SCALING FOR PEAK SEASON DURING A LABOR SHORTAGE

MEETING E-COMMERCE DEMAND IN THE MIDST OF A LABOR SHORTAGE.

White paper written by:

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BACKGROUND

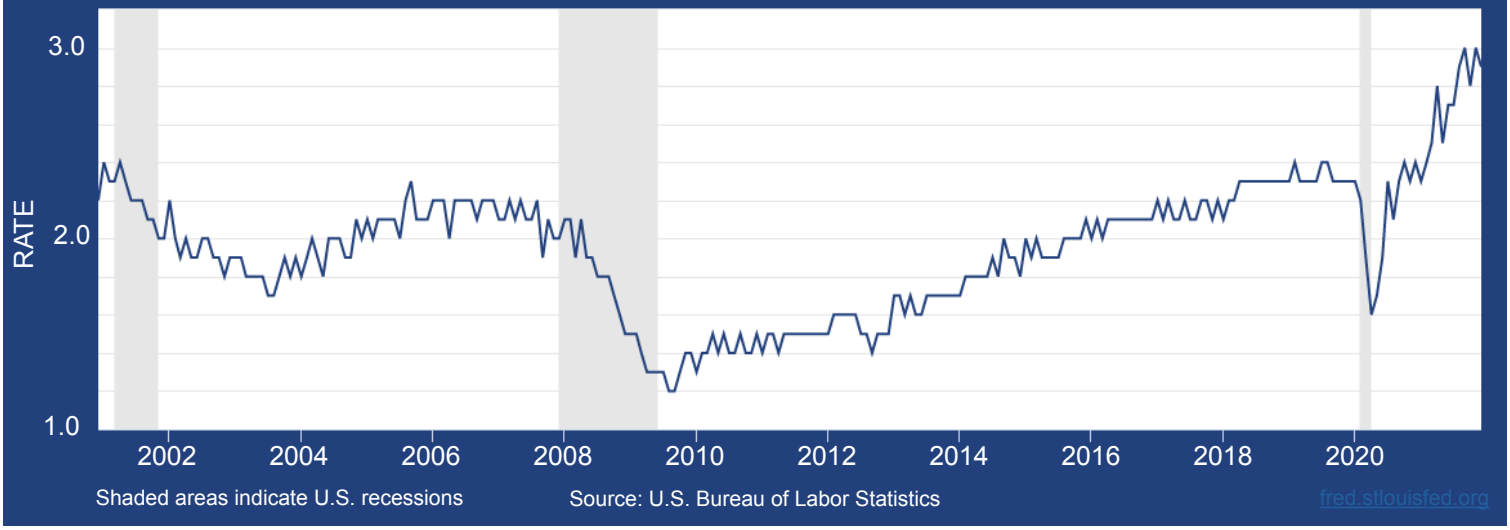
The supply chain, like any system or network of businesses, processes, or people, is not immune to societal disruption. The impact COVID-19 has had on global and local supply chains has been felt across all communities and industries. Beyond the sourcing of raw materials and the manufacturing of finished goods, the distribution, fulfillment, and consumer logistics portions of supply chains are going through a major inflection point, as it relates to the type of fulfilled orders.

Distribution and fulfillment businesses have been forced to fulfill the ever-growing and dramatic increase in small-quantity, eCommerce orders for end consumers. This type of order profile demands a different, and often more labor-intensive, fulfillment strategy. Couple this shift with today's struggles to attract and retain qualified employees, and there are questions organizations in the fulfillment industry need to consider. How and what do we adapt to offset a seemingly shrinking labor pool? What changes do we need to make to get through peak season on our current workforce? And how do we stay competitive in a market of increasingly tight Service Level Agreements (SLAs) given this environment?

DEFINING THE PROBLEM

One of the greatest challenges to any supply chain is meeting its labor demand. The COVID-19 Pandemic, which induced a national emergency declaration from the United States government and resulted in subsequent furloughs and layoffs, has caused disruption to the national labor pool. To further exaggerate the impact, in addition to furloughs and layoffs, the U.S. was, and still is, experiencing what is being referred to as "The Great Resignation". The chart below indicates a steep and (currently) escalating increase in the number of voluntary quits since its sharp decline in the beginning of 2020 and the implementation of COVID-19 restrictions.

