



WHITE PAPER

Benchmarking and improving distribution center metrics

Best practices to optimize warehouse operations and lift truck fleet utilization for 2023

Whether replenishing retail locations or facilitating direct-to-consumer deliveries, you're tasked with moving inventory more efficiently than ever to meet growing demand, making accuracy and flexibility imperative.

And in order to compete as a modern warehouse, metrics are critical to help you identify latent inefficiencies and power through daily work and peak challenges. But what distribution center (DC) metrics are most valuable? What should you lean on to shape business strategy and ultimately drive customer satisfaction?

The top 12 DC metrics in the 2023 Warehousing Education and Research Council (WERC) DC Measures Report reflect the demands of customers in the era of e-commerce - and how distribution and fulfillment operations are serving them.

This white paper presents top metrics from the 2023 WERC DC Measures Report, and highlights best practices to help leverage lift truck fleets for best-in-class performance.



Top 12 warehouse operational metrics

The 2023 WERC Report revealed a new top 12 metrics reported from warehouse professionals.





1. Percent of orders with on-time delivery
2. Shipped complete per customer order
3. Shipped damage-free (outbound)
4. Correct documentation
5. Peak warehouse capacity used
6. Average warehouse capacity used
7. On-time shipments
8. Order picking accuracy (percent by order)
9. Part-time workforce to total workforce
10. On-time ready to ship
11. Dock-to-stock cycle time, in hours
12. Overtime hours to total hours

YEAR-OVER-YEAR CHANGES

Most of the metrics from the top 12 of the 2022 list remained within that group this year. However, there was a noticeable shift at the top of 2023's rankings, demonstrating an increased focus on customer service. The new top four are all customer-facing measures and represent the perfect order index, a score that measures the four major components of a perfect order: delivering orders on-time, shipping them damage-free, complete and with correct documentation. These metrics displaced the most commonly used metric for each of the previous two years, average warehouse capacity used. Correct documentation boomeranged back onto the list after falling out of the top 12 last year. Another change worth highlighting: part-time workforce to total workforce and overtime hours to total hours leapt into the top 12 this year after falling outside the top 20 in 2021 and 2022.

Lift truck operations and best-in-class

Lift truck operations identified several of the top DC metrics ranked as most important in the WERC Report, including shipped damage-free, average warehouse capacity used, on-time shipments and dock-to-stock cycle time. The table below summarizes what the 2023 WERC Report revealed as best-in-class performance for these metrics.

METRIC	DESCRIPTION	BEST-IN-CLASS MEASURE*	YEAR-OVER-YEAR TREND
 Shipped damage-free	Percent of customer orders shipped in good and usable condition, not including orders damaged in transit.	$\geq 99.4\%$	Down slightly from 99.6%, indicating that minimizing product damage remains an important challenge.
 Average warehouse capacity used	Average amount of warehouse capacity used over a specific interval, such as a monthly or yearly window.	$\geq 95\%$	No change from the previous best-in-class performance classification, indicating consistent performance despite a reduced focus on the metric.
 On-time shipments	Percent of orders shipped at the planned time, meaning off the dock and in transit to its final destination.	$\geq 99.5\%$	Best-in-class performance decreased slightly from 99.8% to 99.5%, indicating a continued challenge for warehouses.
 Dock-to-stock cycle time	Time elapsed between the arrival of goods and when they are put away and recorded into inventory management systems.	< 3 hours	No change in best-in-class cycle time, indicating warehouses have maintained but not significantly improved performance.

*Best-in-class operations exhibit a level of performance that falls within the top 20% of all respondents.

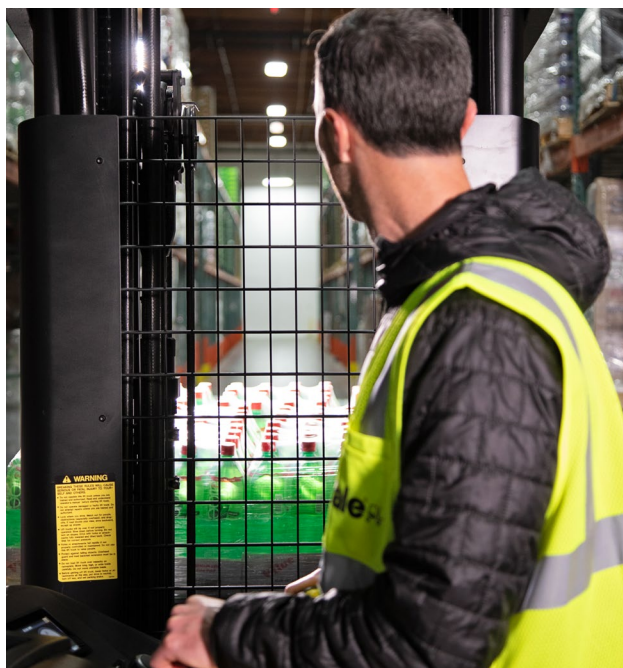
Shipped damage-free

Best-in-class operations ship outbound orders damage-free more than 99.4% of the time. Achieving this level of performance requires lift truck operators to maneuver through tight spaces like narrow aisles and trailers, and to carefully lift and place loads without impacts or incidents that could damage product or packaging. Two factors that can help reduce damage include:

- Implementing an operator assist technology
- Using equipment with maximum visibility and maneuverability

IMPLEMENTING AN OPERATOR ASSIST TECHNOLOGY

Products can easily be damaged when a load slides off forks, a truck hits racking or other equipment or if a fragile load is lowered too quickly, slamming it on the floor. An operator assist system (OAS) can automatically intervene to help operators maintain lift truck and load stability and avoid potential hazards. Such a system keeps the operator in ultimate control of the lift truck, but proactively adjusts truck performance based on real-time conditions. Whether the intervention is a reduction to travel speed or a smoothing of fork lift and tilt movement, certain advanced systems even monitor the combined stability of the truck and load to apply carefully measured adjustments that avoid abrupt shifts or jerks that can upset stability.



USING EQUIPMENT WITH MAXIMUM VISIBILITY AND MANEUVERABILITY

A clear view – to the forks, the load when picking and placing, and to the aisle when traveling – is important for precise, efficient handling of product. Lift truck design that prioritizes operator sight lines can help support consistency and speed while helping to reduce facility, product and truck damage. Characteristics such as strong through-the-mast visibility, which provides the operator a significant front field of view to help optimize visibility of forks and load, is especially important for productivity in high-density storage configurations where loads are lifted and placed at height. Other tools like wireless cameras, built-in fork LED lights or even fork laser levels can help boost operator accuracy.

Maneuverability is also a vital consideration. A tight turning radius and a compact truck design can help operators to more easily stack and position pallets in tight spaces and move through congested loading bays while minimizing the likelihood of product damage from unintended load contact.

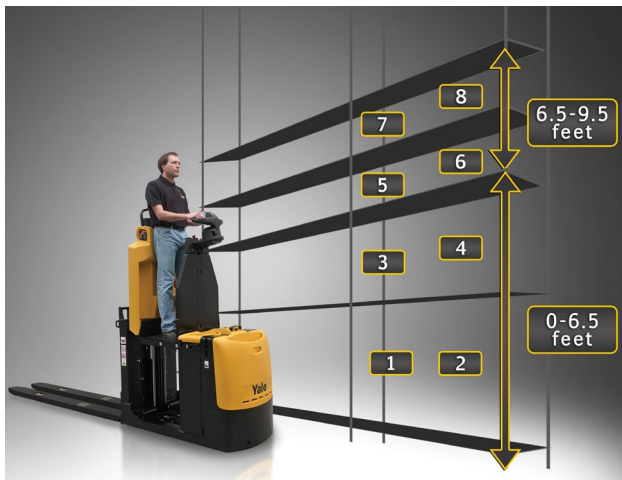
Average warehouse capacity used

Best-in-class operations, on average, utilize 95% of available warehouse space. Operations can improve their response to shifting inventory demands by using lift truck fleets that are designed to support optimized storage configurations and efficient workflow strategies. Best practices that support optimization include:

- Implementing slotting and storage strategies
- Using cross-docking

IMPLEMENTING SLOTTING AND STORAGE STRATEGIES

Growing SKUs and order counts can complicate efficient use of space. These conditions can force DCs to expand their picking footprint, reduce slot sizes and reduce inventory in each pick slot, risking decreased efficiency and productivity. Conducting a slotting analysis can determine the optimal storage space and location for each item – some of which might be at height. The conversation then shifts to enlisting the right equipment, with appropriate speed, dimensions and vertical heights to access the loads.



For instance, a low-level order picker can raise operators vertically to expand the “golden zone” of the pick face. This can enable new slotting strategies to help increase pick positions up to 400% and slot capacity 140% within the same footprint.

USING CROSS-DOCKING

Cross-docking involves transferring incoming merchandise from receiving directly to shipping – without spending time in storage. This workflow can help move goods more rapidly, reducing inventory levels and permitting for more efficient use of existing warehouse storage capacity.

