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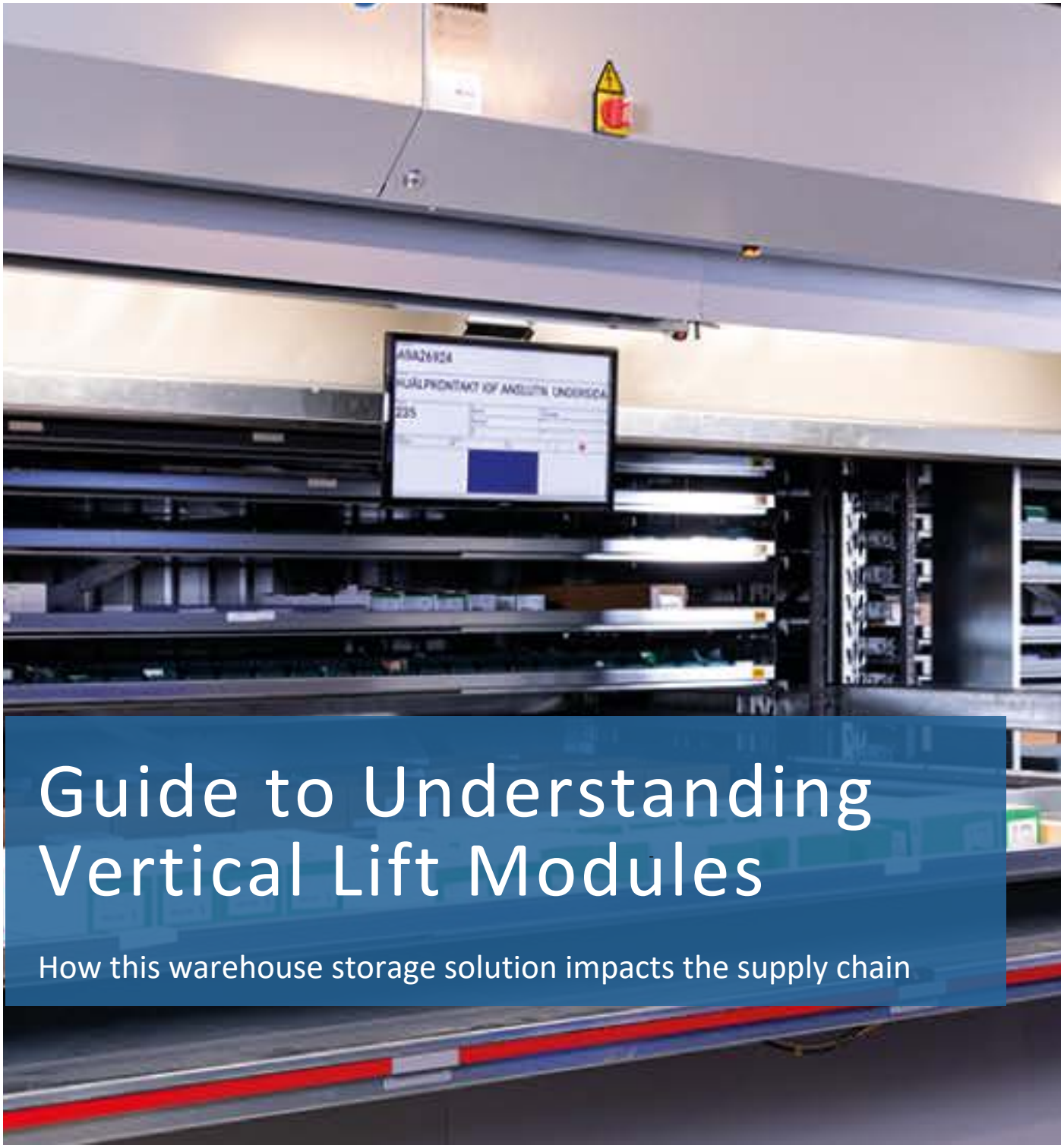

Guide to Understanding Vertical Lift Modules

How this warehouse storage solution impacts the supply chain

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How Vertical Lift Modules Are Used Across Industries

The characteristics and features that make them the optimal storage choice across a range of settings and industries.