TABLE 1: QUIT RATE, NONFARM



Another contributing factor to the labor shortage that will continue for years to come, is the exiting of the Baby Boomer generation into retirement. Baby Boomers, which hold the largest percentage of blue-collar positions, are leaving behind many open positions, specifically in the manufacturing, warehousing, and distribution sectors.

In addition to the shrinking labor pool, the pandemic has also given rise to a huge increase in eCommerce sales. With pandemic-related regulations forcing temporary (and in some cases permanent) closure to brick-and-mortar retail facilities, consumers adapted by virtual means. Online purchasing offers a different consumer experience including a larger selection of items but with the drawback of a waiting period to receive the items. Online retailers are experiencing higher-than-ever pressure to raise the bar to meet consumer expectations around convenience. In order to be competitive in today's landscape, businesses must offer fast SLAs, which is, in many areas of the country today, same-day delivery.

TABLE 2: ONLINE RETAIL SALES

Economy	Online Share (% of retail sales)		
	2018	**2019**	**2020**
Australia	5.6	6.3	9.4
Canada	3.0	3.6	6.2
China	18.4	20.7	24.9
Korea (Rep.)	18.2	20.8	25.9
Singapore	4.7	5.9	11.7
United Kingdom	14.9	15.8	23.3
United States	9.9	11.0	14.0
Economies Above	14	16	19

Source: UNCTAD, based on national statistics offices.

All of these factors add to a facility's demand for labor, and that demand is only further amplified during peak season. A conventional solution to seasonal demand is to hire seasonal labor, often at increased wages that help lure potential workers. In today's environment, this expense may not be feasible, especially since companies are competing in the same depleting labor pool. Hence the question, "How do I maintain strict, same-day SLAs when there aren't enough workers, especially during peak season?"

This paper walks through potential ways to maximize current associate output, which is crucial during peak season. We also describe how process optimization and automation can help reduce or even eliminate the need for workers to complete non-value-added tasks.

PROCESS OPTIMIZATIONS FOR PEAK SEASON

There are many ways to help reduce the labor strain of peak season on a facility. An initial effort should be taken to look at potential operational changes that could improve a facility's performance whether that is improving a facility's throughput, reducing labor-intensive operations, or improving order accuracy. These initial changes deal mainly with eliminating wasted effort and travel, more accurately matching an order picking strategy with peak season business order profiles and allocating product to positions that help reduce travel and are easily accessed.

This section outlines key areas to evaluate prior to any major overhaul. A factor to consider is that as a business changes, the effectiveness of its current strategy will alter as well; what worked two years ago may need to be updated to meet a changing forecast, a changing product mix, or a changing competitive environment. Hence, this effort should not be a one-and-done task, but rather a planned, periodic evaluation.

Eliminate Waste

A large area of opportunity, and perhaps some of the easiest opportunities to spot, is noticeable, operational waste. In the context of this paper, waste refers to labor spent on unnecessary tasks, motions, or waiting time. Taking these one-by-one, an unnecessary task is one that adds no value to the process. Here, it may be easier to define tasks that add value. In general, the following three points summarize a valuable task:

- The step must be performed correctly the first time
- The task must change the form or function of the product or service
- The customer must be willing to pay for the change

A task that does not meet the above points should be evaluated as a potential task to remove. For example, if an order-picker is directed to pick to an outbound carton, only to have orders assigned to specifically sized outbound cartons at packout, the activity of assembling the carton for order-picking may be an unnecessary and wasteful task.

