

Engineered Space Optimization

GUIDE TO OPTIMIZING WAREHOUSE SPACE UTILIZATION

Innovating Supply Chain Storage One Square Foot at a Time

INNOVATING SUPPLY CHAIN STORAGE ONE SQUARE FOOT AT A TIME

The Guide to Optimizing Warehouse Space Utilization covers the following crucial areas that fulfillment center and warehouse managers need to know to achieve the benefits of maximizing warehouse space utilization.

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This guide will help supply chain managers better optimize their facilities, resulting in:

- Extra space for adding new product line(s) or processes to the existing footprint
- Reduced overhead costs
- Improved efficiencies
- Increased productivity

INTRODUCTION TO OPTIMIZING SPACE UTILIZATION



When additional warehouse space is needed, it is not always financially feasible to build a new location or find warehouse space to lease for the right price. The cost of land, rent, building, machinery, labor, and inventory can be daunting.

The best option is to examine existing warehouse space. Warehouse and fulfillment center managers constantly face the challenge of efficiently utilizing their existing space. **Studies show that most businesses are using only 20% of current warehouse space optimally.** There is often more space warehouses can unlock to store goods within their existing footprint.

Warehouse managers know that inventory levels can fluctuate anytime within a year or sales season, especially during a holiday when inventory levels are typically at their peak - often double or triple normal levels. In addition, because of 'the Amazon effect', consumers demand more products with faster and better service, putting additional strain on warehouse space. Many businesses are looking for extra warehouse space to distribute and store products, but warehouse real estate is hard to find and can be costly.

If acquiring additional space is out of the question, what is a warehouse manager to do? The answer: find more warehouse space within the four walls of the current operation. Many warehouses only use 20% of their existing space, so there is room to grow as long as storage is optimized. By optimizing storage utilization, warehouses can maximize storage capacity without having to expand, buy or rent additional space.

SUPPLY CHAIN UNDER PRESSURE

NEW STUDIES PROJECT THAT WORLDWIDE RETAIL eCOMMERCE SALES WILL REACH A NEW

HIGH OF \$10.87 TRILLION BY 2025, and there are no signs of the growth letting up. As a result, more brick-and-mortar stores will embrace online sales, while online businesses must find new ways to elevate their brand. This growth applies to B2B and B2C companies, with B2B eCommerce projected to be two times higher than B2C by 2025.

With the explosion of eCommerce during the pandemic, warehouses have reached a significant capacity crunch. Previously, warehouses handled large volumes of products distributed in bulk to brick-and-mortar stores around the country. eCommerce orders are typically low quantities of many items or just a singular item. In addition, many SKUs exist in **eCommerce fulfillment operations,** each needing a specific space or slot.

MANUFACTURERS FACE THE SAME OBSTACLES AS RETAILERS, LOGISTICS PROVIDERS, AND DISTRIBUTORS -

keeping up with the growth of orders and producing products in the same amount of space.

Manufacturers are just as space-constrained as retailers (fulfillment), logistics providers, and distributors. They often have to add additional production lines or expand their assembly operations to keep up with demand. Plus, many manufactured items are becoming more complex with extensive customization to meet individual customers' needs. These complex products require a large quantity and variety of parts, therefore:

- Having lineside storage to hold parts can save on space and speed assembly.
- Being able to feed parts directly to workers can keep them working smarter and faster.
- Assembly workstations having enough space to hold parts while keeping tools close by for easy access.



RELATED READING

How to Increase Storage Capacity in Your Warehouse

The warehouse vacancy rate is currently below 4%, a record low, with no signs of improvement.

This industrial real estate shortage can be challenging for small to mid-size businesses with smaller budgets. Because of this, companies must look for warehousing alternatives or optimize their current warehouse space.

DID YOU KNOW? +29%

eCommerce growth

The eCommerce market is expected to grow by \$10.87 trillion during 2021-2025, an almost 29% growth during the forecast period

+\$732.2_{billion} manufacturing market

The global general manufacturing market is expected to grow to \$732.2 billion during 2021-2027, with a compound annual growth rate (CAGR) of 1.7% during the forecast period.

