity. Our turn-key design and automated order fulfillment machines deliver the greatest ROIs.

Lean and efficient automated processes save space while lowering labor and operating costs, resulting in 30% to 100% productivity improvements and accuracies of 99.9% or higher.

Numina Group's Real-time Distribution, WES-WCS Software, RDS™ is a high performance, adaptable family of pre-developed application modules that automate the entire pick, pack, & ship order fulfillment process.

Numina Group brings over 35 years of industry expertise in software, controls, design services, and system integration of the latest technologies to eliminate "bottlenecks" and excessive labor, while increasing accuracy in our customers' DC operations.

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