

SOYOU WANT PAUTOMATE?





SO YOU WANT TO AUTOMATE? Your complete resource to obtaining a competitive advantage with warehouse automation by: Westfalia Technologies, Inc. and DPR Group.

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INSIDE

04 / **CHAPTER 1:** Understanding Automated Storage & Retrieval Systems

14 / **CHAPTER 2:** AS/RS and Order Fulfillment

19 / CHAPIER 3: Warehouse Execution Systems to Run **CHAPTER 3:** Your Entire Facility

CHAPTER 4: **30** / Warehouse Optimization Strategies

CHAPTER 5: 36 / **CHAPTER 5**: "Go Green" with a Sustainable Automated Warehouse

41 / **CHAPTER 6:** AS/RS Preventative Safety & Service

CHAPTER 7: 45 / The Workforce: Manufacturing



One indisputable fact exists for most manufacturers and distributors: warehouse automation stands as one of the last areas where long-term costs can be significantly reduced.



Automated storage and retrieval system (AS/RS) technology has come a long way in recent years.

Component materials have never been sturdier, and engineering designs are thoroughly vetted. **Warehouse management system** (WMS) and **warehouse control system** (WCS) software has undergone numerous refinements and operates almost flawlessly. In fact, one of the biggest changes is that these two warehouse software systems can be integrated with one another and have become known as **warehouse execution systems** (WES).

While warehouse automation technology —an AS/RS and WES — can help manufacturers and distributors keep products fresh, prevent and mitigate recalls, enable compliance with industry regulations and protect consumers, they also provide long-term benefits that generate additional cost savings. The AS/RS-WES combination allows companies to improve overall efficiency, meet growing customer demand, raise productivity, lower risks, boost throughput and increase inventory accuracy. Plus, an AS/RS has an average lifespan of 25 to 30 years with typical payback periods of between three to five years.

Manufacturers and distributors are looking for new, strategic ways to obtain a competitive edge. For most, this means doing things a little bit differently in order to operate more efficiently, improve customer satisfaction and cut costs.

Today, one of the most promising solutions for achieving a competitive advantage is warehouse automation technology.





Understanding Automated Storage and Retrieval Systems (AS/RS)

UNDERSTANDING AS/RS

Automated storage and retrieval systems (AS/RS) take the complexity created by growth and increased SKUs out of the hands of manual warehouse processes and place it in the reliable hands of automated machinery and software provided by the AS/RS manufacturer. A high-tech AS/RS offers companies the ultimate combination: a long 20-30+ year life span with internal rates of return (IRR) generally over 20%.

The savings are real. The returns are high. The reliability is incredible. It is all possible due to the following reasons:



Optimized space utilization	An AS/RS can enable the selection of a tight site or land-locked building by densifying and adding height to the storage system. Existing buildings can often be retrofitted, and new building heights can enable corporate growth by providing the proper inventory levels to meet customer demands.
Reduced labor and equipment costs	Although every warehouse situation is unique, a single crane operating on three shifts can generally do the same work as three forklifts and nine employees.
Less waste	An AS/RS results in less product damage, and theft is eliminated by "locked" inventory. Further, stretch wrapping costs decrease because less wrap is needed to secure goods on a pallet.
Lower maintenance costs	Forklift leasing and maintenance costs (battery charging station, battery replacement and general cleaning costs) generally exceed normal AS/RS maintenance requirements.
Lower energy costs	Businesses experience lower energy costs, often on the order of 30% or more, especially in refrigerated and frozen warehouses. An AS/RS allows businesses to operate using less square footage and in a tighter cube with smaller ingress/egress openings. Thus, there is less space to cool and less refrigeration tonnage needed.

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05

The AS/RS industry is mature, and along with that, the technology has been proven across many industries.

These are just some of the reasons why companies worldwide are investing in high-tech AS/RS. Better still, the efficiency gains realized through optimized warehouse operations and the cost savings accrued via maximized space utilization are only expected to rise as new innovations advance this technology.

Most of the advancements a user will see are in the stability of systems and robustness of equipment. Along with this comes the user friendliness of software interfaces and the accessibility to operational metrics.

AS/RS DESIGN

With continued growth and SKU proliferation, manufacturers and distributors are struggling to find the necessary space for storing these products. Warehouse space is at a premium and new construction can be an expensive undertaking if not planned properly. By retrofitting their facilities or expanding with high-density, multiple deep AS/RS, these organizations can essentially "do more with less" – they can store more product in a smaller, or same amount, of space and have room to accommodate future growth.

Often, these systems can eliminate off-site storage, cross-docking to remote facilities or other inefficient double handling and extra transportation of product. With transport and storage costs averaging as much as 50 cents per case, these savings can quickly add up.





Robotic systems can also complement an AS/RS. They can release cases and layers to fulfill orders and be replenished from the AS/RS. The WES ties it all together, triggering automatic replenishments and managing all product movement into and out of the warehouse. These systems are often called "order fulfillment systems" and add another level of automation to the process.

Today, two storage and retrieval machines (S/RMs), or cranes, can be placed in the same aisle, an AS/RS innovation made possible by greater flexibility in controls and WES software. So, if throughput increases are anticipated, the addition of a second crane in one aisle may handle the volume with ease. Plus, the second crane provides redundancy should the other be undergoing routine maintenance.

An AS/RS also allows for better management of SKUs. Modern AS/RS implementations can be flexible hybrid systems. In a hybrid configuration, some lanes are single deep, some are double deep and some are multiple deep (3 to 12 pallets deep). Thus, AS/RS design can match a client's item/ SKU mix and its varying product throughput rates and inventory levels. Should the AS/RS require expansion to meet future growth, aisles can generally be lengthened or added, providing both lateral and longitudinal expansion alternatives.

Assuming the 80/20 rule applies to your operation, the AS/RS better manages "slow-moving" SKUs and targets high-moving SKUs by optimizing their space effectively.



An AS/RS is made up of five essential components:

- 1. A rack system to store product
- 2. A crane or S/RM (storage and retrieval machine) that runs on a floor rail
- 3. A load-handling device/shuttle to move product from the crane to the rack location
- 4. A *conveyor system* to move goods to and from the AS/RS and dock areas
- Warehouse execution system software to control, track and optimize all product movements 5.





DATA ANALYSIS AND METRICS

Despite any preconceptions about automation technology, it is simple to decide whether or not to invest in an AS/RS by taking the following three-fold approach:

- **1.** *First*, perform an analysis of the warehousing system's existing design and framework.
- **2.** *Then*, examine some basic, yet key, criteria to determine if the operation is suited for automation technology.
- **3.** *Finally*, justify the basic cost for such a system by demonstrating its overall benefits.

