Calculating the True Cost of Storage Space

White Paper

Regardless of where in the U.S. your manufacturing or distribution operations are located, square footage is a significant cost. Learn how to maximize your inventory density and reduce storage space costs by deploying automated, dynamic storage and retrieval systems.

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Introduction: Space—The Next Savings Frontier

Industrial square footage used in manufacturing and distribution operations throughout the U.S. is both expensive and increasingly scarce. Depending on the region in which a facility is located, cost of rent per square foot (PSF) and scarcity per million square feet (MSF) of space are magnified to different degrees, but both have been trending up over the past 12 months.

Consider Table 1:
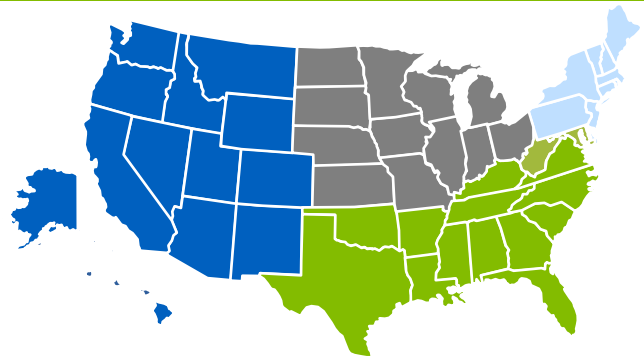
TABLE 1: U.S. Industrial Space (All Types) by Region per Million Square Feet (MSF) [1]				
Location	**Overall Vacancy Rate Q1 2018**	**Overall Vacancy Rate Q1 2019**	**Average Asking Rent PSF Q1 2018**	**Average Asking Rent PSF Q1 2019**
Northeast	5.1%	5.4%	$7.69	$7.64
Midwest	5.2%	4.6%	$4.77	$4.94
South	6.1%	6.1%	$5.60	$5.54
West	3.6%	3.7%	$8.13	$8.77
U.S. Average	**5.0%**	**4.9%**	**$6.18**	**$6.41**

As shown in Table 2, average asking rents per square foot vary slightly depending on the type of space. Costs differ whether the space is in a manufacturing facility—holding work-in-process (WIP), components or spare parts to support equipment repairs in a maintenance and repair operation (MRO)—or in a distribution center (DC), holding inventory for shipment to customers.

TABLE 2: Average Asking Rent per Square Foot (PSF), Manufacturing vs. Distribution[2]		
Location	**Manufacturing Q1 2019**	**Distribution Q1 2019**
Northeast	$5.20	$7.57
Midwest	$5.05	$4.53
South	$5.28	$4.85
West	$9.84	$7.77
U.S. Average	**$6.50**	**$5.74**

What this means, of course, is there is a consistently decreasing amount of available space, and what is available is becoming increasingly expensive. Although most operations have a clear grasp of how much each of their facilities' square footage costs annually, very few have taken the time to calculate the true cost of space in terms of storage density—and how those costs impact the bottom line.

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[1] Cushman & Wakefield, "U.S. Industrial MarketBeat Report, Q1 2019." Accessed June 4, 2019.
http://www.cushmanwakefield.com/~/media/marketbeat/2019/CW-Q1-2019-MarketBeat_Industrial.pdf
[2] Ibid.

That's because typically, manufacturing and distribution facilities store non-palletized inventory (cases and eaches) in one of two ways:

- On traditional, static commercial or industrial shelving[3] made of upright posts, with formed steel sheet panels as horizontal shelves, and end and back braces or sheet steel back and side panels for support.
- On pallet rack[4] with bases, posts and decking material that provides larger format storage of unit-loads of bulk materials.

To minimize square footage expenses, regardless of the type of facility in operation or its location within the U.S., it makes sense companies would want to do more with the space they currently possess. Fortunately, when it comes to maximizing storage density in cases and eaches item handling, another option exists: self-contained, dynamic automated storage and retrieval equipment. These systems offer higher density storage in a more compact footprint than manual equipment can provide. They include:

Horizontal Carousels – Consisting of bins mounted on an oval track that rotate horizontally to deliver stored items to an operator. These automated storage and retrieval systems save up to 60% of floor space when compared to standard shelving and rack.
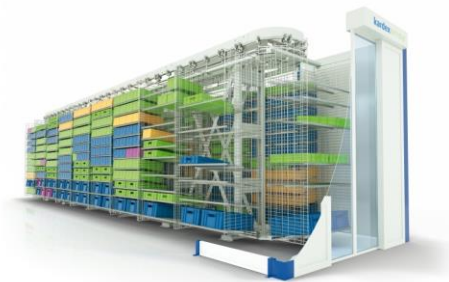
Vertical Carousels – Comprised of a series of shelves that rotate around a track—similar to a Ferris wheel—these automated storage and retrieval systems quickly deliver stored items to an ergonomically positioned work counter at the operator's command. When compared to static shelving and rack, they save up to 75% of floor space.

