



Optimizing Today's Warehouse

Taking a Comprehensive View
of your Warehouse Environment



INTRODUCTION

Today's complex supply chains have become interdependent and interconnected networks where one change anywhere in the system could potentially impact your entire operation. Virtually every piece of your supply chain needs to work together to keep your products moving at the needed efficiency, productivity and safety levels.

Any significant decision or new equipment deployment requires alignment, collaboration and change management to realize the needed return on investment. Without proper planning and a holistic view, a point of action or inaction can become a weak link in the microcosm of your warehouse.

To understand the level of complexity occurring in the warehouse, one simply has to look at the amount of technology being introduced and deployed into the environment, including connected devices, digital tools, automated forklifts and robotics. It can be difficult for many companies to divert the needed attention and resources away from their core business to assess, deploy and fully integrate these emerging technologies into the supply chain.



It can also be challenging to take a holistic view of this complex environment, given the variety of equipment and technology involved and the contributions and support needed from many disparate suppliers. This underlines the importance of working with a partner who can help you achieve a holistic view.

This e-Book will help supply chain and warehouse managers understand the value of taking a comprehensive approach to warehouse design and ensuring key components of the environment, including forklifts and racking, are designed to work together to deliver optimum product flow, meet the desired efficiency and safety standards and create a scalable foundation that supports tomorrow's growth.