A vertical lift module (VLM) is an intelligent storage solution comprised of two stacks of trays, one toward the front (the forward column) and the other in the back (the rear column).

In the middle of the forward and rear columns, there is a centralized elevator that runs vertically, retrieving trays and delivering them to the operator(s).

VLMs have characteristics and features that make them the optimal storage choice across a range of settings and industries.

For instance, VLMs maximize floor to ceiling space, freeing up warehouse horizontal square footage for purposes other than storage.

In addition, VLM shelves can be customized to accommodate different product mixes, and multi-column systems can be designed with access for up to six operators, allowing multiple users to retrieve product from the same machine, maximizing productivity while minimizing waiting.

The vertical lift module storage system operates according to the “goods to person” picking principle: the required materials are automatically taken to the access opening positioned at an ergonomic height, where a warehouse operator can retrieve or store items.

Multiple side-by-side access openings ensure continuity, speed, and maximum performance: as the operator retrieves or stores goods in one access opening the shuttle continues with its next handling mission. In this way, the warehouse operator is presented with the next tray in the adjacent access opening with zero waiting time.

Applications in the aerospace, life sciences, and e-commerce industries showcase the versatility of VLMs.

VLMs in the Aerospace Industry

Manufacturers in the aerospace sector typically have complex storage needs because they use a variety of different parts, ranging from very small and lightweight engine screws to very large and heavy fuselage components.

White Systems has even customized VLMs with shelving that is 16 feet wide to accommodate storing the leading edge of aircraft wings.

When selecting a VLM for the storage of heavy aircraft parts, it is critical to determine the load rating of the shelving. Why? Because the full width trays in a traditional single column VLM generally have a high tray capacity, but a very low pound per square foot rating in the tray itself.

That means an aerospace manufacturer that wants to store relatively small, but very heavy, dense items, should opt for a multi-column VLM designed to have a compact tray with a high pound per square foot rating.

At White Systems, we design each VLM to meet the needs of our aerospace customers. Some of our VLMs in the aerospace industry are eight feet wide, with trays that measure six feet wide. Others are multi-column VLM units measuring 23 feet wide and enclosing several single column VLMs.

VLMs in the Life Science Industry

Pharmaceutical companies, medical device manufacturers, and others in the life science industry need to store various parts, often in secure and definednenvironments.

In many instances, it is the site location that drives the VLM design. Ceiling height can vary, as can overall warehouse dimensions and other parameters.

White Systems offers numerous VLM options, and all of our automated storage and retrieval systems are fully customizable to meet each client's unique needs.

Case in Point:
One of our customers in the life sciences industry recently needed a VLM that provided operator access from both a clean room and a warehouse.

For this application, we designed a specialized solution that allowed product to be loaded from the clean room side, and then shipped from the warehouse side.

VLMs in the e-Commerce Industry

VLMs are proving increasingly valuable in the e-Commerce industry. Because they are vertical—some of our units reach 40 feet tall—VLMs help e-Commerce retailers maximize their floor to ceiling space and reclaim their warehouse floor space.

Moreover, even though the VLM is not the fastest technology available to retrieve product, a multi-column design that includes four or five VLM units working together can be a very effective e-Commerce solution.

A VLM can better utilize shelf space as it can use a concept called dynamic storage which means it can place shelves at varying heights above the tray below it.

For example, there may be a items that are 12 inches high and items that are 4 inches high. A VLM's dynamic storage system will minimize the air space between shelves making for a dense storage solution.

Put all of this together and it's easy to see why more and more e-Commerce retailers are using VLMs for space and efficiency gains.

Why Vertical Lift Modules (VLMs) Can Provide Competitive Advantages for Manufacturers

A popular storage choice across various warehouse settings and industries.