Data analysis is the first step in determining the requirements of any warehousing and distribution operation. Customer-provided data regarding the number of items/SKUs, product throughput rates and more are critical to AS/RS design. However, merely receiving the data is not enough. System designers must understand each customer's data in order to develop a design that will take advantage of the latest technology and generate the maximum savings possible.

So You Want to Automate?



Answering the following five questions will help analyze your warehouse using basic data that should be easily available.

1. HOW MUCH INVENTORY (IN PALLET POSITIONS, IF APPROPRIATE) MUST BE STORED IN A GIVEN DESIGN YEAR (EX: 5 YEARS OUT)?

The capacity of the system will define the cube of the warehouse. *Most automated systems storing finished goods tend to have over 500 pallet positions of storage.* Systems smaller than that tend not to be candidates for automation unless used for work in process (WIP) production buffers or similar applications.

2. HOW MANY ITEMS (SKUs) DOES THE INVENTORY CONTAIN?

This should include all variations of product size, container type, etc. *The number of SKUs will define how selective the inventory will have to be*, thus enabling the potential use of multiple deep systems that reduce the building footprint.

3. HOW MANY SKUs REPRESENT APPROXIMATELY 80% of the Annual Sales Volume and 80% of the Inventory?

The Pareto analysis (80/20 rule) will validate what SKUs have the volume and inventory, allowing you to allocate the right storage depth to the right type of inventory. *More often than not, 80 percent of a company's volume and inventory is based on 20 percent of its SKUs.* An

AS/RS will allow you to better manage "slow-moving" products and target your top inventory to effectively optimize space.

4. HOW MANY UNIT LOADS PER HOUR ENTER AND EXIT THE WAREHOUSING OPERATION? Warehouse input could be from production and/or outside suppliers. Outbound loads could be full pallet to truck or replenishments to a pick area. *The throughput will determine the number of storage and retrieval machines (S/RMs) needed.* Throughputs less than 20 to 30 pallets per hour total will tend to be more difficult to justify.

5. HOW MANY HOURS OR SHIFTS IS THE WAREHOUSING OPERATION ACTIVE?

The number of working hours will determine whether the asset will be used for more than one shift. *Automated systems used in single shift operations tend to not be justifiable.* At least two shifts are generally needed to justify automation.



Knowing the above information and verifying its accuracy are crucial to form an initial idea of whether or not warehouse automation is a good fit. By analyzing the inventory data in more detail, you can determine the average inventory levels per SKU and divide these into logical groups.

The following breakdown groups can be used as a guideline:

Inventory levels per SKU of less than 7 pallets – *use single deep storage*

Inventory levels per SKU of 8 to 14 pallets – *use double deep storage*

Inventory levels per SKU of 15 and greater – *use multiple deep storage* By defining these conditions, it is possible to gauge if the operation is best suited for single-deep or multiple-deep storage. With multiple-deep storage, considerable space savings are achieved but selectivity is reduced. Therefore, you generally want to store the same SKU in a multiple-deep storage lane. Automated systems have an advantage in that they can rewarehouse pallets automatically as long as this work is not performed during peak shipping hours.

For most manufacturing operations, a small number of items typically account for 80% or more of the volume and inventory. So, how deep (storage lane depth) should these manufacturers store their inventory? Again, this depends on the inventory levels per SKU. Generally, high inventory item SKUs, or items with more than 30 pallets per SKU, are assigned to a storage block that is anywhere from seven to 12 pallets deep. The rest of the items are assigned to another storage block that ranges from two to six pallets deep. Of course, with automated systems each lane at every level is accessible. Compared to a drive-in or drive-through rack, it is obvious that an 8-deep automated high-density warehouse will result in a higher storage utilization than a 4-deep, 3-high drive-in rack system serviced by conventional fork-trucks. In the automated case, to get to the eighth pallet, seven pallets must be removed. In the conventional case, to get to the last three pallets, nine pallets must be removed.



So You Want to Automate?

Perhaps the most important statistical information concerns throughput. In conventional systems, throughput determines the staffing levels and the number of fork trucks required, whereas with automated systems, throughput determines the quantity of S/RMs required. One S/RM is usually capable of handling between 60 to 70 unit loads per hour when handling one unit load at a time. Systems handling two unit loads at a time are also available and can almost double that throughput per S/RM.



COST JUSTIFICATION

Assuming an automated warehouse is deemed to be a good fit, it is time to justify its cost by looking at the following elements:

Site conditions	Consider site conditions of the warehouse. If the site is landlocked, the automated system is advantageous because the building (assuming new construction) can be as high as 90 to 100 feet (although 40 to 80 feet is typical). This reduces the slab size and can allow the storage facility to remain on existing property. If an existing building is to be retrofitted with automation, increases in density can often achieve 30% to 50% more storage.
Labor requirements	Calculate the labor required to operate the facility. Worker productivity in environments with automation technology is often significantly higher.
Inventory accuracy and control	Look at inventory accuracy and the level of control needed to manage it. Do employees requiring inventory management information have it available at their fingertips? Can custom reports be generated by warehouse personnel? An automated system allows for accurate inventory control on a real-time
Equipment usage	Lastly, assess the number of shifts the equipment is running per day. Typically, automated systems require a 2-shift operating period to justify. This is logical as any machinery must be properly utilized to be justifiable.

Perform the justification of an automated system using discounted cash flow capital budgeting techniques. When using straight payback methods, the time value of money is rarely taken into account. To compound the problem, the benefit of having the automated system operate for its anticipated life of more than 25 years is ignored. Fortunately, determining the net present value (NPV) and the internal rate of return (IRR) is easy with today's spreadsheet programs. These figures should justify the initial cost difference associated with installing an AS/RS versus building a conventional system. Compare both of these by establishing cash flow differentials between a "base case" conventional approach and an automated approach, and then apply the cost differential to the cash stream that is generated to offset the investment.



IMPLEMENTING AN AS/RS: FIVE RULES OF AUTOMATION

The beauty of an AS/RS is that it can be installed in an existing warehouse or designed specifically for a new facility. However, many companies considering this technology are unsure where to begin. **Here are a few considerations to get started:**

1. PURCHASE HIGH-QUALITY Equipment

Lowest cost does not equate to the best business deal. Any perceived initial cost savings will soon be replaced by expensive equipment downtime and costly repairs.

2. LOOK LONG TERM

No business success is achieved overnight. Most involve progressive steps implemented over time. With a **25+** year life cycle, it is unrealistic to think an AS/RS can pay for itself in 12 months.

3. BRING IN OPERATING PERSONNEL EARLY ON

Do not wait until the system is about to go live to involve operating staff. *Operating personnel should be part of the project team from the start.* An AS/RS implementation is far more successful when it is embraced by the people and culture of the organization.