Establishing a Warehouse Workflow

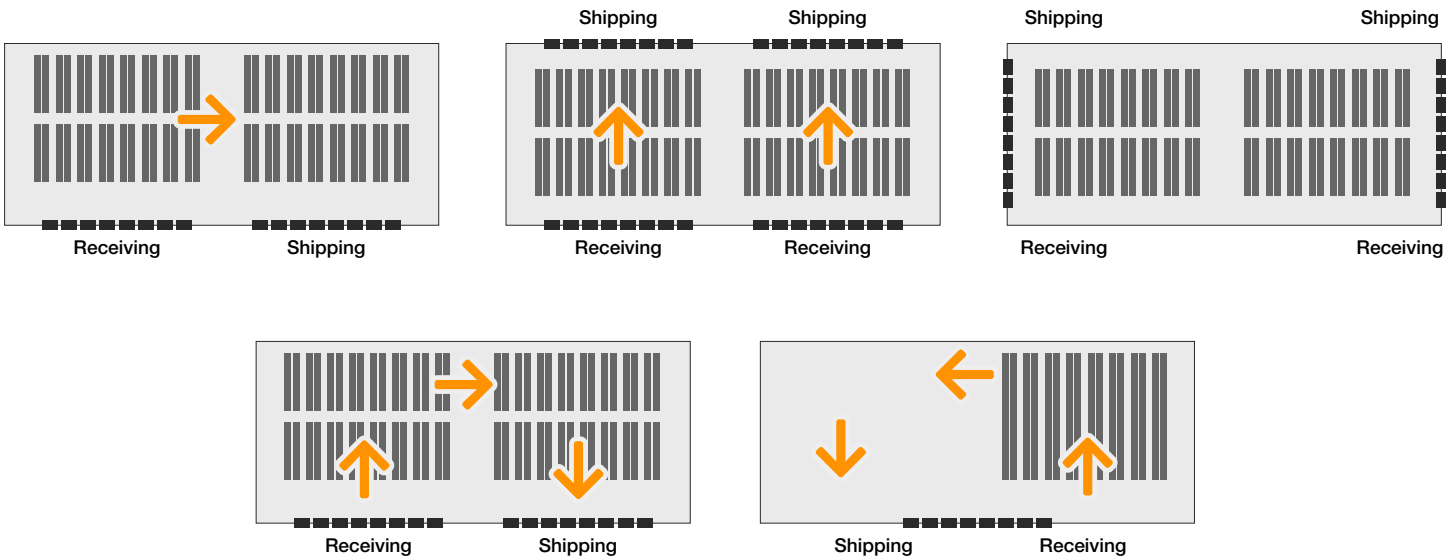
CHOOSING A LAYOUT THAT BEST FITS THE APPLICATION

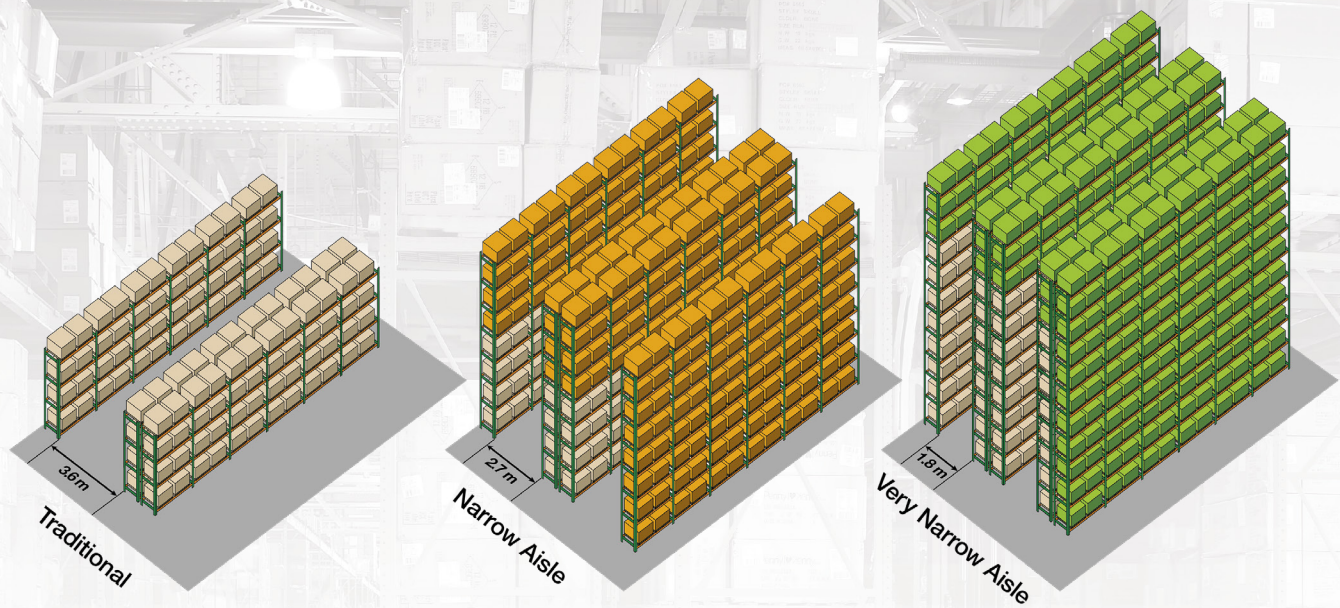
The first step in establishing warehouse workflow is to consider the layout of your existing or new facility and how products move from receiving to storage to shipping. It's finding a way to store and move products through your warehouse space efficiently and effectively while maintaining a safe environment for your warehouse employees and pedestrians.

This typically depends on two main factors. The first is the purpose of the facility. For instance, is it a distribution center where products are temporarily stored before being sent to customers or a fulfillment center where items are picked to fulfill e-commerce orders and

then shipped out? Maybe it's a cross docking facility with little to no storage requirements and more of a focus on the staging and quick transfer of material from one end to the other. Or is your domain a manufacturing facility where an inventory of parts is used to create a finished product and requires consistent output?

The second factor is the location of the facility's material and product entry and exit points. There are three types of door placements. First and most common, the dock doors are on the same side of the building. The best layout for this type of facility is typically a U-shaped flow with shipping and receiving on parallel sides, storage in the middle and the racks laid out perpendicular to the doors.





In the second configuration, the dock doors are located on opposite sides of the building. The ideal layout for this type of facility is an I-shaped flow where products are received at one end of the facility and shipped out at the other end, with racks in between running parallel to the doors.

The third type of door placement is when the building is L-shaped, with openings to the facility located on adjacent sides at a 90-degree angle. This means the flow must be L-shaped, with the main storage at the base of the L-shaped facility.