WHY IS OPTIMIZING WAREHOUSE SPACE UTILIZATION IMPORTANT?

WAREHOUSE AND FULFILLMENT CENTER MANAGERS CONSTANTLY FACE THE CHALLENGE OF UTILIZING EXISTING SPACE EFFICIENTLY AND THEREFORE REDUCING COSTS.



In warehouses with properly utilized space, there is no wasted space. For example, if a storage rack is positioned to hold a 4' x 4' box, but the largest container is only 3' x 3', the space could be more efficiently utilized by re-slotting the rack. As a result, more items could be able to be stored in the same space.

Workers have easier access to products by storing products in the right slot locations in the proper storage mediums. Right-sizing storage also has ergonomic benefits because products are well-positioned so workers don't have to reach or strain to lift items. In addition, adequate slotting for items helps maximize space utilization. Another reason to optimize warehouse storage utilization is to add more products in the same footprint. SKU proliferation is rampant in most eCommerce fulfillment operations as the need grows to carry more and more product variations and brand items. Therefore, warehouse managers must fit this growing number of SKUs into the same warehouse footprint.

Sometimes it is feasible to reduce the square footage of the warehouse by consolidating shelving that is not being used or getting rid of slow-moving and obsolete items. Reducing the square footage of the warehouse reduces costs, decreases the pull on labor resources, and improves efficiencies.

ONLY 20% CURRENT WAREHOUSE SPACE IS USED OPTIMALLY

MAXIMIZING STORAGE SPACE ACROSS THE SUPPLY CHAIN

The Rise of Omnichannel Fulfillment

In the past, businesses built two distribution centers: one on each coast of the U.S. to handle distribution to stores or other companies, with an additional fulfillment operation to process eCommerce orders. The closest distribution center fulfilled stores on the East and West coasts within one or two days, but stores in the Central U.S. had to live with 5-day fulfillment. As a result, eCommerce orders were fulfilled out of the eCommerce-only fulfillment center, regardless of customer location.

Today, fulfillment operations are designed to support all types of orders. These **omnichannel fulfillment operations** can handle the large volume of a small number of items, typical of eCommerce orders, or replenishment orders for brick & mortar stores, which are typically single SKUs shipped in bulk.

ECommerce fulfillment operations hold many SKUs that continue to grow as businesses add more and more products to their offerings. Often eCommerce fulfillment centers are tight on capacity and have trouble adding more SKUs. The solution is to optimize their warehouse space to keep up with customers' wants for more and more products.

Improved Space Utilization for the Retail and eCommerce Industry

THE NATIONAL RETAIL FEDERATION (NRF) FORECASTS US RETAIL SALES TO REACH \$4.86 TRILLION IN 2022, WHICH INCREASED 14% PERCENT DURING THE PANDEMIC, THE HIGHEST GROWTH RATE IN 20 YEARS. NRF attributes the rise to strong job and wage growth with a decline in unemployment. Still, the retail industry will face the pressures of inflation and economic uncertainty due to the continuing pandemic and international tensions.

In addition, retailers today face competition from Amazon and other big-box retailers. Those that can't complete have gone out of business. The basis of competition for today's retailers is meeting customer demand for Amazon-like services with quick shipments and lower prices. Plus, retailers need to differentiate themselves from the competition by offering products no one else offers or delivering services better than the competition. These services can be quick, accurate deliveries, delivery tracking, better prices, etc.

Many retailers sell just a few products, but others sell several thousands of items. Regardless, retailers need to have the right-sized storage for the number of SKUs they carry. In addition, many retailers have turned their brick & mortar stores into fulfillment centers to lower transportation costs and speed fulfillment.



RELATED READING

The Importance of Dynamic Storage in Omnichannel Fulfillment

MAXIMIZING STORAGE SPACE ACROSS THE SUPPLY CHAIN

Space Optimization for Third-Party Logistics Providers (3PLs)

THIRD-PARTY LOGISTICS PROVIDERS (3PLS) HAVE WAREHOUSES IN STRATEGIC LOCATIONS ALL ACROSS THE COUNTRY, AND EVEN THE WORLD.