4. BE PROACTIVE

It is less expensive to follow recommended preventative maintenance schedules today

than to skip them and pay for major repairs tomorrow. Delays that create dissatisfied customers are "hidden costs" that can be avoided by following expert recommendations.

5. SELECT THE AS/RS VENDOR CAREFULLY

If a company does not possess credentials in the industry vertical in which you operate, find a vendor that does. Choose an automation partner that takes the time to understand your business and develop the right level of automation for your specific needs. Too many times automation suppliers focus on fitting their systems into a customer's needs and the end result is a system the customer is not satisfied with. Understanding your business and your unique requirements is a prerequisite to a successful implementation. Identify a vendor that sticks to the fundamentals, stays within its core competencies and has the vision to identify with your problem domain. The open and honest partnership of discussing current business practices and how those will blend with applying automation to your business is the key to success.

While these rules may seem simplistic, they are guiding principles that all businesses should follow. Adhering to these five fundamentals will assure the purchase of a high-quality AS/RS that will yield economic benefits for the next 25+ years.





AS/RS and Order Fulfillment

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ORDER FULFILLMENT

Order fulfillment is becoming a more complex process than ever before. In today's fast-paced business climate, companies demand and expect more from their warehouse and distribution centers as their orders are more frequent, contain more diverse SKUs and require more custom-tailored solutions. There is simply no excuse for delays, delivery of low-quality products and order line errors.

To meet these demands, distributors and manufacturers are under pressure to fulfill orders within a shorter time while maintaining the highest level of service, reaching a broader range of customers and remaining competitive. However, successful order fulfillment begins with the design of the warehouse and picking process.

Integrating an automated storage and retrieval system (AS/RS) with robotics or case release systems can drastically simplify the picking process to improve order fulfillment. Using a combination of robotics, equipment and controls, an AS/RS, when properly integrated, can provide reserve and replenishment functions without human intervention. Automatic layer picking, as shown in the picture on this page, can automate a large portion of what might otherwise be picked manually without using complicated mixed layer technology. This depends on the order profiles and a separate analysis must be performed to evaluate its merits.

So You Want to Automate?

The great thing about a high-density AS/RS is its ability to combine and simplify different processes inside the same building footprint.

JUST-IN-TIME

With today's fast-paced supply chain and rising consumer demand, it has become a standard practice for warehouses to prepare and stage orders prior to the truck's arrival, typically up to 24 hours in advance. While this practice may seem like an effective method of fulfilling orders in a timely and accurate manner, it doesn't take into consideration the possibility that the truck is late, or worse, doesn't show up at all.

So, what happens if a warehouse prepares and stages an order and the truck doesn't arrive until hours after it is due? In such cases, the staged order ends up sitting in the facility, clogging up valuable space and incurring costs. Additionally, when the truck does arrive, most carrier companies require a two-hour turnaround for loading and shipping the order, and if the truck exceeds that two-hour window, the warehouse or distribution center will face a detention fee.

The reliability of trucks is vital to keeping a warehouse flowing and running smoothly. In order to make the entire logistics plan more reliable, and to solve the trucking problem mentioned above, warehousing and distribution companies should implement Just-in-time (JIT) order fulfillment strategies. The idea behind JIT order fulfillment is to prepare orders right when the truck arrives on site as efficiently and quickly as possible.





Yet, with a manual labor force and a traditional warehouse storage system, JIT order fulfillment is nearly impossible. Instead of spending money on increasing staff or expanding existing real estate, organizations should look to warehouse automation technology to solve this problem.

An automated order fulfillment system provides a viable solution for meeting JIT requirements. These high-density, robotic systems can store and retrieve layers and cases from inventory with maximum speed, efficiency and responsiveness. When integrated with a warehouse execution system (WES), a system such as this gives the organization full control over its material flow.

With an AS/RS integrated with more manual picking processes, full pallet quantities are generally retrieved just in time when the truck is confirmed to be on the premises. Order picking at the case level tends to be executed beforehand as this can take more time. Order pallets can be pre-staged on the dock or placed back into the AS/RS for later retrieval with the full pallets.

Using a WES, organizations can more easily identify the product that is necessary to fulfill a particular order and then direct the workflow needed to fulfill that order in a timely fashion.

SO HOW DOES IT WORK?

The order fulfillment process really starts when the truck appointment is made or when the truck arrives. When the user "checks in" the truck, he or she assigns the order and a specific loading location for that vehicle using the WES software. Once the truck pulls into the loading position – regardless of arrival time – operators then use the WES to release the orders. Here, the software directs the material handling equipment (i.e. S/RM or robots) and/or material handling personnel to pick and dynamically deliver the product for the order to the appropriate area for loading. Because of the sheer speed of the system, it is not necessary to stage all material on or near the loading dock, and products are only brought out when needed. This may not apply



to order-picked pallets that may need to be staged ahead of time due to the lag time required for picking. This frees up a great deal of warehouse space and keeps everything flowing smoothly. When manual picking processes are also involved, a WES will marry these portions of the orders with those picked by automation and direct them to the appropriate loading dock. This cuts down on the number of wasted steps in the manual process.

From a quality standpoint, WES software plays a key role in verifying that the product ordered is the product that is actually loaded and shipped. As the truck is loaded, the software automatically performs real-time verification checks to verify that the correct product, and quantity of that product, is being placed onto the correct truck. This is especially useful when there are many operators handling a high volume or wide variety of orders. Using barcode or RFID scanning systems interfaced with the WES, the operator can simply scan a tag tied to the loading location, then scan a tag on the product or pallet and automatically validate that the correct goods are going onto the correct truck.

Operators can later perform pre-shipment activities, such as generating a bill of

lading, manifests and other necessary paperwork. Additionally, the WES can interface with transportation systems so that carriers can track the loads and loading times in their systems. This allows warehouses to uphold service level agreements with their carriers, helping to prevent shipping delays. If the truck shows up four or five hours late, or if the load gets dropped, the warehouse is able to continue operating without a hitch – there are no scheduling disputes and the likelihood of detention fees decreases. And, for food and

If the truck doesn't show up, everything will continue to operate smoothly.

beverage companies that deal with frozen or refrigerated goods, perishable items are kept fresh and safe in their respective freezers until the truck arrives.



Warehouse Execution Systems (WES) to Run Your Entire Facility

25



WAREHOUSE EXECUTION Systems

With the increased emphasis on automation, today's manufacturers and distributors are realizing the importance of software applications in running their operations as efficiently as possible. Most of these companies are accustomed to using both a warehouse management system (WMS) and a warehouse control system (WCS) to help move product quickly, create optimal inventory levels and improve order fulfillment accuracy.

However, in a typical warehouse, the WMS and WCS tend to be separate applications. Without seamless integration of the WMS and WCS, this combination of applications actually creates more challenges.