Vertical Lift Modules (VLMs) – 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.

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[3] MHI, "Glossary>Shelving." accessed June 4, 2019. http://www.mhi.org/glossary?q=shelving
[4] MHI, "Glossary>Rack." accessed June 4, 2019. http://www.mhi.org/glossary?q=rack

Vertical Buffer Modules (VBMs) – 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.

Implementing one of the four types of high-density automated storage and retrieval equipment immediately reduces the amount of square footage required to store items within static shelving and pallet rack in two ways: one, by utilizing previously unused overhead space, and two, by compressing items stored within the technology for greater storage capacity. This is because the volumetric efficiency of each automated technology is so much greater, as shown in Table 3.

TABLE 3: Storage System Comparison of Net Cube		
Technology	Capacity (Wasted Space Within Unit)	Space (Wasted Vertical Height Based on 20' Ceiling)
Static Shelving / Rack	50 - 70%	70%
Horizontal Carousels	25%	30%
Vertical Carousels	20%	10%
Vertical Lift Modules (VLMs)	10%	10%
Vertical Buffer Modules (VBMs)	15%	10%

An investment in a dynamic, automated storage system therefore enables much more highly compressed storage of the same number of stock keeping units (SKUs) previously held in static shelving, but within a smaller footprint. The resulting increase in available floor space can then be leveraged in one of two ways:

1. Through the storage of greater quantities of existing SKUs, or an expansion in the number of different SKUs, within the same amount of existing facility square footage.
2. Through the repurposing of now available square footage via an internal expansion, such as the revenue-generating addition of another manufacturing cell or value added activity.

This white paper demonstrates a calculation for estimating the true cost of storage space within both manufacturing and distribution operations. It also shows how an investment in a dynamic, automated storage and retrieval system as a replacement for static shelving or rack will yield significant gains for a facility, both in terms of increased storage capacity/floor space and additional revenue.

Do the Math: How Much Does Storage Space Cost?

Depending on the type of dynamic storage system selected, the resulting space savings will range from 65% to 85%. To determine the potential cost savings associated with replacing static storage shelving or rack used within a manufacturing facility's parts, stockroom, warehouse or toolcrib area or within a distribution warehouse with a dynamic automated system based, reduce the current cost total square footage utilized for that activity by a sample 80%. This figure represents the amount of square footage saved from implementing an automated storage system. To determine the actual cost of the space, multiply the amount by your current rent per square foot. For example, a manufacturing facility in the Midwest recovering 5,000 square feet could save over $20,000 to the bottom line.

Do the Math: Consider the Value of Added Revenue

Because an investment in a dynamic automated storage system will free up anywhere from 65% to 85% of existing square footage currently used by static shelving or rack in a manufacturing parts, stockroom, warehouse or toolcrib area or within a distribution warehouse, the recovered space can be repurposed for other value added—and revenue generating—activities. To calculate your potential opportunity to convert wasted space into additional revenue, use the table below.

Calculate Your Potential Savings w/ ASRS

Use our quick ROI calculator to determine how much automated storage could save your operation!

[Calculate Your Savings]

Case Study

Adding VLMs, Horizontal Carousels Saves 73% of Floor Space in DC Dental's Baltimore Warehouse; Enables Downsizing of Lease

Based in Baltimore, DC Dental **is the fastest growing, full service dental supplier in the country, delivering** competitively priced supplies to dental professionals in the mid-Atlantic region. Within their warehouse, the company stores more than 20,000 of the most commonly used dental products—from burs to bibs to curing lights.

The company increased its warehousing volumes by 54% with an acquisition in 2012, filling its existing 30,000 square foot facility to near capacity. To accommodate this uptick in inventory, DC Dental moved to a three-zone, **pick-and-pass fulfillment strategy that incorporates two, 21-foot-tall** Shuttle XP Vertical Lift Modules (VLMs) **and four 56-foot-long** horizontal carousels **from Kardex Remstar.**

By using these automated storage and retrieval systems, roughly 13,000 square feet of shelving was consolidated into 3,500 square feet—a 73% space savings. This recovered floor space actually allowed DC Dental to reduce the overall footprint of the facility from 30,000 square feet to 20,000 square feet.

Further, the company resigned its lease, saving nearly $1 million dollars in rent and utilities over the next 10 years and further justifying the investment in the dynamic, automated storage equipment.

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To learn more about how automated storage systems can better maximize your facility's square footage, contact your Kardex Remstar representative today.

About Kardex Remstar

Kardex Remstar, LLC, a company of the Kardex Group, is a leading provider of automated storage and retrieval systems for manufacturing, distribution, warehousing, offices and institutions. For information about the company's dynamic storage solutions visit www.kardexremstar.com.