Businesses can expand their markets with minimal costs by working with a 3PL. In addition, utilizing a 3PL allows companies to focus on their core competencies when a 3PL takes over their warehousing operations.

3PLs handle inventory management, fulfillment, and shipping/delivery for multiple clients out of the same warehouse. They must know and utilize best practices in the industry to provide the best services for their clients. 3PLs must optimize their warehouses for best space utilization to handle a fluctuating number of SKUs as clients add/subtract items within their inventory.

Process Improvements for the Manufacturing Industry

The layout of manufacturing assembly lines can significantly improve space utilization and substantially affect workers' performance.

A U-shaped assembly or production line is a type of **cellular manufacturing** used in manual manufacturing. The main benefit of implementing a U-shaped line is the ability to place multiple operators on workstations within the "U" of the line. At the same time, parts and material supplies come from outside the "U." To replenish the line without interfering with the process, devices like chutes carry material over the line, and roller conveyors convey material below the line.

Reconfiguring machinery and workstations into U-shaped cells reduces material handling and storage footprint. A properly executed U-shaped line can simultaneously optimize storage space, shorten your lead times, and dramatically reduce work in progress inventory (WIP).



You can't improve what you don't measure.

– Peter Drucker

INNOVATIONS IN WAREHOUSE STORAGE

The demand of eCommerce fulfillment operations challenges businesses with smaller orders, quicker delivery time-frames, and changing customer demands. As a result, warehouse operations are looking for solutions to address these issues, including labor shortages, while increasing productivity and efficiencies. Technologies, ranging from automation to robotics to software, can improve many of these challenges. However, non-automated solutions can bring big rewards most cost-effectively.

Amazon is at the forefront of automating its fulfillment operations and warehouses with next-generation technology such as robotics and artificial intelligence. Most recently, Amazon has considered introducing automated packing machines at its warehouses.

Amazon uses robots in various operations, from grabbing bins filled with merchandise to stacking these bins on pallets. Robots help perform the most mundane tasks while cutting down on the walking time of workers. In addition, because there is no need for aisle space for people, shelves are packed more densely. However, there are some tasks where humans outperform robots – like the ability to pick individual items of varying sizes and shapes off the shelves.

ECommerce warehouses often use high-density **pick modules**. Pick modules are multi-level, combining mezzanines, conveyors, carton flow racks, pallet racks, static racks, and other equipment that deliver goods to pickers at each level. Stacking the racks use less space on the floor, while pickers can take less time to pick orders from the rack of SKUs close by and easy to reach.

Multi-level pick modules use **FIFO (first in, first out)** stock rotation using tilted shelves with carton flow to deliver products to the pick face. FIFO presents order pickers with the product in the correct order ensuring the worker picks older products first.

By using carton flow in the picking operation, cartons can be replenished from the back of the shelving while picking goes on at the front. Pickers can pick from open boxes or individual items on shelves. **Pallet flow systems** allow the pallet to flow forward. Conveyors can tie everything together in the picking operation by bringing items to the picker or transporting empty cartons and pallets away to recycle them.



WAREHOUSE STORAGE OPTIMIZATION ROI

Significant space savings occur when warehouse storage is optimized, but it is crucial to know the implemented solutions' return on investment (ROI). Optimization and automation of a warehouse can greatly benefit operations by saving space, reducing picking errors, improving ergonomics, and enhancing productivity. In addition, optimization processes can result in significant cost savings with an optimal number of SKUs slotted in the correct location. The case studies below provide a sense of the benefits of implementing durable carton flow systems, flow rack workstations, and high-density storage solutions within your operations.



CUTTER & BUCK

READ THE CASE STUDY

Apparel from Cutter & Buck is contemporary and meticulously designed, and so is the company's high-tech distribution center. Each day, a small core team of Cutter & Buck employees pick, pack, and ship multitudes of orders to Canadian customers. More than 4,000 UNEX SpanTrack wheel beds help keep the high-tech operation wrinkle-free.

"We are exceeding performance expectations, largely because of the efficient systems we have in place. The wheel beds are a big part of that picture." -Mark Alexander, Operations Manager



HELLOFRESH

READ THE CASE STUDY

With business growing rapidly, the HelloFresh team began investigating ways to add more lines and speed up the meal kit assembly line at their Newark, NJ facility. UNEX carton flow and flow rack solutions helped HelloFresh condense meal-kitting lines, maximize space, and make room for future growth.