Consider the functions of these two interdependent applications: the WCS receives commands from the WMS and in turn, tells the equipment what to do. In essence, the WMS manages the workflow of the operation while the WCS executes the workflow utilizing automation. However, in order to reap the benefits of automation with separate WMS and WCS applications, complex integration efforts are generally required. Valuable time and resources are often needed to support both systems and ensure that they effectively communicate with one another.

A WES is a software solution that offers an integrated set of WMS and WCS functionality within a single application. A WES is able to simplify warehouse communication and controls while greatly reducing the complexity of utilizing several "function-specific" applications.

So You Want to Automate?

ENTER THE WAREHOUSE EXECUTION SYSTEM (WES).

Ideal for organizations with increased order volumes and high throughput needs, a WES is able to receive and track product while optimally marrying inventory to customer orders through its order fulfillment processing capabilities. As users generate orders for fulfillment, the WES efficiently breaks the orders into logical units of work and then utilizes its WCS functionality to direct automated material handling equipment and/or manual labor to execute the work. Higher-level WMS functions, such as inventory tracking, lot management, etc., continue to be managed within the WMS components of the WES application. Like the conductor of an orchestra, the WES provides the overall coordination of all WMS and WCS functionality in one application – inventory management, order management, bill of lading/manifest creation and workflow as well as the direction of material handling equipment in real time throughout the entire warehouse.

ONE SYSTEM, MULTIPLE BENEFITS

As a "two-in-one" solution, a WES has many distinct advantages over individually implemented WMS and WCS software. First, complex integrations are dramatically reduced because of the WES's built-in WMS and WCS feature sets. Resource time is also greatly reduced because you no longer have to worry about whether or not the WMS and WCS will communicate with one another.

Second, a WES offers the flexibility of interfacing with other applications and host systems, such as a corporate ERP, PLCs and other automated equipment like wrappers and print-and-apply units. Inevitably, customization is necessary within a WES. That effort should be focused on the implementation of customer-specific business rules and the interfaces needed to accommodate specific ERP/host system needs, not on integration of the WMS and WCS applications. When implemented company-wide, a WES requires less of a learning curve for those using the system as everyone is using the same system.

Organizations can transfer individuals from one location to another without needing to retrain them and, therefore, raise productivity.

While a WES is able to replace WMS and WCS applications altogether, its flexibility allows for various deployment options. For those with an existing WMS looking to introduce a WCS only to assist in automation, it is best to opt for a WES instead. The company has the ability to continue using their familiar WMS, integrate it with the WCS portion of the WES and then enable the WMS/WCS functionality as needed.

It is also important to note that a WES is effective in a non-automated or slightly modified facility – where an AS/RS is not required to utilize a WES. If an organization has not yet introduced automation warranting a WCS, it can still implement the WES, utilize its WMS capabilities and then "turn on" the WCS function when needed. This allows operators to utilize a familiar user interface, reduce training time and shorten the system start-up duration.

When manual picking processes are involved, a WES helps users to more efficiently manage order fulfillment by performing preallocation checks. This allows the user to determine if enough of the right product is available to fulfill the requested order quantities and better manage their appointments and vehicle-scheduling activities. Ultimately, a sophisticated WES has the ability to help an organization utilize its automation and warehouse personnel more efficiently, deliver better storage utilization, increase inventory accuracy, improve product traceability and allow for customization to accommodate specific warehousing needs.

Without a doubt, manufacturers and distributors who consider WES now, rather than later, are positioning themselves to gain an edge in the increasingly competitive global marketplace.

TRACK-AND-TRACE: WHAT IS REALLY HAPPENING?

With a WES and integrated automated storage and retrieval system (AS/RS), operators can obtain real-time insight into their inventory, including when a shipment arrives, when it departs and where it is going. Therefore, *if a product is recalled, it is easy to look into the system and quickly identify the batch that contained the faulty goods, pinpoint when it departed and where to and pull all items in that batch from the store*

shelves. By identifying and pulling the exact batch, companies do not have to waste valuable time and money removing every product from stores in an attempt to remove all contaminated items. And, with reliable data, they can prove compliance with any relevant safety regulations and confidently assure consumers that they have taken fast and thorough action to withdraw all necessary products.

Also, traceability data can indicate if any faulty products are still in the warehouse. If this is the case, manufacturers can remove these goods before they are even shipped and make sure that perfectly good, uncontaminated products do not go to waste.

While quickly reacting to recalls is great, preventing them from happening in the first place is even better. This, too, is possible with automation technology – not only because users can identify faulty products before they leave the warehouse but also because automation increases the speed that products are moved in and out of the warehouse. For the food and beverage industry in particular, the high-speed nature of AS/RSs prevents the spoilage of goods. In addition, *automation contributes to safe materials handling, decreasing the likelihood of product damage and the contamination of food items.*

As the number of recalls shows no sign of slowing down and more industry rules and regulations are coming into play, it is up to manufacturers and distributors to do more by investing in automation technology to keep consumers safe and their brands intact.

IMPLEMENTING A WES

Most experts agree that the average life cycle of a WES is between eight and 10 years. Of course, inefficiencies that increase staff response time, as well as the inability to incorporate new technological advances or new functional requirements within legacy systems, may signal the need to retire a WES long before the end of its projected life cycle.

New technology enables warehouse operations to leverage the latest advances and be more efficient. Moreover, it helps reduce overhead costs, especially in those instances where in-house staff

Warehouse inefficiencies carry significant business costs both in terms of personnel time and customer satisfaction. Delays can even translate to lost business. have been maintaining older technology and/or vendors have been customizing the legacy system in an attempt to keep up with new demands. Technology acquisitions are major capital investments that require careful due diligence.

When considering a move to a new WES, the management team should consider these six factors when evaluating vendor offerings:

FACTOR #1: SOFTWARE SUSTAINABILITY

Sustainability is a key component when assessing software. It speaks to both the stability of the software and the vendor behind it.

Companies seeking a WES application should be mindful that there are many applications in the marketplace branded as "WES software." The technology employed provides insight into how viable a product might be.

Key questions to ask the vendor include: Is the product a "one off "? Is it open source? Is it **Microsoft-certified? Can it support new** platforms such as Android, Apple and others?

From a warehouse perspective, most firms are not currently using handheld and tablet technology, yet market trends are moving in that direction, especially for team leaders and operational managers. Firms looking to employ advanced applications in the near future should consider looking for WES software that can integrate with this technology.

A vendor's use of the .NET technology and C# language demonstrates a desire to keep current with modern technology and to develop secure and robust applications. It is also indicative of a future-oriented company whose application will not be moving to a legacy status any time soon.

