White Paper

Calculating the Cost of Labor

kardex remstar

The Labor Challenge

Regardless of where a manufacturing or distribution facility is located within the U.S., labor is widely accepted to be one of the biggest operational costs. According to the U.S. Department of Labor's (DOL) Bureau of Labor Statistics (BLS) most recent figures, companies in the Warehousing and Storage subsector (North American Industry Classification System/ NAICS 493), have seen rising labor compensation rates (~32% over 5 years) and labor hours worked have decreased (~2% over 5 years).[1]

Further, adding warehousing labor has become an increasing challenge. Unemployment rose drastically in April 2020 due to COVID. After the unemployment peak in summer 2020 (15.7%) unemployment within the BLS Warehousing and Storage parent sector, Transportation and Warehousing has dropped down to right about 4% in 2022 – on par with 2019 levels.Unemployment in this sector remains stable hovering just over 4% in the past 2 years.[2]

Even with unemployment returning to more normal levels post pandemic – when surveyed, more than 250 top logistics and supply chain managers said their three biggest workforce challenges revolve around labor:

1. Finding and keeping qualified/skilled/dependable workers (62%)

2. Increasing workforce productivity (57%)

3. Controlling labor costs (45%)[3]

As labor continues to remain a top challenge, many manufacturing and distribution operations are considering automated storage and retrieval systems (ASRS) to boost operational productivity while prioritizing worker health and safety.

Automated technologies

Automated technologies maximize storage density, and provide workers more distance from one another by eliminating pickers walking up and down aisles and search for stored items—an activity that can waste as much as 60% of their productive time.[4] Automation keeps workers safe within their assigned workstation, less fatigued and more productive. Installing one of these systems can cut labor requirements by as much as 66%, enabling current employees to be reassigned to more value-added work while easing hiring pressures and labor expenses.

Vertical Carousel Module (VCM)

Comprised of a series of shelves that rotate around a track – similar to a Ferris wheel – these automated storage and retrieval systems quickly deliver stored items to an ergonomically positioned work counter at the operator's command. When compared to static shelving and rack, they save up to 75% of floor space.

Learn more about VCMs.

Vertical Lift Module (VLM)

An enclosed automated storage and retrieval system that incorporates two columns of trays with a central inserter/extractor that automatically locates and retrieves stored trays from both columns, then presents them to the operator at a waist-high pick window. These systems save up to 85% of floor space compared to static shelving and rack.

Learn more about VLMs.

Vertical Buffer Module (VBM)

In the middle of a multi-segment shelving system is an aisle, where a moveable mast with a telescopic gripper operates. The control unit sets the gripper in motion picking a bin and transporting it to a picking station.

Learn more about VBMs.

Benefits of ASRS

Further reducing labor costs associated with injuries, liability insurance and downtime, ASRS minimizes the risk of injuries. That's because they deliver products to operators at ergonomic workstations at the optimal work height: waist-high. The workstations are designed to minimize stretching, pulling, bending, twisting and reaching, preventing the overexertion that leads to musculoskeletal injuries (which cost U.S. businesses $19.37 billion in direct workers' compensation claims yearly.)[5]

In addition, goods-to-person picking systems can also speed up item picking for a boost in throughput, yielding higher rates of product picked. This allows an operation to extend order cutoff times, so more orders can be filled within a day, or to pick up to 400% more items with the same number of workers during the same amount of time.

In addition to providing a great social distancing solution, ASRS can reduce overall labor costs and provide a fast ROI. This white paper demonstrates two calculations that contribute to calculating the true cost of productivity within a manufacturing or distribution facility—labor costs and throughput—and details the potential costs of worker liability insurance and downtime. It also shows how an investment in ASRS as a replacement for static shelving or rack will yield significant productivity gains for a facility in each of these areas.