"We're all about providing customers with wholesome, fresh food. The racking system helps keep our centers clean and organized to help deliver on that promise." - Valerie Clements, Special Operations Team



CAPITAL CANDY

READ THE CASE STUDY

Capital Candy transformed their new warehouse expansion with 27 new bays of SpanTrack Wheel Bed carton flow and two bays of SpeedCell high-density storage. The new system allowed Capital Candy to store 3,600 more cases of product in the location and enabled the operation to add 900 new items with room to spare.

"Efficiency was up immediately on day one—greater pick density, fewer steps, less climbing, and better product storage." - Jim Thibeault, Operations Manager

10 STEPS TO OPTIMIZING YOUR WAREHOUSE STORAGE UTILIZATION

WAREHOUSE STORAGE OPTIMIZATION REQUIRES CAREFUL PLANNING AND PREPARATION.

The key is to start with a space optimization strategy and apply the process to create a highefficiency and operational excellence culture. Having these goals at the forefront, management can instil these cultural strategies with each person and continually look for ways to boost performance and improve operations. Sometimes, refining the methodologies and optimizing the areas that need improvement is all it takes to increase performance and capabilities.

Optimizing warehouse storage begins with a holistic view of operations, including workflow and organization. These ten steps will lead to fully optimized warehouse storage:



1. MAP THE WAREHOUSE LAYOUT

Look at the warehouse's total capacity, from floor to ceiling. Often warehouses can find additional storage space in unused vertical space. Therefore, it's crucial to thoroughly understand the current layout's flow and space utilization, including rack configuration and processes like pick methods, receiving, put-away, replenishment, inventory management, and packing and shipping.



2. IMPROVE PRODUCT FLOW

In the warehouse, products are constantly flowing in and out. Managing an efficient product flow improves turn-around times so businesses can easily meet customer delivery expectations. The flow of products through the warehouse depends on the size of the facility, the number of dock doors, products handled, and the labor pool.

Warehouses are often designed with either a U-shaped or L-shaped product flow. A U-shaped design arranges product flow around shipping and receiving areas, storing or processing orders in the middle, sharing workers and material handling supplies. The U-shaped design also facilitates cross-docking, which leads to less product handling. The L-shaped product flow design uses different warehouses' areas for shipping and receiving. The advantage of this design is more storage space, larger sorting areas, and more extensive shipping/receiving areas that can handle more products.

Regardless of the warehouse design, speeding fulfillment leads to more available space. Also, while picking orders, a smooth flow of products and orders ensures workers aren't idle or unfilled products/orders aren't accumulating.

10 STEPS TO OPTIMIZING YOUR WAREHOUSE STORAGE UTILIZATION

3. RATIONALIZE SKUS

Properly slotting SKUs can solve the problem of SKU proliferation. As distributors handle more and more products, running out of space in the warehouse can be an issue.

Slotting improves storage density, opening up hidden storage space within a facility. Slotting maximizes warehouse space by improving storage by optimizing product location. Inventory is slotted using various strategies focused on speed/velocity of products, item storage (carton, pallet, individual SKU), seasonal usage, etc. In a typical warehouse, approximately 80% of inventory is slow-moving items. Using **high-density storage** minimizes the footprint of slow-movers. Storing slow-movers in less space means more valuable space—such as the end caps and racks closest to the shipping or packing areas—is available for fast-moving products. Workers will be able to pick fast-moving products quicker and easier in this format, helping to minimize footsteps while maximizing pick speeds.



Case Study | Darn Tough Vermont

Darn Tough Vermont is a busy sock manufacturer in the Northeast. When squeezing production, picking, packing, and shipping into one small facility was no longer cutting it, Darn Tough trusted UNEX SpanTrack carton flow and Flowcell flow rack solutions to help make expansion a breeze.