CONSIDER ADDITIONAL INTERDEPENDENT FACTORS

The following are additional key factors that must be considered when establishing and supporting your warehouse workflow. Each one can influence and be influenced by the layout of the other. They also can have an effect on productivity, efficiency and safety.



STORAGE RATIO

This is the ratio of productivity vs. space utilization, or how quickly you turn product. This can depend on many factors, including the type of forklifts and racks used, the shape of your inventory, product expiration dates, the number and size of pallets you need to store and whether or not you use automated storage solutions like pallet shuttle systems. You must ensure that your forklift operators have enough room to maneuver comfortably and efficiently without wasting available space or damaging product, racking or equipment.

Considering and establishing key factors is important. Each can have an effect on productivity, efficiency and safety.



RACKING LAYOUT

An efficient warehouse racking layout meets the needs of your operations. Determining factors can include storage ratio, available floor and vertical space, docking locations, throughput and the type of forklifts used. Choose your racking based on the type of storage you need (e.g., narrow aisle, high-density, bulk storage). Also, a code-compliant racking design may affect aisles and overall spacing if your warehouse is in an area of potential seismic activity. It is important to match the rack capacity to the weight of stored inventory and adhere to that limit.



FORKLIFTS

Forklifts are vital for keeping your products moving. However, efficiency and safety issues could arise if you do not choose forklifts that fit the application. While several factors are involved in choosing the correct forklifts for your operation, your forklift choices must align with the type of racking and storage you need in your facility. For instance, you may need a very narrow aisle (VNA) turret truck to maximize your rack height and available floorspace. There is also the question of how best to introduce automated forklifts into your operation.



CHARGING STATIONS

Strategically locate charging stations to ensure easy and efficient access throughout the shift. This is especially important for forklifts that are opportunity charged to increase runtime. Especially in cases where lithium-ion batteries are used, it is possible to forego a centralized charging and battery storage area and charging stations can be dispersed around the facility where they best fit the application and operator travel. This may include areas near break rooms and dock areas. Charging station locations should be considered when designing the warehouse layout and racking to ensure sufficient room to park the forklift and access the charger without straining cables. You will also want to make optimal use of the warehouse space and maintain adequate access throughout the facility.





EMPLOYEE AND PEDESTRIAN SPACE

As you design your facility layout and flow, ensure you do not forget space for your employees. This may include office space and packing, labeling and weighing stations, as well as ample space for employees to travel through the facility. Establish designated walkways that separate pedestrian and vehicle traffic to limit the potential for interaction. Signage that identifies these different warehouse areas should be strategically placed to be visible to pedestrians and forklift operators. Walkways should be outlined and defined by guard rails, durable floor tape, painted lines or UL-approved line and image projectors.



ROOM FOR GROWTH

While you must have the workflow and layout that meets your current needs, they also should be able to adapt and align with growth strategies, accommodate planned or unplanned fluctuations in demand, and integrate new product production or distribution. A good rule of thumb is that once your facility reaches 80% of its storage capacity, you should consider it full since you need space to maneuver equipment and move pallets. At this point, you need to consider adding another building, expanding the existing building or deploying a different storage method, such as narrow aisle or high-bay storage.

A good rule of thumb is that once your facility reaches 80% of its storage capacity, you should consider it full since you need space to maneuver equipment and move pallets.

While it often takes a team of suppliers to address all these issues within a single facility, this can be a difficult experience due to conflicting goals and objectives related to their specific expertise. It may be beneficial to consolidate or streamline the number of suppliers and/or consultants involved and ensure they each understand the effects of their specific recommendations on the entire system. The simplest approach may be to work with a single-source supplier.

Depending on the expertise and offerings of your forklift provider, they might be able to play this role and help ensure more cohesive and integrated solutions. Acting as a single-source supplier, they can make sure all parts of your

organization work together to ensure efficient product flow. This includes everything from matching your forklift choice to your racking to recommendations on benchmarking your storage ratio.