Reduce labor required by 2/3

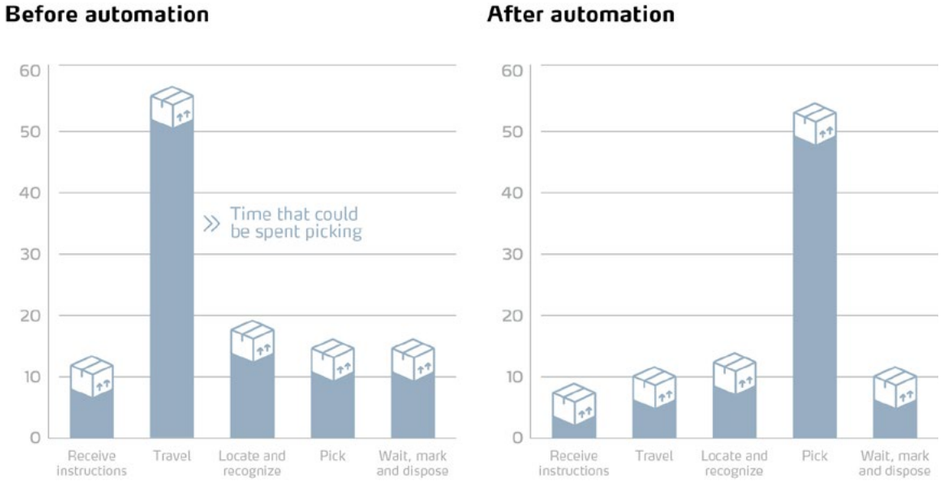
Save up to 85% floor space

Improve worker ergonomics

Manual vs automated picking operations

Picking involves much more than grabbing an item off a static storage rack or shelf. In the typical manual operation, picking means a warehouse associate receives a paper list of instructions about what to pick and where, travels to the correct storage location, refers to the paper pick list to determine the number of items required from the pick face, picks the items, confirms the pick by marking the paper, then delivers the items for packing.

In a manual picking operation, overall the worker spends over 50% of their time traveling to the item to pick. In an automated picking operation the items are delivered to the worker, reducing travel time to just over 10% of their time. Automation allows a worker to spend over 50% of their time actually picking items - making them far more productive than a worker in a manual picking operation.