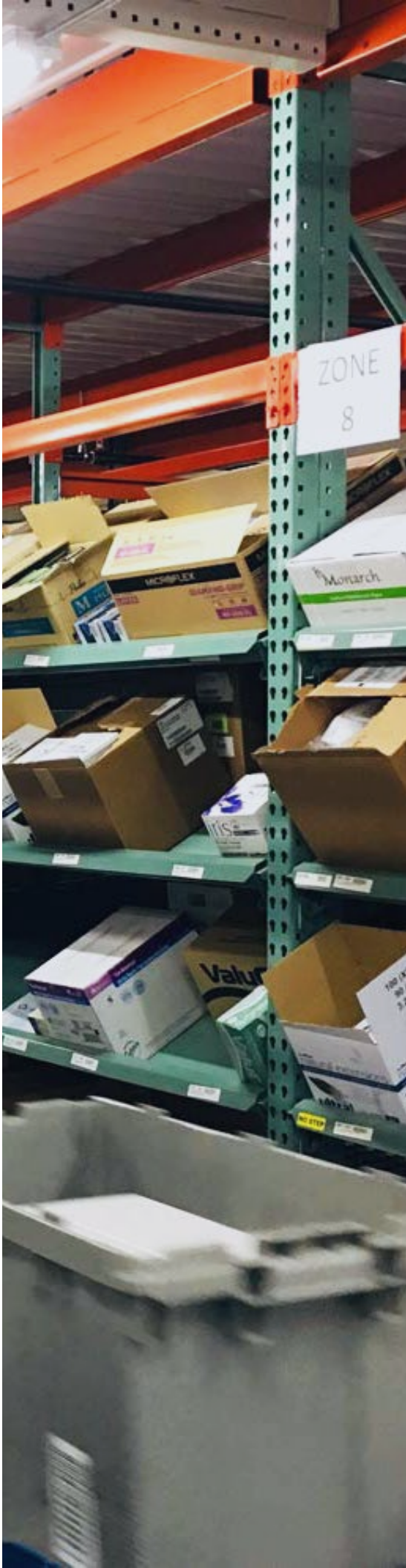
The second wasteful task on our list is unnecessary motions. Unnecessary motions generally come in the form of excessive travel for both people and product. Eliminating any amount of travel for an associate can add to the their productivity. As an example, suppose that all product received in a facility must be put away to a reserve[2] location before making its way to active[3] picking locations. In this situation, product may be hauled and stored in reserve, only to be replenished to active picking the same day as being received. Here, the ideal situation would be to allow direct to active put-away. Correcting this would eliminate travel to reserve on any product that can be put away directly to active locations.

The final wasteful task is waiting time. Waiting time refers to an associate's on-the-clock downtime waiting on work. Waiting time can have dramatic effects on productivity. If associates are spending a fair amount of time waiting on other associates to complete tasks, the facility is not getting the most out of its current workforce.

As an illustration, consider an associate assigned to replenish a pick module where product for replenishment is hoisted to the correct level by fork truck. If the associate is capable of replenishing 75 cases per hour, but the fork truck operator can only deliver 35 cases per hour (perhaps due to the task of pulling cases from reserve), there will be time that the replenisher is waiting for work. Outside of assigning additional fork truck operators, a possible solution would be assigning additional tasks to the replenisher, such as order picking or inventory control tasks.

Order Picking Strategy

Another way to help optimize a fulfillment facility during peak season is to choose an order picking strategy that supports the order types prevalent during peak season. For example, if a facility's peak season sees the bulk of its units transitioning from retail to e-commerce, it may be best to move from discrete order picking to a batch-and-sort order picking strategy.



[1] Order picker, referring to a person, versus a vehicle, often used for order picking.

[2] Reserve locations are storage areas that are not available for order picking.

[3] Active locations are storage areas that are picked from to fulfill orders.

This is especially true if the percent of single line, single unit orders jumps dramatically during peak season, given that this order type can be batched without needing sorted prior to packout.

To be brief, some of the basic order picking strategies to investigate include batch-and-sort versus discrete order picking, cluster cart picking versus pick-to-pallet, picking technology such as pick-to-light or pick-from-voice versus RF handhelds, zone picking versus full order picking, and wave versus waveless order release. All these topics are addressed in greater detail in the paper: *Order Picking Solutions: Understanding Your Options.*

Dynamic Slotting

The final method covered here to help optimize productivity, which in turn reduces labor needed to perform tasks, deals with product slotting. Slotting refers to the positioning of product within a facility. As an illustration, if a facility is picking from standard pallet rack, the product at floor level is more efficiently picked than the product above. Therefore, if item A is picked twice as often as product B, and it takes half the time to pick from ground-level than above, placing item A at ground-level increases productivity 20%.