In Chapter Two, we'll build on our understanding of the application's workflow and focus on maximizing your storage space, discussing the various racking and configuration options that are available.





Making the Best Use of Your Storage Space

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SELECTING THE RIGHT RACKING TO INCREASE CAPACITY AND OPTIMIZE EFFICIENCY

Once you've established the layout of your facility and how products move throughout, it's time to tackle one of the most common material handling challenges in the warehouse: making the best use of your storage space. Space is the most precious commodity in the warehouse, and expanding the physical footprint can be costly and time-consuming. Pushing existing capacity to its limits often means relegating inventory to deep, hard-to-reach areas, creating inefficiencies.

Accessing the facility's vertical space with a customized racking solution can unlock additional capacity and help you meet challenging space and storage demands. Thoughtful rack design matches the type of storage to inventory movement and helps ensure it follows the most efficient path both into and out of the warehouse.

Matching the right racking solution with the right lift truck capabilities allows your team to have the proper tools for each job so they can work more efficiently. In this chapter, we will explore some of the key considerations for a warehouse racking system and some of the most popular types of racks in the market.

A CUSTOMIZED WAREHOUSE RACKING SOLUTION

One size does not fit all. To determine the customized warehouse racking solution that best fits your space and storage requirements, there are several critical components to consider, including:

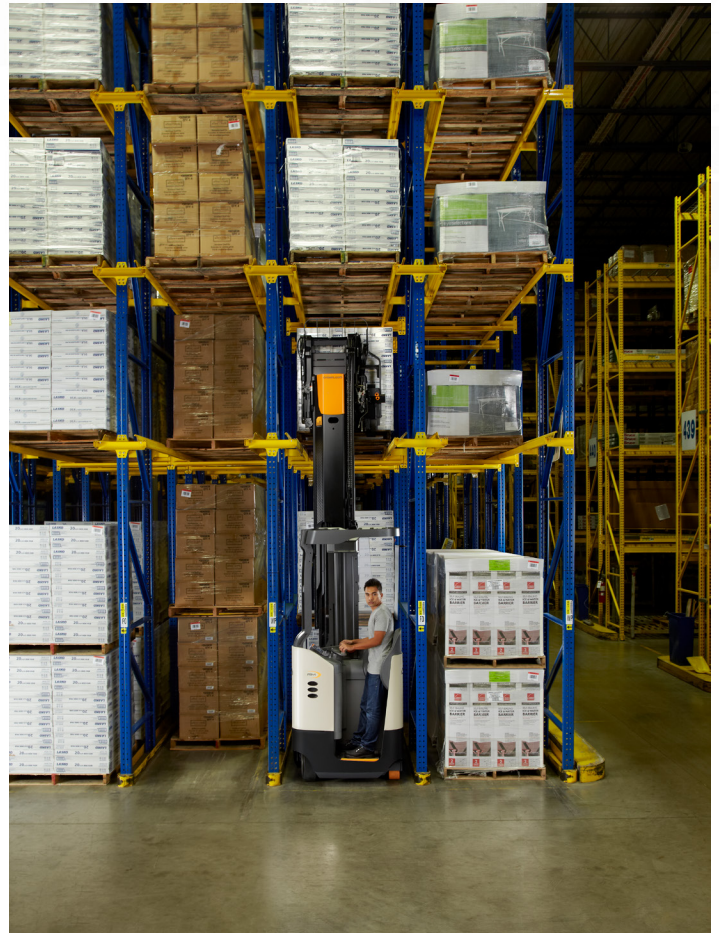
Product type, size, weight and expected throughput — the number of units your warehouse processes over a period of time.

Warehouse storage ratio — the measure of occupied space versus available storage space.

Types of storage needed (narrow aisle, high-density or bulk storage).

These factors influence the types of forklifts you need to purchase or determine any changes you may need to make to your existing fleet to ensure the desired performance level.