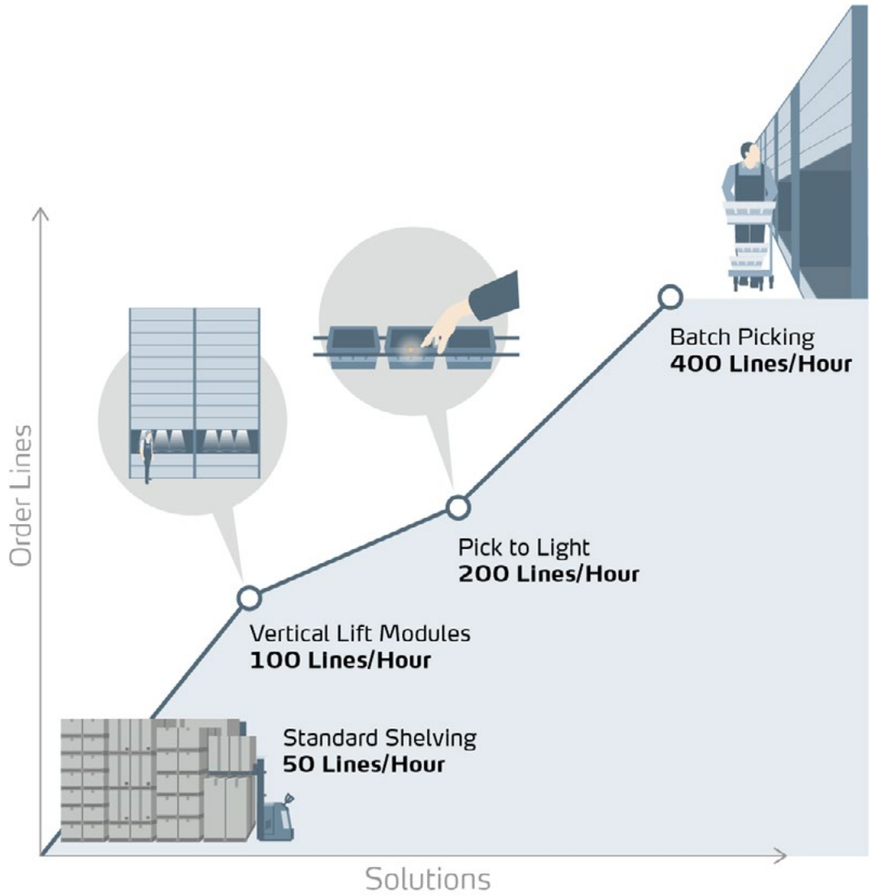


The power of ASRS

In a manufacturing facility, components and maintenance and repair operations (MRO) parts storage are frequently a considerable distance away from the production line. Likewise, most distribution centers are packed with pallets, cases and pieces. That's because travel and search time in a manual storage operation can account for as much as 60-65% of a picker's time.

Implementing one or more ASRS in a facility lets associates work more productively. These technologies present stored items directly to an operator. The "goods-to-person" method eliminates time spent walking from one pick location to another within a warehouse. Equipped with pick-to-light technology, the item's location and quantity required are displayed for accurate picking, dramatically reducing the time spent searching for a specific stock keeping unit (SKU).

ASRS interfaces with both inventory management and order management software. Picks are sequenced so the machine's movement is optimized to match the required picks. This means all items can be picked in one rotation, or cycle, of the machine's storage bins or trays, maximizing pick time.

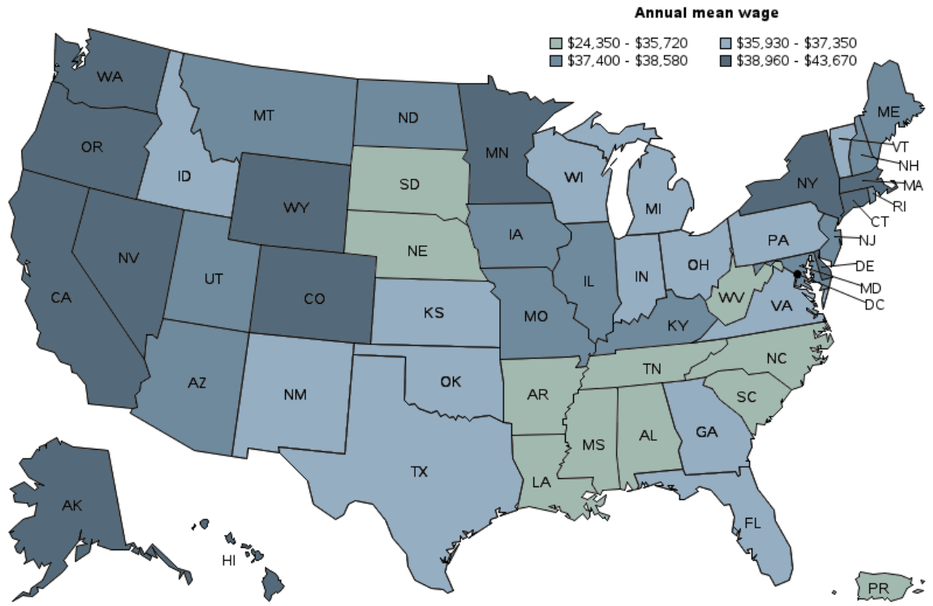


All three of these functions can optimize an existing labor force, increasing productivity from 200% to 600%. Because an automated solution enables just one worker to handle the picking assignments of multiple operators, as many as two-thirds of a facility's workforce can be reassigned to non-picking tasks without a loss of throughput.

Facilities implementing an automated solution to increase picking capacities most often choose to maintain current labor levels. Increased picking capabilities enable the consolidation of multiple picking operations, meeting increasing order demands and accommodating the addition of more SKUs to inventory. Alternately, implementing these solutions can compensate for scarce or unreliable labor.