With that said, to help reduce labor strain during a peak season, an effort to re-allocate a facility's locations (slots) should happen prior to peak season. The goal with this effort would be to allocate the fastest movers to prime picking locations that are both easily accessible as well as close to any available automated product transfer, such as conveyance.

AUTOMATION FOR PEAK SEASON

Starting with process optimizations allows a company or facility the ability not only to chip away unnecessary costs, but it also provides the opportunity to gauge the optimal performance available to meet daily and peak demands. Often, a facility's current workforce alone, operating under optimal performance, is not enough to cover peak season demand. After the optimization efforts, focus can turn from eliminating wasteful tasks to eliminating manual tasks. That means understanding which tasks can, and probably should, be automated to help reduce and eliminate peak season labor surges.

There are many tasks a in fulfillment facility that are easily automated, and there are other activities that are very difficult to automate.

An activity involving several decision points that require very different reaction tasks may be more difficult to automate than an activity with few decision points and closely related reaction tasks. For example, product transportation generally involves the task of taking product from one area to another. The decision involved is where to take the product, but the reaction task is the same. That is, product transportation is an activity that requires labor which is easily automated. On the other hand, an order packing station receiving orders that may need gift wrapping, protective packaging, personalized messaging, unique packaging material, targeted promotional material, hazmat legal compliance requirements, or a variety of other specific requests, may be an activity more difficult to automate.

Automation allows us to rid labor in performing a task. The trade-off is, of course, its expense and any additional space and maintenance required. Automation is not quite the same as saying, "we need an additional 50 workers this season." An automated solution needs to be vetted and justified as an expense worth investing. Hy-Tek completes return-on-investment (ROI) analysis for each business case, suggesting which technology offers the best return to help justify the capital investment made.

Low-Budget Automation

Low budget automation refers to technology that installs quickly, supports a high volume of activity, and requires comparatively little capital; it is the ideal first step when considering automated task replacement. The remainder of this section provides examples of low budget automated solutions.

A mobile A-frame is a common eCommerce order fulfillment solution that works well with small, boxed items, cylindrical bottles, and "hockey puck" style packaging that have a high throughput. It's a piece of automation that can be relocated and reconfigured based on inventory slotting and pick method optimizations that accompany a higher seasonal demand. The Mobile A-frame dispenser stores product in vertical channels and, once aligned with a takeaway conveyor, quickly and effectively dispenses product either to tote or outbound shipping carton.

Another popular peak season solution is the addition of mobile sortation like the ModSort. The ModSort is a movable sortation conveyor that can pass products through an area or divert product to an order destination or downstream process.

An increase in the number of outbound order packages during peak season means there are more items to be moved and sorted. In case the current conveyance and sortation solutions cannot support the influx of orders during peak, multiple ModSorts can be quickly implemented to handle the higher throughput.

In addition to mobile sortation technology, there is technology that can automate more simple non-value-added tasks such as labeling. The task of labeling is a crucial part of the outbound process, and if other upstream processes are being optimized to increase throughput, the area where labeling occurs could create a bottleneck for a portion of the facility. Adding Print and Apply technology (PandA) will automatically print labels and apply them to outbound orders, increasing labeling speed and accuracy.

Manually constructing outbound cartons, packing orders, weighing orders, sealing cartons, and labeling cartons, slows order throughput in the packout area. Few companies have the space or labor to implement additional packing stations just for peak season, and as mentioned above, finding temporary labor is more of a struggle now than ever before. There are many automated solutions for packing including autobaggers, autolabeling, dunnage fill, and automatic corrugated box makers that alleviate the pain of the labor shortage and keep up with demand of peak season.

Static Automation

Static automation refers to technology that is relatively inflexible and non-scalable. By design, it needs to be calibrated during initial setup and implemented to meet peak season throughput requirements, versus a technology that can be scaled up as demand increases. Companies strive to achieve high year-over-year revenue growth, so if static automation is introduced to meet only next year's demand, it may not be able to support the demand of the following year. Therefore, automation technology is generally calibrated to meet the demand for a five or even ten year projection. Hence, if the calibration is too low, so too will be the technology's output.