A vertical lift module (VLM) is an enclosed storage system consisting of upright stacks of trays with a centralized elevator running vertically between them.

The elevator responds to commands and can automatically retrieve and deliver trays to the operator(s), creating a true goods-to-person pick solution.

The combination of technology and design make VLMs a popular storage choice across various warehouse settings and industries.

Since VLMs offer numerous benefits, ranging from increasing available floor space and maximizing storage density to improving efficiencies and reducing labor costs, they can provide a competitive advantage in today's challenging manufacturing environment.

VLMs Increase Available Floor Space

VLMs have a small footprint on the warehouse floor. They are taller than they are wide, which optimizes overhead air space and frees up valuable floor space for purposes other than storage.

In addition, VLMs can be sized and capacity rated to maximize storage density. As a result, White Systems VLMs require up to 90% less floor space than conventional racking.

What size are VLMs? At White Systems, we design each VLM to meet the individual needs of our customers. We designed a large VLM to store aircraft components measuring up to 16 feet long, and that unit is 40 feet tall. Typically, though, VLMs are used to store smaller parts with shelves that are 27 inches high and eight, 10, or 12 feet wide.

VLMs Accelerate Picking

The mechanical elevator that runs between the stacks of trays in a VLM automatically locates and retrieves specific trays as directed by an operator.

Generally speaking, items stored in a VLM can be presented to the operator in less than 45 seconds; however, individual throughput rates will vary, depending on VLM configuration and application. VLMs have a wide range of throughput capabilities of up to 500 LPH utilizing a pod of machines.

One of the distinguishing features of a VLM is that its shelves can be customized to accommodate different product heights, maximizing storage density and increasing slotting options for better SKU management.

Moreover, multi-column systems can be designed with access for up to six operators, allowing multiple users to retrieve product from the same machine at the same time, with minimized downtime and waiting.

VLMs Improve Picking Accuracy

VLMs are intelligent storage solutions equipped with technology that can help improve picking accuracy, eliminating wasted operator effort and increasing customer satisfaction.

For instance, some multi-column VLMs, such as the SILO 2, have a user-friendly and intuitive visual picking solution called I-Ride, which illuminates the particular cell in which an item is stored and instructs the operator where to find the item on the tray.

While I-Ride technology is the most advanced way to access products, there are other options for improving picking accuracy.

For example, VLMs can have pick-to-light systems that use light-directed technology to identify product locations or voice automation systems that use verbal commands to drive the operator to a specific cell.

VLMs Provide Ergonomic Benefits

VLMs eliminate the need for operators to bend or reach for items.

Because VLMs present items at a consistent location, operators no longer need to walk the warehouse floor or use a ladder or man lift machinery to access items stored on elevated shelves.

VLMs can even adjust tray deliver height to accommodate different operators. Ergonomic benefits like these enhance employee satisfaction and lead to improved warehouse productivity.

WHITE DIGITAL LEARNING SERIES:

Special Features of Vertical Lift Modules

Custom features for increased throughput, efficiency, and accuracy of the picking process.

Today's Vertical Lift Modules (VLMs) are intelligent and versatile, enabling companies to work smarter, ship faster, and use space more effectively than ever before.

Comprised of stacks of shelves with a centralized elevator running between them, VLMs function as true goods-to-person delivery systems.

The elevator is programmed to retrieve certain trays and present them to an operator at a workstation, increasing throughput, efficiency, and accuracy of the picking process.

To complement their basic functionality, VLMs can be customized with additional features, including dynamic storage capabilities, multiple access openings, product identification systems, and specialized software integrations.

Dynamic Storage

VLMs are equipped with innovative hardware and software that can automatically adjust shelving based on the height of the items being stored.

This dynamic allocation of tray heights ensures maximum storage capacity with the VLM.

Dynamic storage makes VLMs ideal for companies storing parts or inventory that vary a lot in height, and it is one of the primary reasons these units have become so popular.