Regional labor costs
Regionally, the annual mean (average) wage by state for workers who pick inventory – what the BLS terms as "Material Moving Workers – Stockers and Order Fillers" – ranges from $24,350 to $43,670 as shown.[6]

Nationally, the BLS reports 451,860 people employed in this occupation in the warehouse and storage industry with a mean hourly wage of $21.13 and a mean annual wage of $43,950 (neither of these numbers are fully burdened.[6] To calculate the cost of benefits – such as health insurance and retirement savings – add another 36% to these wages.) For the purposes of this calculation, we've used the fully burdened mean annual wage of $59,772 ($43,950 mean annual wage plus 36% for benefits).



BLS annual mean wage map of material moving workers by state[6]

Productivity rates

Operators picking manually are often restricted to filling one order at a time, which severely limits productivity. Restricted to paper pick lists and a lack of picking optimization software, they may visit the same popular SKU pick faces multiple times in a day. For a facility with static shelving or pallet rack, this translates into pick rates of approximately 50 lines per hour.

Alternately, an ASRS facilitates batch picking. This process groups orders with a common item, or items, together so that multiples of the same item are picked during one visit to the pick location, then sorted to their appropriate order totes for shipping at a nearby workstation. This means multiple orders can be filled at one time – up to 750 lines per hour, as shown in Table 1.

Table 1: System Comparison – Picking Rates

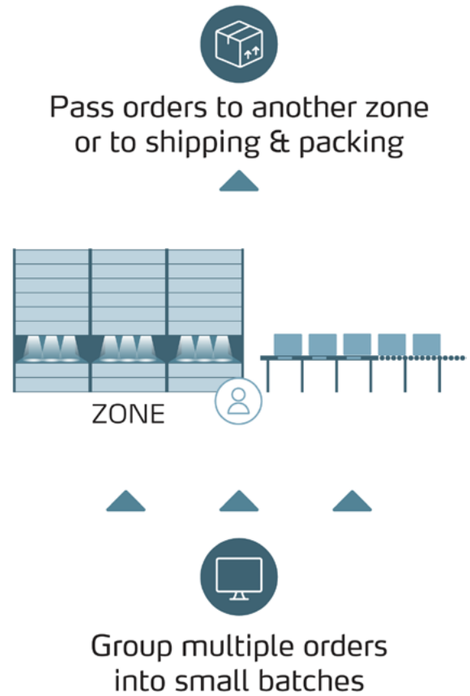
System	Bag & Tag (lines per hour)	Pick & Toss (lines per hour)
Shelving	10 – 35	30 – 75
Drawers	10 – 35	30 – 50
Flow Rack	25 – 45	75 – 150
Pallet Rack	35 – 60	95 – 200
Horizontal Carousel Module	75 – 200	225 – 750
Vertical Carousel Module	50 – 175	150 – 225
Vertical Lift Module	50 – 150	125 – 175

Calculate your potential space savings with ASRS

Because Horizontal Carousel Modules, Vertical Carousel Modules, Vertical Lift Modules and Vertical Buffer Modules utilize integrated inventory management software, batch picks can be completed in a single rotation, or cycle, of the unit. Batch picking with an ASRS eliminates bottlenecks associated with waiting for one last item to complete an order or to finish a manufacturing process. Should a “hot pick” come up, the ASRS easily accommodate a pause in the batch picking sequence, allowing a non-batched order to be fulfilled on demand to prevent additional holdups.

Batch picking can also be used to prioritize orders by importance or by inventory availability. This enables customer order cut-off times to be extended, increasing a company’s competitiveness and customer satisfaction.