4. INCREASE STORAGE DENSITY

Pallet racks are material handling storage systems that store products on pallets, helping to increase storage density by using more vertical space instead of storing pallets on the ground. Pallet racking systems are most effective for storing large pallets of varying, medium-to-large goods. Modular pallet racks can scale to fit any warehouse configuration to minimize wasted space. Plus, pallet racks can be easily adjusted to product mix changes by simply reconfiguring them and using them with different products, saving money.

Avoid unused pallet rack storage in the pallet rack by using the entirety of the pallet rack depth. Instead of lining a shelf with one SKU and having workers reach deep into the rack to grab the following SKU, use a carton flow system to load all the SKUs behind each other and let them flow forward to the order pickers on the slanted shelving. Using **carton flow** allows more SKUs in less space. This will help maximize space utilization in the warehouse or fulfillment center, and it will help to make inventory easier to monitor and control while reducing travel time and footpath between picks.

10 STEPS TO OPTIMIZING YOUR WAREHOUSE STORAGE UTILIZATION



5. AVOID DEAD AIR SPACE WITH RIGHT-SIZING

Make sure the warehouse space is consistent with items stored. For example, a particular size container needs to be stored on a rack that accepts that size item to eliminate wasted space. If the container measures $2' \times 3'$, the rack should be approximately the same size.

In addition, containers need to fit products so that the item stored fits snugly within them to avoid wasted space inside the containers. Finally, items within containers are often packaged with lightweight materials to protect the finished item. Choose packaging materials for their strength, weight, and recyclability; the packaging must be small enough to take up limited space but sufficient to protect the finished item.



6. IMPROVE PICKING OPERATIONS

Multiple SKUs should not be mixed in the same location to take less space in order picking operations:

- Store products in optimal locations for order pickers.
- Designate zones for certain products like seasonal items.
- Label shelving to make products easier to find for order pickers.
- Use carton flow in picking operations, allowing picking to continue in the front while replenishing products from the back.
- Pallet flow systems allow pallets to flow forward once the items on the pallet have been picked.
- Strive to reduce travel and search time for order pickers to speed fulfillment.
- Keep track of how often an item is picked; avoid wasting space on infrequently picked items, discontinue offering these products or create a section in the warehouse for slow-moving items.



7. LOOK UP

Most warehouses don't use the vertical space they have. Instead, utilize all vertical space available by stacking products in storage racks.

Reclaiming overhead space allows you to recover up to 85% of unused space. Combining high storage racks with narrow aisles and vertical picking machines improves picking speed and accuracy. Design the minimum width aisle required to match the material handling equipment used without compromising operating efficiency.

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10 STEPS TO OPTIMIZING YOUR WAREHOUSE STORAGE UTILIZATION

8. IMPROVE PUT-AWAY OPERATIONS

A warehouse management system usually directs put-away rules. Follow these rules to save space instead of letting workers just put the pallets or cartons anywhere. Directed put-away knows what locations are best suited for pallets or cartons. It can improve picker productivity by ensuring storage of high-volume products is in the best possible locations. The best practice is to put away products the same day they are received; not doing so affects space, causes congestion, increases errors, and makes products more susceptible to damage.

9. CONSIDER CROSS-DOCKING

Consider cross-docking to reduce the amount of inventory requiring storage space. A cross-docking warehouse moves products directly from receivables to outgoing shipping without long-term storage. Most items cross-docked are palletized items that stay in the warehouse for less than a week. However, individual cartons can be cross-docked, as well. As a result, cross-docking facilities require far less storage space than a traditional distribution center. Cross-docking is very cost-effective for businesses with high-volume shipments.

10. CHOOSE THE RIGHT VENDOR

Choose a vendor that has a history of satisfied customers and successful implementations. Get references and talk to them to ensure complete satisfaction with the vendor, including confirming that the vendor met the strategic performance goals. The vendor should listen to the specific operational needs, understand objectives, and suggest various solutions. Work with a company committed to designing innovative solutions with excellent customer support and service.



RELATED READING

Warehouse Optimization Tips to Modernize Your Space Optimizing existing space to streamline processes is critical.

UNEX'S SUPPLY CHAIN SOLUTIONS ARE THE INDUSTRY STANDARD FOR CARTON FLOW, LINE-SIDE STORAGE, CONVEYOR, AND OTHER PROCESSES. UNEX SpanTrack, SpeedCell, and other solutions hold multiple industry patents. These innovative, space-saving solutions help to maximize space utilization, increase picking speeds, and improve productivity and efficiencies.