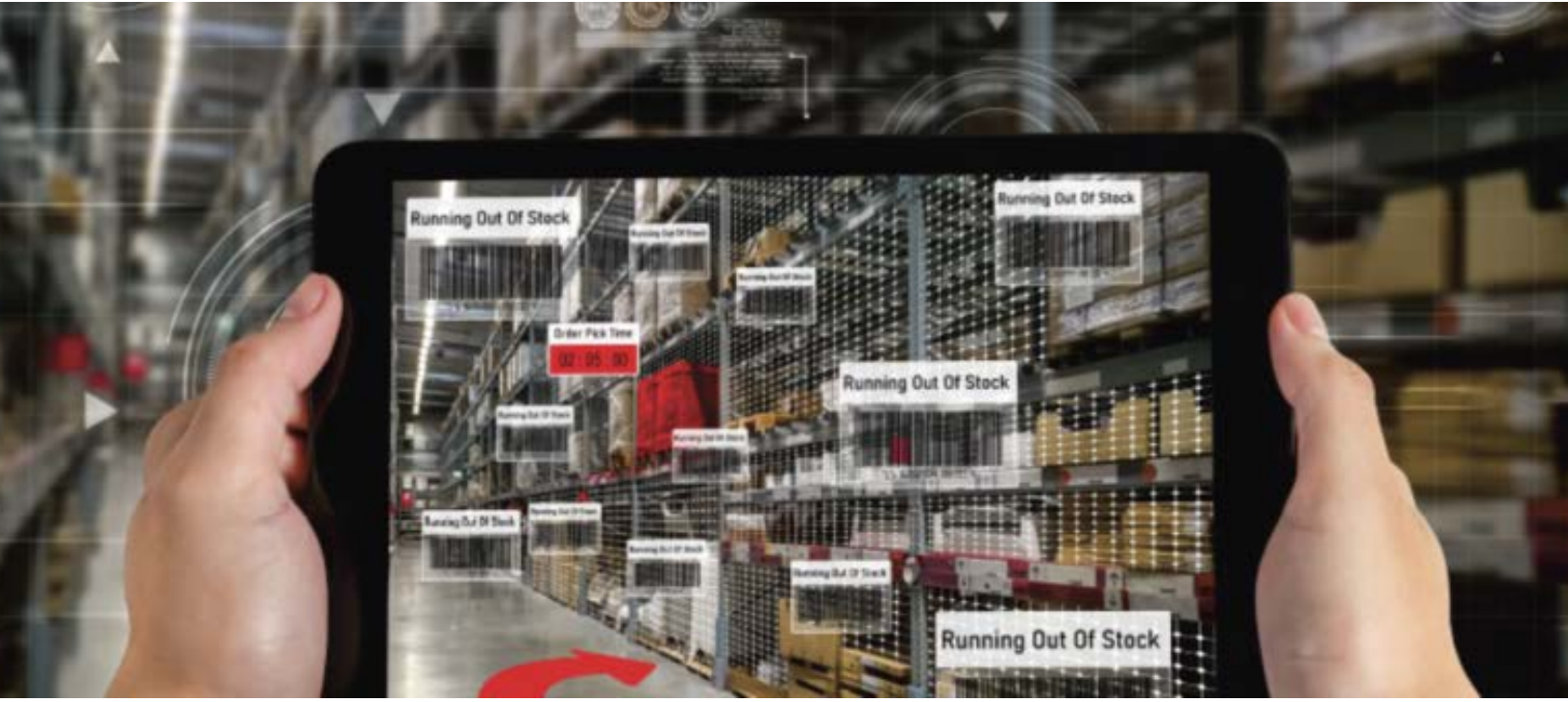
Multiple Access Openings

Multi-column VLMs can be designed with up to six access openings. These access openings are often located next to one another other, so that multiple users can retrieve product from the same machine at the same time, with minimal downtime and waiting.