Possessing the credential of "Microsoft Gold/Silver Partner" also shows that a vendor is keeping pace with technology. It indicates that the vendor has a closer working relationship with Microsoft, giving it access to new Microsoft products earlier than the general marketplace. This helps to ensure that the applications delivered support newer technologies.

So You Want to Automate?

FACTOR #2: CUSTOMER SUPPORT

Customer support is one of the most important — yet frequently overlooked — considerations when acquiring WES software. For many years, customer service was an afterthought. Today, it is a critical factor that sets companies apart.

To understand the support model a provider offers, start by looking at the level of support and service a vendor is willing to give before, during and just after product installation. Does the vendor act as a partner or more like an hourly service provider? Review how the provider handles customer training as well. Is the vendor willing to do hands-on training? Are they willing to come on site and work with staff to not only understand the application but also show how the application runs in the customer's unique environment?

Assess the knowledge base evident within a company too. Does it appear as though only one person holds all the product knowledge? What happens to support if that individual is unavailable?

Evaluate the availability of support as well. Is the vendor always available (24/7) or accessible only on a 24/5 basis? Does the vendor charge more for after-hour support?

Above all, determine whether the vendor can get you what you want when you need it — or at least provide a credible timeline for receipt.

Successful vendors know that word-of-mouth reputation is vital, and one bad experience can make or break a **firm. Do not be afraid to ask for references and speak** candidly with current vendor customers.

So You Want to Automate?

FACTOR #3: SOFTWARE FEATURES

WES software can provide a variety of features. Clearly, the core features encompass areas such as inventory management, lot or batch tracking, order processing functionality and product movement tracking. Beyond offering this, the application should run on multiple platforms.

It is becoming evident that standalone warehouse management systems that are not born out of automation tend to not interface well with WCS.

Consider, too, your business plan relative to warehouse or distribution center automation. Remember, WMS applications deal more with the administrative tasks of a warehouse, such as managing inventory, spoilage, MRP, etc., whereas WCS software focuses on equipment control, storage optimization and processes for optimal product retrieval.

If a business is just looking for a WMS and has no plans to automate the warehouse, then integration of WMS and WCS is not a critical concern. However, if automated product movement (utilizing LGVs, conveyors, etc.), stretch wrapping, automated label application, etc., is under consideration, then the ability to integrate the WMS and WCS is vital.

27

FACTOR #4: COST

Cost is often a more influential factor in smaller companies seeking WES software than in larger firms. Still, the benefits a system provides should always carry more weight than the price tag. Of course, all companies must consider the payback period, or how long it will take to pay back the capital investment. Most firms consider a good investment to be one in which payback occurs within one to five years. *The return can come in many forms, including labor savings and economies available through inventory control and possible reductions.* The accuracy of the information a WES provides — and the business advantage such data offers— is an often overlooked consideration that adds to ROI. It's not strictly about headcount reduction and dollars and cents. It's about workflow processes and having your software drive standardization, information sharing and consistency.

Don't forget the cost of annual software maintenance when evaluating the total cost of ownership. A system may cost \$300,000 to acquire, but annual maintenance could range between 10% and 20% of that cost.

FACTOR #5: CONSISTENCY

In an ideal world, businesses would prefer a streamlined system to run all their warehousing and/or selling locations seamlessly. Having one vendor's enterprise resource planning (ERP) system and another's WMS for example can create issues. Then adding yet another application to the mix, such as a WCS, will make things even more complicated.

Yet, each application serves a unique purpose, and different organizational units possess distinct preferences and may have separate purchasing efforts. So, the ability to simplify these integration efforts across an enterprise by purchasing a WES is important.

FACTOR #6: LONG-TERM SUPPORTABILITY

Most experts estimate that annual system support costs will average between 15% and 18% of the system acquisition cost. While most companies are comfortable with this estimate because cost is not the most important factor, it may still raise concerns. However, when it comes to supporting your firm, the more important questions are, "Does the WES vendor want to learn about and understand my business?" and, "How dedicated is that provider to assuring that the WES keeps pace with my business as it grows considering all the advancements in technology?"

Another factor to consider is whether keeping current with new technology will require undergoing a major upgrade. Most vendors offer one or two software updates a year. Anything more than that could be indicative of an unstable product where the vendor is still growing and trying to understand what it needs to deliver.

A good support contract should cover any system needs the customer has throughout the contract term and enhance the original product through updates.

The biggest focus that many software vendors miss is customer support. Customer support and customer service should be a number one priority and the providers that understand this will not only be around for a long time but also enjoy repeat customer business.

Software can offer all the bells and whistles in the form of hundreds of features, but in all likelihood, you, the customer, will only use a few of them. If the selected few don't work well — and the vendor doesn't support them or take the time to understand your business — then it is time to look elsewhere.

Chapter 4

Warehouse Optimization Strategies

OPTIMIZATION STRATEGIES

From SKU proliferation, to e-commerce, to increasing customer demand, changes and trends in today's supply chain have significantly complicated the warehousing industry. As warehousing organizations look for new ways to stay ahead of these shifts and challenges, many are embracing automation technology to drive new efficiencies.

Many organizations have relied on the same facilities, the same processes and the same homegrown systems for years; however, when it comes to automating their warehouse, some are unsure where to start. To help jump-start your efforts, here are five strategies for optimizing warehouse operations with automation.

#1: RETROFIT YOUR EXISTING FACILITY

After experiencing a period of significant growth, you realize that your remaining warehouse space is limited. Your facility is maxed out, and you're receiving pressure from upper management to meet these growth needs. In order to accommodate your booming business, you immediately decide to embark on an expansion project and begin weighing your options. Should you build a brand new warehouse, utilize an off-site storage facility or expand the current facility?

Although these options will certainly generate more space, in actuality, the general construction will yield nothing to ROI and add minimal value to the growth process. Instead of opting for expensive new construction, you may be overlooking the most practical solution, your existing facility. All you need is the right type of automation. By retrofitting your warehouse with the proper automation technology, you may be able to leverage your existing assets and real estate to accommodate growth. Retrofitting opens the door for many businesses to increase their warehouse storage capacity without actually expanding the facility itself. Introducing a highdensity AS/RS to your existing facility will instantly improve your cube utilization.

You'll be able to store more product in the same (if not smaller) amount of space and eliminate the need for new construction or off-site storage – costly options that produce little ROI.

Often, an AS/RS can minimize your overall building footprint by up to 50% when compared to a conventional warehouse. At the same time, you'll better position your facility for growth and have room to accommodate new SKUs.

It is also possible to integrate other capabilities into the AS/RS within the existing warehouse, including order fulfillment or case picking to accompany unit load demand. As a result, you get even more value out of your investment.

