

Warehouse Insights

Maximizing Warehouse Space



High-density storage

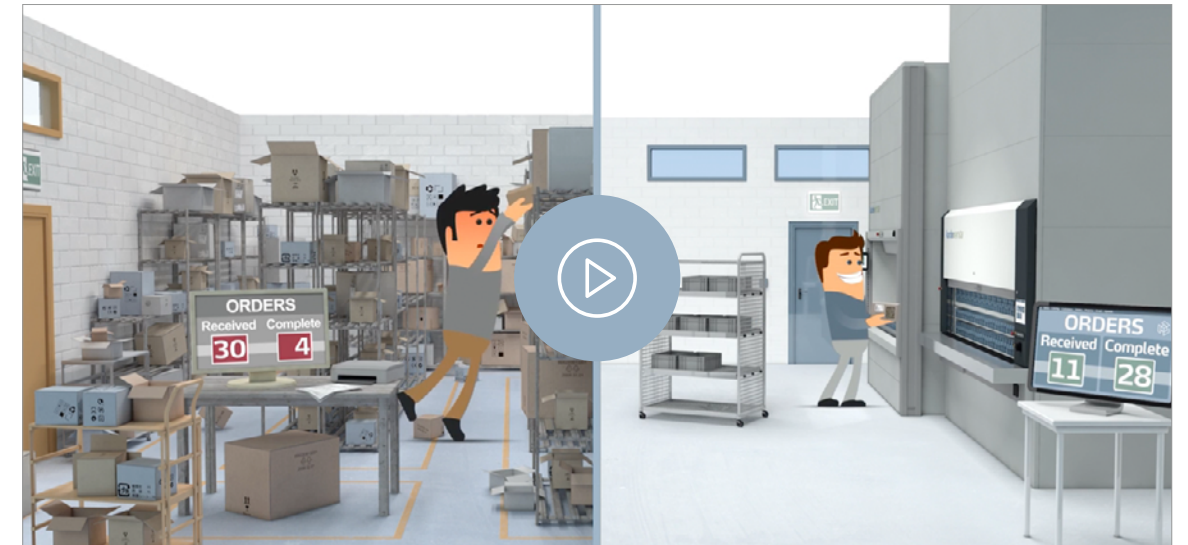
Facilities using shelving to manage inventory often find themselves squeezed for space. Before you tear down walls to expand or sign a lease for an additional facility, be sure you're maximizing the warehouse space you currently have. A reorganization of your current warehouse might not be the answer to your long-term space problem, but you might be able to recover enough space to delay your expansion or relocation decision.

By design, shelving has three main space limitations:

1. Wasted Storage Capacity
2. Wasted Aisle Space
3. Wasted Ceiling Height

Unless you move or expand the size of your current warehouse, space isn't going to increase (it may even be decreasing). Vertical storage can be used to recover up to 85% of the floor space currently occupied by shelving and drawers by eliminating the aisle spacing and utilizing the full ceiling height of your facility.

Not familiar with high-density vertical storage systems? See how they work



[Automated Order Picking by Kardex Remstar](#)

Thousands of organizations throughout the world have used high density storage – such as Vertical Lift Modules or Vertical Carousel Modules – to increase storage capacity and avoid costly brick and mortar expansions or relocations.

Let's get some of your questions answered:

- How can you find space in your current facility?
- Exactly how much shelving or drawers can you replace with automation?
- What's the monetary value of that space savings?

Limitation #1

Wasted capacity in low-density shelving

The first place to look to recover valuable storage space is within the shelving itself. Most shelving is setup for a standard 8, 18 or 24 inches vertical spacing when it's installed and years later is storing product far too small for the space. If your shelving is spaced 12 inches apart and storing 6-inch product – that wasted vertical space adds up.

Also, each shelf should store products of similar height. If all products on a shelf are 4 inches tall and there is one 10-inch product, the whole shelf needs to accommodate the 10-inch product. Lastly, check behind stored products. Often, SKUs get pulled to the front of the shelving for easy access, leaving wasted space in back.

You'll be surprised how much space you can recover by simply re-slotting a few SKUs and adding a few more shelves. It's a labor-intensive task and depending on the condition of your warehouse can be dirty – but well worth it in the end.



Solution #1

Increase capacity with high-density storage

Automated storage and retrieval systems provides high-density storage on trays and shelves. For example, within a Vertical Lift Module (VLM) trays are stored on one inch centers – meaning if you have a 5-inch high product in a tray, the VLM stores it in a 6-inch space – utilizing every square inch of space available. When your product mix changes, so does the tray spacing. Each time a tray is returned into the machine the height of the product on the tray is scanned and the storage location is dynamically adjusted to use the least amount of space within the machine. A 5-inch product requiring a 6-inch storage space automatically adjusts to an 8-inch product requiring a 9-inch storage space – no lost capacity.

Similarly, carriers within a Vertical Carousel Module (VCM) can be fitted with shelves and drawers to provide the exact storage heights your product mix requires. When compared to wasted capacity within manual shelving, these automated systems recover a tremendous amount of capacity.



Limitation #2 Wasted aisle space

Once you've squeezed every square inch of space out of your shelving and you're still looking for more – it's time to take notice of your aisle space. Workers travel up and down aisles to access product stored on shelving. These aisles need to be a minimum of 3 ft wide to accommodate workers and simple push carts.

If you need to access product with a pallet jack, the aisle space increases to 4 to 5 ft wide. If product needs to be accessed with a forklift, it's far greater as you need to accommodate the length of the forklift plus an additional 12 inches of maneuvering space. A standard forklift can require 12 ft aisles – you can get this aisle space down to around 4 ft with a narrow aisle order picker.