In other cases, access openings may be located at the front and rear of the VLM, so that items can be loaded and stored from one area and the retrieved from another.

As an example of what's possible with mul ple access openings, one of our customers in the life sciences industry needed a VLM that provided operator access from both a clean room and a warehouse.

We customized a solu on that allowed product to be loaded from the clean room side, and then shipped from the warehouse side.



Specialized Software

VLMs are equipped with two types of software that must work together for optimal efficiency and productivity. First, there is the software responsible for the overall functionality of the VLM itself.

This software runs the machine, including dynamic storage capabilities and certain VLM options. In addition, VLMs use inventory management software that must be integrated with the host system.

The integration of the inventory management can be accomplished in a variety of ways. For instance, a transaction processor can be implemented, allowing the host system to run the VLM and pull the needed trays. Alternatively, full suite software can be run, enabling both the host system and the VLM to maintain inventory. Running full suite software creates duplicate inventory systems that can share information and keep records up-to-date.

Inventory management software can be the driving force of a VLM project, and at SencorpWhite, we are fortunate to have both Intek and Minerva, two software companies with expertise in this area.

WHITE DIGITAL LEARNING SERIES:

Successful Vertical Lift Module Installation

3 key steps to consider while researching your options

Vertical lift modules (VLMs) increase productivity by helping companies use cubic warehouse space more effectively while improving inventory management.

To maximize these benefits, it is critical to choose the VLM that is best suited for your storage environment and business goals.

When you research the various intelligent storage options now available, please follow these three key steps:

1. Identify the problem(s) you want to solve
2. Determine available warehouse cubic space and weight of products to be stored
3. Factor in VLM options and features, including service after the sale, which is often overlooked.

Step 1: Identify the problem you want to solve

The first step in selecting an intelligent storage solution is to determine precisely what business issues you are trying to solve.

- Do you want to increase throughput?
- Does picking accuracy need to improve?
- Could you use more warehouse storage space?
- What level of software control and management do you require to solve your problems?

In many cases, warehouse managers need updated storage solutions that can help them achieve multiple business goals at once. Sometimes clients do not realize the additional benefits of the right hardware and software combination.

Identifying the issues you want to solve helps you narrow the field of applicable storage options.

A VLM provides very dense dynamic storage for items of different sizes and allows operator to retrieve items ergonomically.

***Step 2**: Determine available warehouse cubic space, weight of products to be stored, etc.*

A VLM design is typically driven by site location and dimensions of the products needing storage. Because they are oriented vertically, VLMs optimize overhead air space and free up valuable floor space for purposes other than storage.

In fact, White VLMs require up to 90% less floor space than conventional racking.

VLMs can also maximize storage density by automatically adjusting shelving based on the height of the items being stored.

This dynamic allocation of tray heights makes VLMs ideal for companies storing parts or inventory that may vary in height. Compaction of the trays is one of the primary reasons these units have become so popular.

Load rating is also critical to consider when choosing the type of shelving required.

Longer trays often have a low pound per square inch (psi) load rating. That means if you need to store smaller heavy items, you may want to opt for a multi-column VLM that uses a compact tray with a high pound per square inch rating.

Step 3: Factor in VLM options and features, including service after the sale

VLMs can be customized with a variety of different features. Features offered are sophisticated product identifier systems, integrated inventory management software, and multiple operator access openings.

Required pick rates also play a role in selecting a VLM. When a pick rate, in addition to space utilization, is of the utmost importance, a multi-column VLM is often the best approach. Multi-column VLM's can provide the optimum presentations for an operator in distribution to maximize throughput and minimize operator wait time.

All of our White Systems automated storage and retrieval systems are fully customizable to meet each client's unique needs.

White has its own factory trained service technicians in field offices across the country . You can rest assured that VLM service and scheduled maintenance needs will be met quickly and reliably.

We take pride in our VLM hardware and software and celebrate the superior customer service we provide before, during, and after the sale.

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