Additionally, it is easier to justify the cost of automation systems if the general construction can be reduced or eliminated from the project. Facilities themselves do not generate ROI and only dilute the return on the automation being considered. Although you'll contribWith automation, you'll not only eliminate the element of new construction, but you will also receive the added benefits of increased productivity, greater inventory accuracy and improved ergonomics.

ute capital to automation upfront, the pay-off will be well worth it – typical AS/RS payback periods are three to five years, and the systems have lifespans of more than 25 years.

From a "green" perspective, automating an existing facility is the clear winner over new construction. Obviously, automating the existing facility, rather than increasing land usage by building new structures, reduces your organization's carbon footprint. Within an automated facility, you'll realize even more eco-friendly benefits. Besides reducing labor with automation, an AS/RS can run in a "lights out" environment, leading to energy savings. Similarly, eliminating the need for gas or electric-powered fork trucks reduces emissions from engines or battery charging areas.

Today, automation delivers such a high level of performance and reliability that it is in your best interest to investigate this technology. If at all feasible, utilize existing real estate assets and automate what you have. In addition to eliminating new construction, you will be automating your processes and positioning your warehouse for greater efficiencies and future growth.

#2: CONSOLIDATE DISPARATE FACILITIES

While some organizations believe the next logical step in growth is to expand and establish new sites, others are realizing that less is actually more by consolidating and centralizing operations.

Typically, large corporations have a main on-site warehouse, accompanied by additional external locations. Managing geographically dispersed satellite warehouses requires labor-intensive efforts that compromise productivity, especially when the organization is handling a high volume of orders that require picking products stored in off-site warehouses. This becomes a logistics nightmare as workers try to aggregate these scattered items in order to send them to a single destination.

By consolidating operations from several smaller, remote locations into one large, centralized warehouse, organizations can reduce the volume of work needed in external sites, such as order picking, and eliminate the logistical challenge of collecting products residing in multiple locations.

Successful consolidation is achieved with automation technology, specifically high-density AS/RS. Because an AS/RS allows you to better utilize space and store more inventory, consider consolidating several smaller, disparate warehouse facilities. By combining operations from remote locations into a centralized warehouse, you'll reduce costs associated with additional labor, resources and energy consumption. Plus, you will no longer face the logistical challenge of aggregating products residing in different sites to fill orders. Rather, ship ready-made order pallets to your selling locations and only crossdock them there. While there are many choices, each one needs to be studied and applied properly to your unique business needs.

The following are three chief areas in which automation enables effective warehouse consolidation and centralization.

• Cube Utilization: High-density AS/RS allow for improved cube utilization, or storing products more effectively in the existing facility rather than expanding the storage space of the warehouse itself. Not only can the existing facility accommodate the combined inventory, but it can also minimize the facility's real estate footprint and reduce energy usage. • Control: Automating processes within a centralized location gives warehouse personnel greater control over operations. The software component of an AS/RS helps users boost inventory accuracy – workers know where and how much product is located within the facility and can possibly reduce inventory levels. Additionally, there is no need to search for products across several off-site warehouses and then consolidate in a struggle to fill orders in a timely manner.

• Cost Savings: Automation of an existing facility provides a return on investment not found in new construction. The efficiencies provided by AS/RS lead to fewer errors, less damage and a faster turnaround for order fulfillment due to less-complicated logistics. Reducing labor and energy costs provides even more savings.

It is important to note that automation is not about taking dispersed warehouse operations or old processes and bringing them together in one place. Rather, automation revamps and dramatically improves processes so that large volumes of orders are handled with greater efficiency. By turning to automation to help consolidate warehouses, growing companies can more readily store and retrieve inventory, reduce operating costs, and promote efficiency across their supply chains. In a short amount of time, these companies will realize that less really is more.

#3: OPTIMIZING THE PICKING PROCESS WITH AUTOMATION AND REAL-TIME, VISUAL BASED SOLUTIONS

Warehouse automation via an AS/RS optimizes the picking process by reducing travel distances and ensuring that order selectors do not run out of product.

Integrating the order selection process within an AS/RS has significant benefits due to the following factors:

- 1. Order selection tunnels can be integrated below reserve storage, reducing square footage requirements.
- 2. Replenishments are automated, ensuring that order selection personnel always have product to pick.
- Double handling of outbound product is eliminated. An AS/RS replenishing directly to a pick face does not have to transfer the product to another manual picking area where it would likely need to be handled manually again.

More automated order picking options also exist with robotic layer picking and single case release systems. They are generally replenished automatically from an

AS/RS with manual un-wrap stations integrated between the two processes.

Newer visual-based systems allow users to see the warehouse graphically, along with data identifying product codes, lot IDs and destinations during transit. Virtually walking through the warehouse can provide the user with not only the visual cues about what is going on but also the information about what they see in a way that 2D visualizations could not.

#4: KEEPING THE WES UP-TO-DATE

A WES software package, like any large software application, is a constantly evolving collection of programs and control libraries. Over time, the difference between an installed base and the latest version of an application can become quite substantial.

Updating your WES requires a thorough evaluation of the functionality that the latest version is targeting and how to test it in a separate environment. Additionally, a metric of what indicates a successful test

should be created to allow for an educated go/no go decision. The scope of work and the level of risk involved in an update gets larger with each successive update that goes by without being applied.

Finally, the underlying technology that the WES is built on can change over time as well. For example, a database connectivity module can be updated to take advantage of a new driver that improves performance and reliability. Without updating the WES, an operation will not be able benefit from those incremental improvements.

While these are only a few strategies to consider, you are bound to realize long-term success with warehouse automation.

With typical AS/RS payback periods of three to five years, and a lifespan of more than 25 years, your investment in an AS/RS will generate significant savings for years to come.

"Go Green" with a Sustainable Automated Warehouse

oten

SUSTAINABILITY

Sustainability or "going green" is an important business goal as everyone understands the importance of minimizing the environmental impact of business. Efforts at reducing carbon emissions, recycling and purchasing green products serve as common examples of ways in which many businesses try to be more eco-friendly. However, more and more firms are finding that automating their warehouses and distribution centers offers a great way to go green while adding efficiencies and savings to operations. In many ways, going green can change accounting ledger entries from red to black.

> The AS/RS-WES duo maximizes utilization of storage space, allowing businesses to do more with the facilities they already have.

How is that possible? A modern AS/RS offers designs that adapt to most business models and product characteristics. The firm's historic operational data projected to a design year deter-

mines the best layout options, not a standard one-size-fits-all approach. Hybrid designs have the ability to store products single deep, double deep or up to 12 loads deep in the rack structure as well as use a single crane or two in any aisle. These design tools allow logisticians to create solutions that fit the customer's business and do so in an environmentally friendly way.

Improvements in structural design and motor drive technology make it possible to handle multiple loads (pallets) at a time on one S/RM. This allows designers more flexibility to provide higher or lower performance in an aisle.