On-time shipments

Best-in-class operations ship more than 99.5% of orders on time, meaning off the dock and in transit to the customer. To reach this level of efficiency, operations must make sure lift truck fleets are running at peak efficiency, with minimal downtime. Three factors that can contribute to peak efficiency include:

- Using best-fit power solutions
- Delegating repetitive tasks to robotics
- Ensuring proper maintenance and parts availability

USING BEST-FIT POWER SOLUTIONS

Lift truck power options are now more robust than ever, with newer technologies like lithium-ion batteries and thin plate pure lead (TPPL) proving their worth. By implementing the right lift truck power source, operations can unlock greater productivity.

Traditional lead-acid batteries can suffer performance degradation during the second half of their charge, leaving operators with a less-capable lift truck. This can negatively impact performance metrics, including the percent of shipments that leave later than expected.

TPPL offers a middle ground between lead-acid and lithium-ion. Relative to lead-acid, TPPL enables opportunity charging and eliminates battery maintenance requirements, and also provides faster recharging and less of a power output decline as the charge depletes. Lithium-ion batteries, meanwhile, deliver consistent power until full depletion and charge up to two times faster than lead-acid.



DELEGATING REPETITIVE TASKS TO ROBOTS

Advances in sensor technology and processing power permit robotics to pick up, transport and drop off pallets independently and reliably. By providing smooth, consistent operation of repetitive tasks, robotics allow for extended run times between charges, helping increase operational uptime and productivity, while reducing errors associated with misplaced or damaged goods.

ENSURING PROPER MAINTENANCE AND PARTS AVAILABILITY

Factory-trained, certified technicians offer superior product knowledge to help keep lift trucks running and shipments moving. The combined geographic footprint of the lift truck original equipment manufacturer (OEM) and dealer network, affects service capacity and how quickly unscheduled service issues can be taken care of. The larger the dealer network, the faster the response, the less downtime.

Additionally, telemetry systems with fault-code monitoring can automatically contact the service organization to initiate maintenance if a fault code is triggered. This can prevent minor issues that may not be apparent to operators from escalating into more serious problems.



Dock-to-stock cycle time

According to the WERC Report, best-in-class operations are able to move inventory from the receiving dock to storage, and record it in inventory management systems in less than 3 hours. But operations are challenged with two major trends: accommodating growing SKU counts and deliveries, and labor shortages, leaving warehouse positions unfilled and turning over regularly. Best practices to enhance put away include:

- Using technology to move product more efficiently
- Eliminating unnecessary product touches



USING TECHNOLOGY TO MOVE PRODUCT MORE EFFICIENTLY

Because robotic lift trucks reliably automate a range of repetitive functions without intensive supervision and intervention, they can help operations more efficiently move loads to storage with less labor. For instance, a robotic counterbalanced stacker can be deployed to pick up pallets that have been offloaded from trailers and independently move them to designated drop-off locations in racking, even second or third level storage locations.

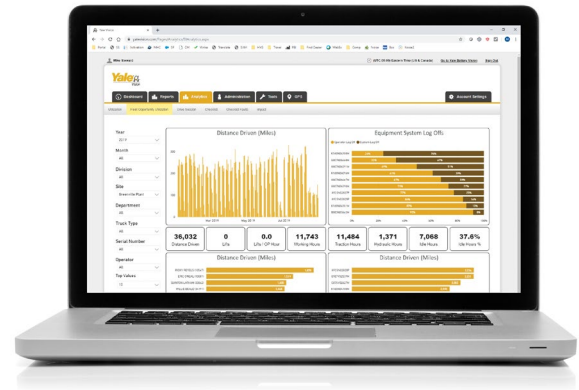
One day, robotics will also shape how operations handle products in dark warehouses. But operator assist systems are a step that warehouses can take today, speeding up dock-to-stock times by supporting both operator confidence and productivity. Disruptions like crashes or tip overs can delay product put away and result in equipment downtime that further hampers productivity. An OAS can help to limit the risk of these incidents by increasing reaction time and reinforcing adherence to best practices.

ELIMINATING UNNECESSARY PRODUCT TOUCHES

Unnecessary product touches and movements are wasteful and slow cycle times. Using telemetry systems, operations can track movements to eliminate unnecessary steps, minimizing product touches and reducing put away times.

Rising to best-in-class DC performance

You can't afford to settle for status quo solutions and strategies - achieving best-in-class performance requires both the attention and resources for continuous improvement. Top DCs strive to constantly improve velocity and accuracy, while fostering a culture of self-examination that enables warehouses to identify and remove inefficiencies.



For a deeper conversation about achieving best-in-class performance, contact a solutions expert at your local [Yale® dealer](#).