In most shelving systems, aisle space accounts for over half of the warehouse space used. Eliminating wasted aisle space alone can double your warehouse capacity.



Solution #2 Eliminate wasted aisle space with vertical storage

Vertical storage systems are fully enclosed units accessed by an operator from one pick window or access point. An access area of 3 to 5 ft in front of the unit is recommended. This reduces multiple aisles required in shelving to one single aisle for access to all stored product.

Consolidating all of the aisle space found in a typical shelving system into one access point recovers a considerable amount of floor space. This recovered floor space gives you room to expand operations internally, avoiding a costly facility move or expansion (not to mention eliminates the time workers spend walking and searching through shelving as all stored product is now delivered directly to the worker).



Limitation #3

Wasted ceiling height utilization

The average ceiling height for manufacturing facilities and distribution centers range from 24 to 32 ft on average. Older buildings (pre 1970's) tend to be closer to the 24 ft mark, while more recently constructed buildings are closer to 32 ft tall. Standard industrial shelving is available in 6, 7, 8 and 10 ft heights. Filling a 24 ft tall warehouse with 10 ft tall shelving leaves quite a bit of wasted space.

Standard pallet rack comes in a wider variety of heights – reaching 16 and 20 ft tall. While this can utilize ceiling height a bit better it creates a variety of other challenges. Workers now must use forklifts to access product (leading to wider aisle space as discussed above) or employees need to climb ladders to access product slowing productivity and creating an ergonomic headache.



Solution #3

Utilize ceiling height with vertical storage

By delivering goods to the operator, vertical automated storage systems are designed to take full advantage of clear ceiling height, up to 98 ft, to maximize every square inch of space within your facility. High-density vertical storage solutions can be customized to the height of your existing facility, with the average height unit between 20 and 30 ft tall.

In some cases, warehouses with limited ceiling heights have constructed a vertical storage unit outside of the existing building, enclosed it and provided access to the unit through an existing exterior wall. This allows the benefits of the storage height without the restriction of the building ceiling – avoiding leasing an additional facility or a full building expansion.



Capacity savings by ceiling height

The number of shelving or drawer sections that can be replaced by one vertical storage system is dependent on your ceiling height. The taller your ceiling, the more floor space you can save. For instance, a 15 ft tall automated vertical storage unit can replace 31–35 ft sections of shelving or roughly 19 ft drawer cabinets. A 40 ft tall high-density vertical storage unit can replace 100 sections of shelving or 65 drawer cabinets. In the chart below, locate your facility's ceiling height in the left column to determine how many sections of shelving or drawers one vertical storage unit can replace. Need to replace more? No problem, vertical storage solutions are designed to work together in workstations or pods for maximum productivity.

Recovered Wasted Rack & Shelving Space Using Vertical Automation

Celling Height	Eliminated Shelving Sections	Space Savings (percentage)	Space Savings (sq. ft.)
15 ft	31–35	76%	317–328 sq. ft.
20 ft	45–49	82%	461–472 sq. ft.
25 ft	59–65	85%	569–616 sq. ft.
30 ft	73–80	88%	713–724 sq. ft.
35 ft	87–94	89%	821–868 sq. ft.
40 ft	to 100	91%	to 929 sq. ft.

Recovered Wasted Drawer System Space Using Vertical Automation

Celling Height	Eliminated Drawer Cabinets	Space Savings (percentage)	Space Savings (sq. ft.)
15 ft	19	53%	90 sq. ft.
20 ft	28	66%	158 sq. ft.
25 ft	36	74%	226 sq. ft.
30 ft	46	80%	311 sq. ft.
35 ft	55	83%	396 sq. ft.
40 ft	65	86%	481 sq. ft.

The value of space

In a manufacturing and distribution facility, it costs on average \$6.50/sq. ft. annually. While the space itself might not be too costly, everything you need to run and manage our operations in that space adds up.

Consider the operational costs (and headaches) of an additional warehouse:



Staffing: Running two facilities requires additional staff (or asking current staff to travel between two locations). Additional staffing will add costs and can impact employee morale. With the majority of the operation happening at one location, it's only natural the "other" location will feel left out or "less-than".



Additional IT: Don't overlook the IT support and infrastructure for a second location including phone systems, internet access and additional employee workstations.



Freight Costs: The cost of moving goods between locations will add up quick. Consider the cost of dedicated transport (daily/ weekly) or adhoc transport of goods or equipment that needs to be combined with goods or equipment at the other location to execute a process and complete a task.



Consolidation of Operational Activities: Internally combining the activities at two locations into one business result can get tricky. Consider how you will report on total operational results and how to manage all inventory spread over two locations.

With the average cost of a high-density vertical storage unit starting around \$75,000–\$100,000 it makes sense to learn if an automated solution could eliminate or delay your need for an additional facility. Make sense of the cost factors, from hardware to software to ongoing maintenance involved in the investment of ASRS with this comprehensive guide.

DC Dental: Realizing the value of space



A full-service dental supplier, DC Dental inventories over 20,000 SKUs in their distribution center in Baltimore, MD. When an acquisition increased their SKU capacity by 54% overnight, DC Dental was facing a costly expansion.

Instead, they implemented automated storage and retrieval systems into their existing operations, consolidating roughly 13,000 sq. ft. of shelving into 3,500 sq. ft., a 73% space savings. This recovered floor space allowed DC Dental to reduce the overall footprint of the facility from 30,000 sq. ft. to 20,000 sq. ft. They resigned their lease, saving nearly \$1 million dollars in rent and utilities over the next 10 years. Combining this space and capacity savings with the 67% labor savings, ROI justification for this project was easy.