Batch picking

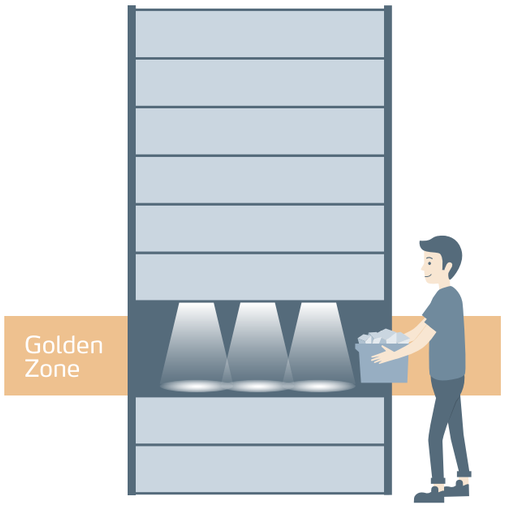


Other considerations: reducing/reduced worker injuries and liability

Manual picking operations utilizing shelving or pallet rack for item storage frequently require a picker to reach, bend, lift, twist, stretch, push or pull to retrieve inventory. That's because these storage units are characterized by poor visibility of products in the back or up high, and unsafe picks due to the stored products' height or distance from the pick face.

To avoid potential injury, it is often recommended that workers pick items from the "'golden zone,' which extends from the belt height to the shoulder height of the average individual. Items within this zone can be grabbed or moved without either stretching or bending."[7]

In contrast, ASRS present stored items at the proper ergonomic, waist-high work height. This creates a safe working environment that minimizes injuries. Walking long distances or climbing ladders are no longer necessary. Not only does this reduce fatigue, but also the chance of worker injury is substantially reduced. In turn, absenteeism, insurance premiums and claims for worker's compensation are lowered.



Those costs can be high. The Occupational Safety and Health Administration's (OSHA) has found that: "...warehouses produce an above average number of worker injuries when compared to other industries. Citations against employers for safety violations begin at $7,000 each, and costs run high for medical care and legal battles related to injured workers.... When an accident hurts a warehouse worker, the direct expenses, like medical care, reach an average cost of $38,000. Indirect costs equal $150,000 on average per accident victim. If an OSHA investigation finds that an employer repeated a previously cited offense, the fine could rise to $70,000.[8]

Productivity improvements from ASRS

Three Kardex Shuttles help Diversco Supply increase order fulfillment productivity by 460%.

Canadian company Diversco Supply is a leading equipment wholesaler, specializing in equipment and supplies for propane and gas, compressed air, scuba and watersports. At the company's largest warehouse (52,000 square feet) in Cambridge, Ontario, it had become a struggle to manage the diverse inventory: a combination of smaller parts (valves, regulators, hoses, snorkels, fins, etc.) and large parts (kayaks, paddle boards, etc.).

Within the Cambridge facility, Diversco installed a combination of three, 32-foot tall Vertical Lift Modules Kardex Shuttle integrated with Kardex Power Pick System inventory management software to manage the smaller parts inventory (4,500 SKUs), while large item inventory (400 SKUs) is kept in standard rack and shelving and picked with handheld RF scanners.

For small parts picking, the web-based ERP sends orders to the inventory management software for fulfillment. A tote is assigned an order ID and a customer ID and is placed in an open position on the batch station. When ready, the operator starts the fulfillment process with the click of a button and the VLMs move to retrieve the parts required for the selected orders.

Light-directed picking systems integrated into each Kardex Shuttle direct the operator to the exact item location within the tray. The operator picks the correct quantity of the item, confirms the pick and turns to the batch station to distribute the items among the orders. Simultaneously, the other Kardex Shuttles retrieve additional inventory required for the batch of orders. The operator is rarely waiting for parts, the VLMs are always working one step ahead of the operator, contributing to a significant boost in productivity.

While labor requirements have remained the same, efficiencies have skyrocketed. With five full time workers (one worker in the small parts VLM area, two workers in the large item rack area and two workers in shipping) Diversco is filing orders faster than ever. Productivity has increased from 25 lines per hour to 115 lines per hour (and accommodated an additional new bag-and-tag step), resulting in a 460% increase in productivity.

Adding the VLMs prompted "a complete transformation from a manual picking environment of walking and searching to a semi-automated process," said James Huddle, purchasing and operations manager at Diversco Supply, "The compact storage, time savings and ease of use completely offset the cost of the system."

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