AMP UP PRODUCTIVITY WITH CARTON FLOW

Whether you have bulky boxes or beer kegs to store, SKUs to move, or orders to fulfill, our SpanTrack and Shelf Track products provide the industry's most reliable, durable, and efficient carton flow systems. Carton flow systems dramatically improve productivity and accuracy on the pick line, maximize SKU storage, and minimize strain on pickers.





span**//track**

SpanTrack carton flow rollers provide the industry's most efficient, reliable, and durable carton flow solution for full case and split case (each) order picking. The patented design easily drops into existing structures, increases throughput, and optimizes product flow with the most surface contact to eliminate hang-ups on the track.

shelf**// track**

Shelf Track carton flow replaces unreliable plastic wheel rails with a durable carton flow system featuring roller lane or wheel bed flow options. Shelf Track features flow options of roller lanes or wheel beds. Roller lanes provide 300% more surface area to eliminate hangups, while wheel beds increase flexibility with slotting, providing 90% left to right bay usage right bay usage.

ACCELERATE PRODUCTIVITY WITH FLOW RACKS

UNEX modular and gravity flow rack systems optimize space utilization, accelerate productivity, improve warehouse safety, and lower operational costs. Durable, modular flow rack systems help warehouse operations and manufacturing facilities organize messy pick areas, increase productivity and maximize space.





flow**" cell**

FlowCell flow rack and workstation solutions boost productivity by up to 30%, improve ergonomics, eliminate waste, and maximize space utilization by 50%. In addition, FlowCell helps to apply Lean manufacturing principles with modular workstations, which allow maximum customization to suit the operational needs.

roller**// rack**

Roller Racks are pre-engineered gravity flow racks equipped with UNEX SpanTrack. Our easy-to-assemble flow racks boost order picking efficiency, improve access for ergonomic goals, and ensure FIFO inventory stock rotation by replenishing inventory from the back. Maximize flexibility to create standalone carton flow units or add units to create

PICK FASTER + SMARTER WITH DYNAMIC HIGH-DENSITY STORAGE

Whether you have bulky boxes or beer kegs to store, SKUs to move, or orders to fulfill, our SpanTrack and Shelf Track products provide the industry's most reliable, durable, and efficient carton flow systems. Carton flow systems dramatically improve productivity and accuracy on the pick line, maximize SKU storage, and minimize strain on pickers.





speed**//cell**

SpeedCell is a dynamic, high-density storage solution designed to minimize unused flue space within your racks. SpeedCell increases storage density up to 60% while dramatically increasing pick faces, which results in less travel and search time. In addition, SpeedCell's highstrength, industrial textiles don't mold, rush, and are flame-resistant.

pick**// shelves**

Pick Shelves are customizable and easy to mount, which improves pick rates. These pick shelves are angled to provide clear visibility and accessibility at the pick point. Angled shelves boost picker productivity by 30% while increasing space utilization up to 50%. Pick Shelves can help integrate slow-moving SKUs into the pick line, saving space and improving efficiency.

GET A MOVE ON WITH CONVEYORS

Move and store a wide range of loads with our made-to-order, easy-to-install conveyors and pallet flow solutions. Our conveyors and pallet flow systems keep orders moving and organized throughout your facility. They are flexible, rugged, low-maintenance, and suitable for transporting multiple-sized boxes, cases, cartons, or totes.





pallet**″ track**

Pallet Track is a pallet flow system with rollers or wheel rails designed to optimize flow. Pallet Tracks are available for single or double-deep pallet flow systems. Spring-loaded rear stops prevent pallets from being accidentally pushed off the rack. The tracks and wheel rails are customizable in length, width, mounting, and track options.



Gravity Conveyors move all types of loads throughout a facility. Our extensive line of durable roller and wheel conveyor solutions are easy to install, made to order, and proven to increase efficiency and throughput significantly. Custom variations of our conveyor products, such as special lengths, widths, roller centers, wheel patterns, or modified standards, are available.