These operational benefits are the key selling points of AS/RS. Less well known, yet equally important, are the environmental benefits that automation provides. Three primary "green" outcomes are less land use, lower energy consumption and reduced hazardous waste production.

LAND USE

Automated warehouses and distribution centers require a smaller building footprint. On average, AS/RS use translates to reductions in square footage requirements by 40% or more when compared to conventional warehouses storing equivalent product inventories. So, when planning to construct a new facility, the amount of land needed will be less, decreasing the environmental impact. Businesses with existing structures contemplating expansion via a building addition or a new facility can forgo construction expenses and additional land use by installing an AS/RS and leveraging existing space more efficiently. Beyond lowering costs, there is less environmental

damage and more opportunities to incorporate green space.

The reduced space requirements are due to several factors. First, the AS/RS allows flexibility in terms of the height, length and width of the storage area. Plus, multipledeep storage lanes make even denser storage possible. Deeper lanes translate to fewer aisles, and aisles occupy a lot of warehouse space that could be used for other purposes including product storage. Minimizing aisle requirements while concurrently integrating infeed and outfeed conveyors and pick tunnels into the AS/RS allows unused space to be used for production and other purposes. Repurposing space demonstrates yet another way in which automation reduces building size requirements, decreases environmental impact and lowers operating costs.

ENERGY CONSUMPTION

Automated warehouses require less energy to function. Reductions arise from fewer interior lights, less space to heat and cool, and the

At a time when warehouses are looking to run as lean (and green) as possible, energy usage can add up to substantial operational costs.

So You Want to Automate?

energy savings made possible by using S/RMs fitted with regenerative braking. Many refrigerated warehouses experience a 40% reduction in overall energy costs due to minimal lighting requirements, fewer openings to warm areas and a generally smaller ceiling area which reduces cooling loss and refrigeration tonnage needed.

Additional savings are possible by using storage and retrieval machines (S/RMs) outfitted with regenerative braking. The principles of physics assert that when an electrically powered object is in motion and comes to a halt, electrical energy is generated, turns into heat, and disappears. S/RMs equipped with regenerative braking allow you to store surplus braking energy or transfer it to the power grid for use by other

machines operating on the same grid. Rather than let the energy go to waste, regenerative braking converts that energy and makes it reusable.

In optimizing the movements within a warehouse, the WES contributes to savings by virtually eliminating waste and damage.

WASTE PRODUCTION

In conventional warehouses, waste is generated from products damaged in handling, accommodations made in product wrapping and other byproducts associated with forklift use, such as damage to the building and rack systems as well as battery use. Another often overlooked source of waste is from human errors in order picking. Each mistake has an environmental impact manifested in labor, fuel, re-packaging and shipping costs.

Eliminating fork trucks reduces product and infrastructure damage. The AS/RS retrieves and transports pallets smoothly across the system through the use of S/RMs and conveyors. Their use also prompts less stretch wrap consumption as securing the pallet is not as great a concern. This reduces non-decomposing plastics in our landfills. Worker safety benefits, too since employees do not have to enter the racks.

Storing loads up to 12 deep results in a denser storage configuration. This unique design consumes a smaller building footprint while utilizing up to 40% less space than a conventional facility.

As mentioned previously, damage – and waste – is an accepted consequence of forklift use that has an environmental impact as do the batteries that power them. Battery charging stations expend energy, and battery replacement means the old batteries will add to our landfills. Depending on battery construction, another ecological concern could be hazardous waste and its deleterious environmental effects.

Today's business leaders see the "green" attributes of warehouse automation - and the financial gains that being environmentally responsible can carry. For them, being green is putting them in the black through lower costs and a more competitive marketplace posture. Warehouse automation supports the principle that it is possible to do good while doing well.

AS/RS Preventative Service and Safety

SERVICE AND SAFETY

SERVICING AN AS/RS

You wouldn't buy a car and wait until the brake pads completely wear out before replacing them. Or, you wouldn't drive 20,000 miles before you go for an oil change. The same goes for an automated storage and retrieval system (AS/RS). As with a car, preventative maintenance is the key to an AS/RS's longevity, reliability and safety.

Although an AS/RS can generate ROI in about five years, proper service and maintenance further maximizes this investment and can lead to a system life span of 25+ years, thus lowering the total cost of ownership and providing long-term operational efficiencies.

In order to realize these benefits and ensure that the AS/RS stays in pristine – and safe – condition, companies must take into consideration the following best practices.

1. Make Time for Training:

Long before getting an AS/RS up and running, it is vital for operators and maintenance personnel to fully understand the equipment and the risks the machinery carries. It is also necessary to educate the AS/RS vendor and its subcontractors on internal safety rules and regulations so that they, too, may comply with the organization's safety rules to avoid accidents that could potentially cause damaging litigation.

So You Want to Automate?

2. Perform Daily Inspections:

Inspecting machinery is a daily obligation. No matter how many hours machines are running, spending time each day checking the equipment is a must. Operators must listen to it run. If something sounds out of the ordinary, it is time to take a closer look. This is why it is important for companies to get to know their AS/RS and how it operates from day one – if an issue arises, it will be easier to quickly take action.

3. Set up Maintenance Schedules:

In addition to daily inspections, companies should set up their own weekly, monthly and yearly AS/RS inspection schedule. Knowing exactly when a particular part needs to be replaced or when a chain needs to be lubricated will keep the organization and its equipment ahead of the game. Sticking to a schedule and keeping records of each maintenance measure performed will certainly pay off.

4. Prepare for Corrective Maintenance:

Let's go back to the car example. No matter how conscientiously you service your car, there are some things that you can't predict, like a flat tire. With any type of machine, there is going to be the occasional unforeseeable issue. While it is hard to prevent these incidents, it is possible to prepare. Having access to spare parts (especially for critical wear items) and technical resources, as well as understanding the right procedures, can help companies take corrective action and minimize downtime when an unexpected issue surfaces.

5. Investigate Maintenance Programs:

Companies should investigate what their AS/RS vendor has to offer in terms of assisting in servicing and maintaining the system. It is a good idea to take advantage of any available inspection packages, 24/7 technical support, preventative maintenance scheduling and other services to extend the life of the system and keep workers safe. Although these offerings will take some weight off the company's shoulders, they do not replace the responsibility to perform daily inspections or to support continuous training initiatives.

While preventative maintenance may not keep a car out of the junkyard 25 years from now, it can keep an AS/RS up and running for more than two decades. Remember that the safety and operational efficiencies of an AS/RS are fueled by proactive, rather than reactive, efforts.

As a result of the right blend of preventative measures and training, an AS/RS will continue to run well into the future just as smoothly as it did after commissioning.

AS/RS and automated order fulfillment adopt the idea of 'bringing the product to the worker' as opposed to the worker retrieving the product. This greatly decreases the amount of physical labor involved with these tasks, including walking, lifting and carrying heavy loads.