The most obvious static automation deals with fixed storage and transportation. Conveyance and sortation replace non-value-added material movement as well as enhance value-added tasks, allowing associates interacting with the material to do so more efficiently. Conveyors are used to move material or product from one place to another, such as between receiving and shipping areas in a distribution center or various cells in a manufacturing facility.

The sortation conveyors are commonly implemented to work in conjunction with conveyors, sorting material or product to various order or inventory destinations. To meet the demands of fast peak season SLAs, conveyors and sorters must be smart, fast, and efficient components of an operation.

During peak season, SKUs are moving faster than non-peak season which increases the number of trips and time spent on inventory replenishment and picking tasks. An automated storage and retrieval system (ASRS) can reduce the labor costs associated with replenishment and picking, track inventory more accurately, and offer denser storage, as the aisle ways are commonly narrower. An ASRS consists of computer-controlled systems that automatically store and retrieve inventory from storage locations. There are a variety of technologies that fall under the ASRS category, but they are all typically used in applications where there is a high volume of products being moved into and out of storage and where a high-density storage system is needed due to space constraints.

Dynamic Automation

Dynamic automation refers to scalable solutions that do not necessarily have to be calibrated for a five- or ten-year demand forecast. This type of automation acts as a risk mitigator in the sense that the demand projections do not have to be 100% fulfilled on day one. For example, robotic solutions can scale one year at a time, spreading out the investment.

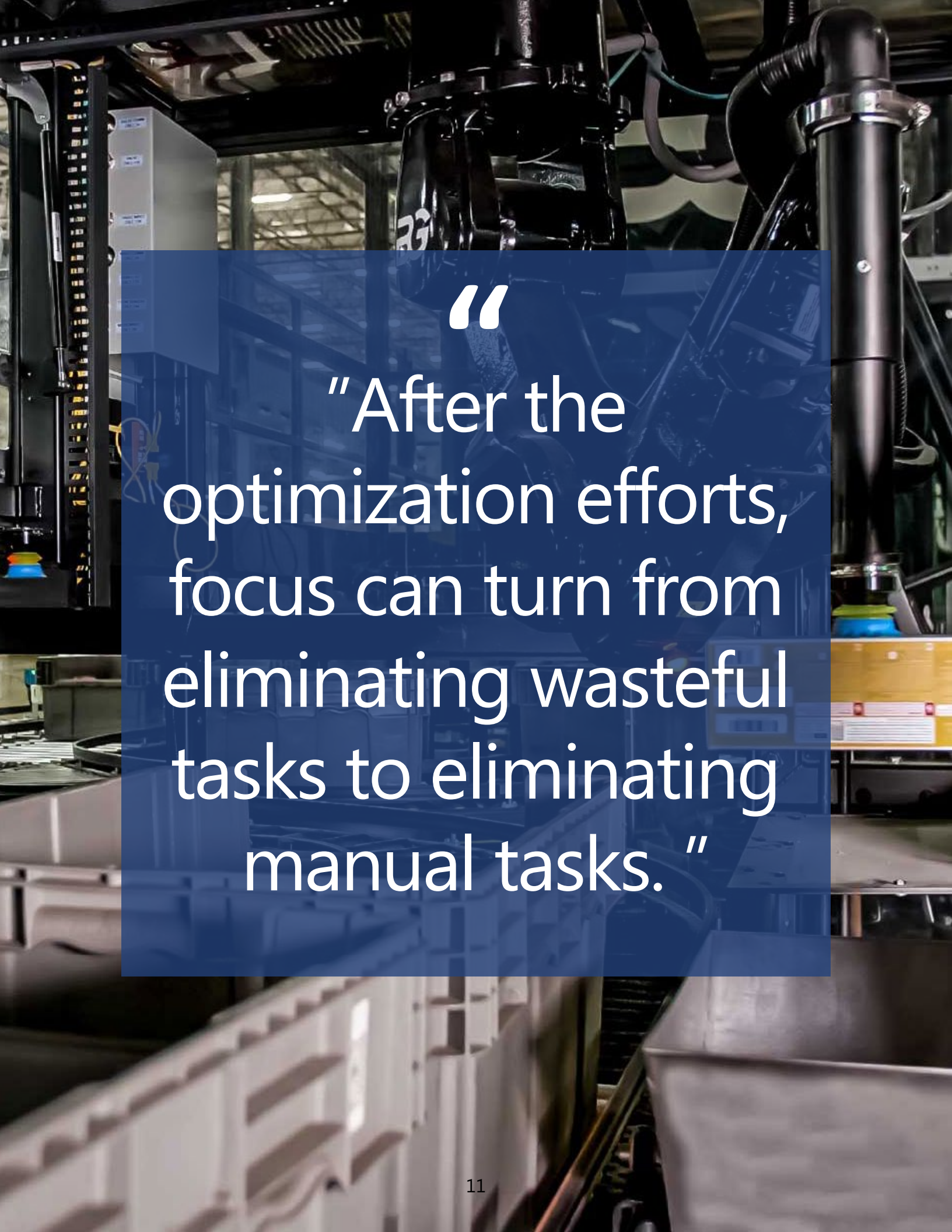
Accurate and speedy order fulfillment seems to be the largest struggle for fulfillment centers during peak season. A goods-to-person technology, such as Exotec or Caja, that reduces the amount of time spent walking is a great solution to meet peak season demand. A goods-to-person solution essentially means that inventory bins containing items to be picked for orders is brought to stationary pickers versus order pickers walking to bin locations. The specific Exotec approach to picking means that, on average, a single picking operator can pick from up to 450 locations an hour. The key to an effective solution is to understand which products to store in the goods-to-person picking system to account for SKU velocity and optimal slotting locations. The system can scale with the business by adding more racking, more robots, or more pick stations depending on which processes need to be optimized.