You must also familiarize yourself with the various building codes to ensure your rack system is compliant. Fire protection is an essential element of warehouse safety, and it is of the utmost importance to understand safety standards for sprinkler systems, pallet racking configurations and other factors that, if ignored, could lead to catastrophic results. It is also essential to familiarize yourself with any building codes related to rack design and configuration that may be unique to your municipality or other agencies with jurisdiction. Compliance not only mitigates the odds of construction delays, but it is also a key component to creating a strong safety culture.



CUSTOMER RESULTS

MENASHA

Increase Warehouse Capacity and Productivity With the Right Racking and Forklift Solution

APPLICATION

Menasha is a provider of primary and secondary packaging services for large consumer product goods (CPG) companies. Over the course of 11 years the company has grown from 40,000 square feet to four locations totaling 1.5 million square feet. At the Minooka, IL site the main focus is Point-of-Purchase (POP) displays and end load cartons.

CHALLENGE

Menasha is a fast growing business facing increased storage requirements from its customers. Originally, the company floor loaded all of their inventory and, when more space was needed, they simply acquired more floor space. The increased space resulted in higher costs, but also created inefficiencies when inventory was located in deep, hard to get to locations. The company knew it was time to utilize the height of its warehouse to its fullest potential.

“Company wide, I figure we had about a 48 percent increase in our capacity due to the racking installation.”

MICHAEL SANTUCCI
Operations Engineering



SOLUTION

Menasha’s management consulted with Crown on a warehouse racking design that would optimize both the vertical and horizontal space in their warehouse. Crown’s Warehouse Solutions personnel also analyzed stock movement within the warehouse and suggested racking that allowed for more efficient movement of that material. Once the racking design was complete, Crown also provided guidance on the best lift trucks to be deployed for each application, ensuring that the company’s stand-up counterbalance trucks provided lift height to support putting heavy, loaded pallets into its newfound storage place. The racking and lift truck solution resulted in a 48 percent increase in storage capacity, ensuring that Menasha is not only prepared to more efficiently handle today’s business but to accommodate growth that is still to come.

COMMON TYPES OF STORAGE RACKS

To reap the efficiency benefits of a warehouse racking system, it's important to understand the various types of racks and the applications they best serve. The type of system you install can significantly impact productivity, storage capacity and your ability to adapt to changing inventory demands. Below are the most common types of racking systems:



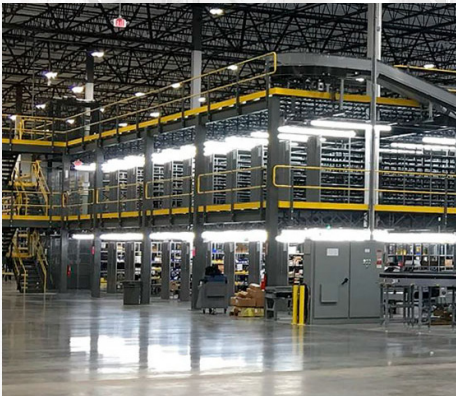
SELECTIVE PALLET RACKS are the most common type used in today's warehouses, especially for general warehousing and manufacturing. Known for their heavy load capacity and flexible design, single-deep selective warehouse racking is typically configured in back-to-back rows, each accessible from an aisle. They provide 100% selectivity, meaning that any pallet in the rack is directly accessible at any time. They are easy to install and maintain and offer a variety of configuration options. However, they provide lower storage density and inefficient use of floor space compared to other racking systems.



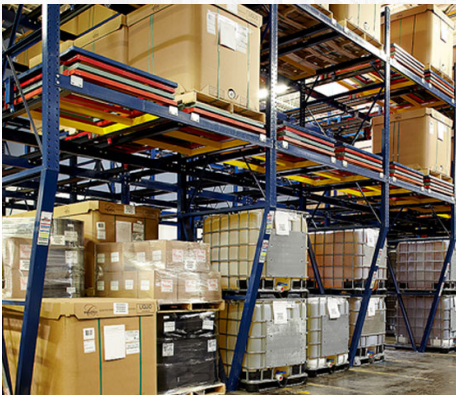
PALLET FLOW-THRU RACKS are ideal for first-in, first-out (FIFO) operations that experience high turnover rates. Pallets are loaded from one side and stored in multiples deep. Using sloped racking and rollers mounted to rails, the pallets are transported to the opposite side of the rack for easy access and unloading. Often, these racks are used in grocery, retail and freezer applications.