AS/RS SAFETY

These systems also ensure worker safety as less heavy lifting and machine operation is required of employees.

Manual forklifts can be very un-safe, specifically in tight warehouses where space is a constraint. For a high-volume distribution centers, many forklifts work within confined spaces and smaller dock areas in addition to personnel walking in and around these areas. By utilizing an AS/RS, the forklift traffic is focused around one single, central location, the shipping dock.

Human error can mean lost shipments, breakage and injury.

An AS/RS decreases the risk of these issues while also reducing the risk of contamination as fewer human hands are handling the products; this is especially important when handling sensitive food or beverage products.

The Workforce: Manufacturing

THE WORKFORCE

Over the past few decades, the American perception of the manufacturing industry has been somewhat pessimistic. However, the U.S. manufacturing industry is showing signs of growth and an increase in job openings. Now, the industry is addressing common misconceptions about manufacturing jobs in an effort to combat challenges and educate future generations.

Today's manufacturers have an opportunity to open their doors, promote job opportunities and show the public what their industry has to offer. For example, according to the Fabricators & Manufacturers Association International, manufacturers have the highest job tenure in the private sector and the average salary of manufacturing workers is more than \$77,000.

The difference today is that skill sets have changed. Many of today's factory jobs involve operating, maintaining and programming the machinery that has taken the place of manual labor. These jobs require highly skilled workers, often with some type of higher education or a technical degree. However, according

to the Manufacturing Institute and Deloitte's report, "The Skills Gap in U.S. Manufacturing 2015 and Beyond," interest in the field is dwindling and American manufacturers could face a deficit of as many as two million workers over the next decade.

Although companies within the manufacturing industry work hard to develop their workforce, they must recruit faster, smarter and harder – targeting the next generation of workers in order to keep up with demand and future growth.

According to a recent analysis of the U.S. Census, more than one in three American workers are millennials, or adults ages 18 to 34. In 2016, millennials surpassed Generation X to make up the largest share of the American workforce. This demographic is filled with computer-savvy multi-taskers who are willing to work together on a team – key traits needed as the manufacturing industry turns to automation.

There is a common misconception that manufacturing jobs will be eliminated due to the growing popularity of warehouse automation, particularly AS/RS technology, and its operational efficiencies. While it is true that some jobs may be eliminated due to the nature of these systems, most of the time corporate sales growth provides many growth opportunities for these workers.

With the millennial workforce increasing and the high-tech functionality automation provides, there are numerous opportunities for workforce growth, development and education.

By keeping U.S. companies competitive in the world marketplace, jobs are actually created, not lost.

If they work together, manufacturers can revive the public image of the industry, address the skilled labor shortage, connect with future generations and ensure ongoing success. In the end, the right automation technology paired with the right workers will position companies for success and uphold their staying power in a competitive marketplace.

How did you get into this field, and what do you like about it?

Handberg: When I got out of the Marine Corps, I went to work for a company that designed and built commercial airline and military vehicle simulators. I focused on electronics and spent a year in Germany working with the Army on Abrams tank simulators and F15 sims. When Westfalia USA was incorporated in 1992, they were looking for a mechanic who spoke German and was willing to travel. I didn't even know how to spell PLC when I started. I had electronic experience, but I'd never seen photo eyes or proximity sensors.

For the first 10 years, I was the only service guy. We now have more than 20 people across the controls department and service

SERVICE TECHNICIAN SPOTLIGHT

RICK HANDBERG: SENIOR FIELD SERVICE TECHNICIAN

Duties: Install and support storage and retrieval systems, educate technicians and end users of automated equipment before, during and after commissioning.

Location: California, covering the west coast, central South America and Canada

side. I'm in my 23rd year and was one of the very first employees when Westfalia came to the United States.

I have really enjoyed what this job has provided for me. There's a lot of traveling, I don't have to go to an office every day, and I meet lots of different people. Every day is a new challenge, and even after 20+ years I see problems arise I've never seen before.

Who are some of your mentors and influencers along the way?

Handberg: I met one of my good friends and mentors in Switzerland in the 1990s. He helped me understand a lot about this business, the pursuit of knowledge, and how fun it can be to solve a problem. He taught me that's what this job is all about. These people depend on us. He also encourages me through many difficult times. When you're out there in the field by yourself or get a phone call in the middle of the night or have to get on a plane at 5 a.m., you make sacrifices like missing birthdays. It can be a frustrating aspect of the job, but he was there to make sure I knew I was appreciated.

I also have to thank my coworkers these past several years. They have had a direct influence on me becoming better at my job.

For years I was the only person at Westfalia responsible for the service, installation and customer interaction. As we brought in new people, I fell into the mindset that my job was threatened. I found it a relief and a threat to my workload. I soon learned that I had been so independent for so long I could not see past the way I had always done things. These younger guys came in and started asking me why I did it this way or that way. Over time, I watched and listened as these guys did the same job differently and, in many cases, faster, safer and with less effort. They made suggestions, we tried them, and low and behold, my life changed.

What technologies have helped you become more effective?

Handberg: It used to be that I only had a box of tools and a multimeter. Even carrying a laptop around only started 10 years ago. Now we can get online, download programs, write reports, get help from the main office, track parts and view work order status. There's a variety of equipment out there, some that the service guys have never seen, much less worked on. By having VPN access to all customers, we've created a help desk that consolidated information on corrective action for various system faults, and every technician and customer can benefit from that bank of knowledge. I now encourage all of my coworkers to listen to even the newest guy on board. I have learned that everyone has good ideas at different levels of service, whether it be administrative, customer interaction, mechanical, electrical or making up jigs or tools to help our job. New eyes are never a bad thing.

Interview conducted by MMHMRO and originally appeared in Materials Handling MRO Magazine: March 2016 issue

So You Want to Automate?

Automation technology is one of today's fastest-growing supply chain innovations that improve efficiencies and lower costs.

As more manufacturers and distributors explore automation, many will consider how they can use an **automated storage and retrieval system (AS/RS)** to enhance their production and warehouse distribution operations.

The AS/RS industry is mature, and along with that, the technology has been proven across many industries. Most of the advancements a user will see are stability of systems and robustness of equipment. With this comes the user-friendliness of software interfaces and the accessibility to operational metrics.

With an AS/RS's ability to improve workflow, optimize space, boost throughput and more, it is easy to get caught up in the technology itself and dive headfirst into an implementation. There is no magic formula for designing and implementing an AS/RS, but if you take the time to first evaluate your current operations, understand your data points and address the right questions, you will end up with a solution that meets your business's specific needs. Partnering with a knowledgeable AS/RS provider will help you cover each of these steps to ensure a successful project.