By using Autonomous Mobile Robots (AMR) for material movement and automated pallet transport, employees' time can be repurposed

from point-to-point transportation to focus on more value-added operations. AMRs are self-driving collaborative vehicles that navigate around people and objects without the need of a track. This technology is typically utilized to complete activities that do not require specialized tasks and decision making, thus allowing associates to focus on tasks that do require a more advanced level of training. Interchangeable top modules for the MiR robot (a specific AMR) allow for materials of different shapes and sizes. The flexibility of AMRs is endless and the solution is scalable.

As we have discussed, technology and robotic systems increase performance and output as the system size scales, however, it also introduces a new level of complexity and dimensionality. If the systems are not scaled properly, coordination among units can introduce overhead with an impact on system performance which could result in a diminishing rate of return per robot. To avoid a linear increase of operating and maintenance costs, the number of mistakes (commonly referred to as “exceptions”) per robot must go down as the growth operation continues. This would induce a greater return and, most importantly, higher customer value.

How do you know that you are implementing the most cost-effective solution? How many robots do you need? What assurances do you have that the robotic solution has been optimized and will continue to be optimized? These are questions that an experienced systems integrator like Hy-Tek can answer.



"After the optimization efforts, focus can turn from eliminating wasteful tasks to eliminating manual tasks."

To prepare for peak season demand, the first (and most rational) step is to optimize the current process. Simple process optimizations can dramatically increase throughput and reduce labor costs without investing in heavy machinery or robotic technology. Once an optimized baseline is determined for the manual processes, it is then time to consider further optimizations which may be achieved by introducing the use of robotics.

Proper robotic implementation is not a quick process when considering the data, calculation, and forecasting that must occur prior to deployment. Our experts recommend preparing at least eighteen months in advance for larger scale automation solutions to ensure that proper testing can be completed prior to peak season.

WHAT'S NEXT?

Are you ready to start assessing improvement opportunities or ways to increase capacity within your distribution network? If yes, then contact Hy-Tek Intralogistics today. Our specialized team will work with you to understand your business targets, develop a customized plan specific to your company, and put the appropriate systems and technologies in place to help your facility optimize its processes.

Give us a call at **1-800-891-5504** or email us today at **info@hy-tek.com.**