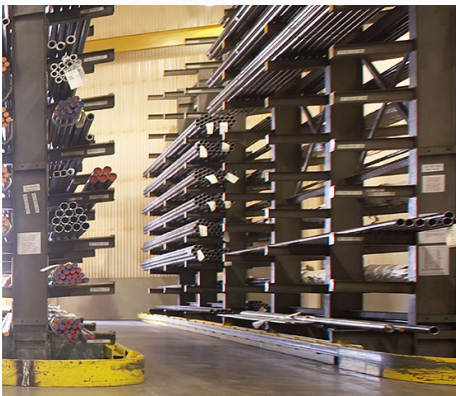
PALLET SHUTTLE RACKS are a semi-automated, deep lane system that utilizes an integrated cart to transport pallets loaded by the lift truck at the lane entry into the deep lane. This particular system works well in applications with high-volume SKUs where you have a high quantity of the same products and pallets. They help increase productivity by minimizing lift truck travel. These racking systems are often used to increase space utilization while boosting throughput in high-density pallet warehouses.



PICK MODULES are high-density storage systems that integrate different types of warehouse rack storage solutions into multiple levels to store inventory for picking and fulfillment of orders with greater efficiency. These systems support FIFO inventory rotation and configuration options, allowing for full- or broken-case picking.



PUSH-BACK RACKS allow for higher-density storage by storing multiple pallets deep on each level, with each pallet loaded from the front. Each level can be accessed independently and offers more storage than selective rack systems. Pallets are loaded into one end and roll toward the other end of the racking. When the front pallet is removed from that end, the next pallet rolls into the front position. This option works best in high-productivity operations with frequent stock turns.



CANTILEVER RACKS utilize cantilever arms attached to columns rather than rails. They feature open access with no vertical obstructions on the one side to facilitate easy loading and unloading. These racks are ideal for storing long, bulky material, such as lumber, carpet rolls and furniture.



DRIVE-IN RACKS are higher density warehouse racking that reduce the number of operating aisles and store pallets in multiple depths with one entry or exit point (drive-in). Drive-in racks are suited for last-in, first-out operations. A common area of concern with this racking is the amount of space offered in the drive-in. Because the forklift physically enters the racking system, it increases the possibility of an impact that could damage the forklift, racking or product.

With so many unique needs, one cannot take a one-size-fits-all approach to choosing a storage solution.

Every facility needs a customized racking solution tailored to fit the materials stored, the method in which they are stored, the frequency of movement, and several other key factors. You may have access to multiple resources, including your forklift provider, to help you analyze your materials and workflow and recommend the right combination of racking systems to help meet the unique needs of your warehouse.

In Chapter Three, we'll discuss safety in the warehouse as it relates to warehouse design to help maintain a safe working environment for forklift operators, pedestrians and products.



Enhancing Warehouse Safety

ADOPTING A COMPREHENSIVE, INTEGRATED APPROACH

A comprehensive approach to warehouse design enables and includes an integrated but thorough approach to safety. A broader view of safety management that considers multiple components of the warehouse environment, including but not limited to forklifts, can contribute to a more effective safety program.

The Crown Equipment e-book, [“An Integrated Approach to Safety,”](#) details this integrated approach and focuses on those components directly connected to the forklift. This can include equipment design and features that enhance safety, a supplier-based approach to training that does more than check a box, and forklift connectivity solutions that leverage data accessed from the truck’s control system and sensors.

A more holistic approach to warehouse design brings non-forklift components (e.g., signage, racking protection) front and center so they can be included in an integrated safety approach to palletized storage.

Bringing together these different components can help existing safety programs and drive measurable improvements in key safety metrics. When properly executed, an integrated safety program can help reduce injuries, lower equipment and product damage, and streamline compliance, generating a positive ROI while encouraging and strengthening a safety-focused culture.



FIVE STEPS TO PROMOTING SAFETY IN PALLETIZED STORAGE ENVIRONMENTS

The following are five warehouse design components to incorporate into a broader safety program.

1 PROTECTION FOR RACKING

You can take several approaches to protect the integrity of your racking structure. This helps to keep racks in good working order and protect your forklifts and the materials you store.

For instance, steel column protection units wrap around the base of the upright column and are anchored to the concrete with wedge or screw fasteners. There are also rubber, steel, or plastic protectors that attach directly to the racking frame. They can be included in the original racking installation, which helps reduce the total cost since the work crew is already on-site. End-of-aisle protection, such as a heavy guard at the end of the aisle where frequent traffic occurs, can isolate and help reduce the effects of impacts on racking structures.

Another step to reinforce upright columns at the time of purchase is to combine a double front post with a heavy horizontal. This can help protect frames from damage caused by pallet strikes during put away/picking operations. A double front post adds a second column welded to the back of the front upright. A heavy horizontal is a heavier strut connecting the front and back posts.



Finally, regular rack assessment inspections should be conducted to identify and repair/replace damaged uprights, beams or wire decks that may no longer be able to hold specified weight. The Rack Manufacturers Institute (www.rmiracksafety.org) furnishes guidelines on how to conduct these assessments and repairs.

2 PROTECTION FROM PRODUCT FALLS

Another element of warehouse safety is protecting employees from product falls. This is important for the safety of your

employees and guests and may also be an OSHA requirement that, if overlooked, could result in serious injuries and fines.

Depending on the size and weight of the product you are storing, heavy-duty wire rack back protection or netting can provide an effective barrier to prevent materials from falling from the rack. The wire rack back protection is designed to help secure entire pallets, while netting can be used to catch random smaller objects, like those dislodged from stored pallets. Load supports placed under a pallet are designed to help keep heavy-loaded shelves from bending or breaking so that pallets won't fall through or between load beams.

line painting or aisle marking tape. Laser or LED line projectors, which can be easily repositioned as your warehouse environment changes, are a forward-thinking option.

Finally, forklift operators and pedestrian employees must be trained on the use of pedestrian walkways, where they are located, and how pedestrians should navigate areas of the warehouse where separate walkways are not practical, such as the aisles separating rows of racking.

3 DEFINED AND CLEAR WALKWAYS

An essential component of a comprehensive safety program is routing foot traffic throughout the warehouse with designated walkways. Separating your pedestrians and vehicle traffic with designated walkways helps reduce the chance of accidents and injuries and is documented as an OSHA requirement.

OSHA Standard 1910.176(a) states that *"...aisles and passageways shall be kept clear and in good repair, with no obstruction across or in aisles that could create a hazard. Permanent aisles and passageways shall be appropriately marked."*

Compliance with the standard can be achieved by placing OSHA-compliant barricades along the entire walkway or using



CUSTOMER RESULTS

LIPARI

Complete Warehouse Solution Helps Eliminate Damaged Rack Replacement

APPLICATION

Since 1963, Lipari Foods has been a wholesale distributor of dry, refrigerated and frozen foods, today serving fourteen states across the Midwest. Headquartered in Warren, MI, Lipari recently completed the development of a new 260,000 square foot warehouse to support the company's rapid growth.

CHALLENGE

When taking on a significant project like the development of a new warehouse, Lipari Foods wanted to ensure it made smart business decisions about the warehouse design, racking and material handling equipment needs for its operation. Lipari had never adopted an engineered standard for its racking system, simply adding uprights and rails on an as needed basis. The company also experienced frequent damage to its rack, requiring replacement of at least one rack per week on an ongoing basis. The new warehouse provided the opportunity to do things a better way but the company wanted the advice of a trusted supplier to help make the right decisions.

“With the amount of employees that we have, they tend to bump into the racks quite a bit. We replaced probably a rack a week. Crown brought us to a whole new level. We’ve been in the facility here a little over a year and we haven’t had to replace one upright yet.”

AL MOY

Director of Warehouse Operations - Lipari Foods



SOLUTION

Lipari sought help from Crown Equipment to develop a complete solution for its new warehouse, from the layout to the racking and the material handling equipment deployed throughout the facility. Crown experts became embedded in the project, working through every new challenge and design iteration, helping Lipari to adopt an engineered standard for all of its racking and select robust structural rack that would meet its demands.

In an effort to reduce rack damage, Lipari also wanted to implement process changes to prevent reach truck operators from traveling while raising and lowering the forks, but had hesitated because it would reduce overall productivity. The RM Series reach trucks' Xpress Lower feature eliminated the concern, enabling the company to make the change while maintaining its high level of productivity.

4 FLEXIBLE AND SECURE SIGNAGE

Prominently displayed signage that identifies the location of designated walkways, and potential safety hazards, such as low overhangs are another key component of an integrated safety program. Signage should be strategically placed in well-lit and visible locations so both pedestrians and forklift operators can see it but also out of the path of travel. Periodically inspect signage locations to ensure signs are still present, nothing has been placed in a way that blocks them from view, and traffic patterns haven't changed to make them less effective.

Physical signs can be damaged and may need to be periodically replaced. A more flexible and secure solution involves mounting projectors on the ceiling that project messages on the warehouse floor. This type

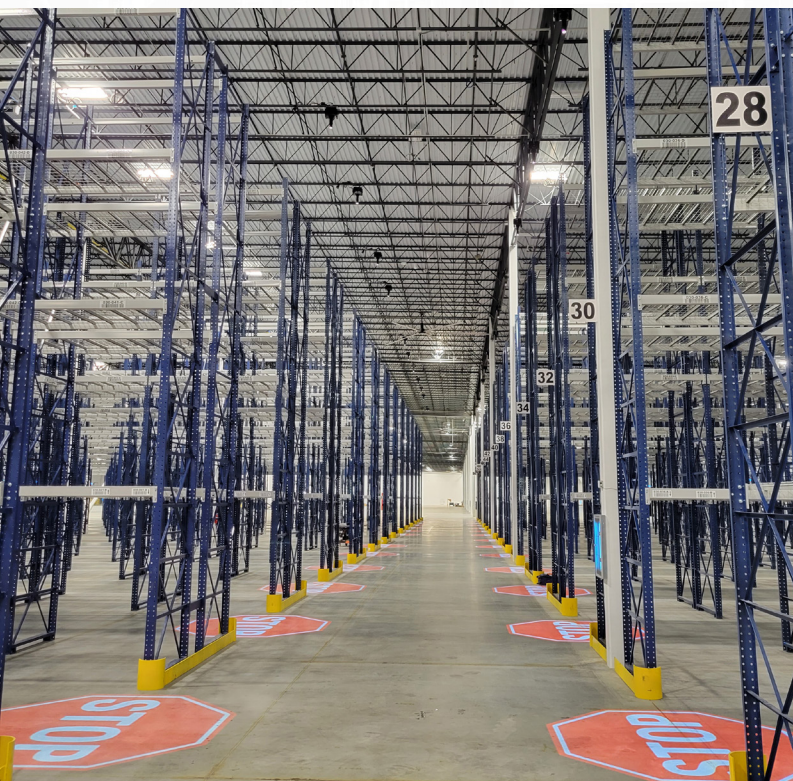
of virtual signage is becoming more common, especially in facilities with high traffic rates. It is better protected from damage since it is mounted on the ceiling. It can also be easily moved or modified to project different messages as needed.



5 RACK CAPACITY LIMITS

All racking systems have capacity limits and you must match the rack capacity to the weight of inventory. Exceeding rack limits could result in collapse, which could damage equipment and products and injure personnel. Work with your provider to use the capacity information provided by racking manufacturers to determine the configuration you need for the weight of the product to be stored.

A best practice is for rack storage limits to be displayed where they can be seen by forklift operators and reinforced in forklift operator training to help prevent accidental overloading. Improper placement can make them difficult to read or scan or more susceptible to damage during pallet letdowns and put-aways. Capacity labels or signage

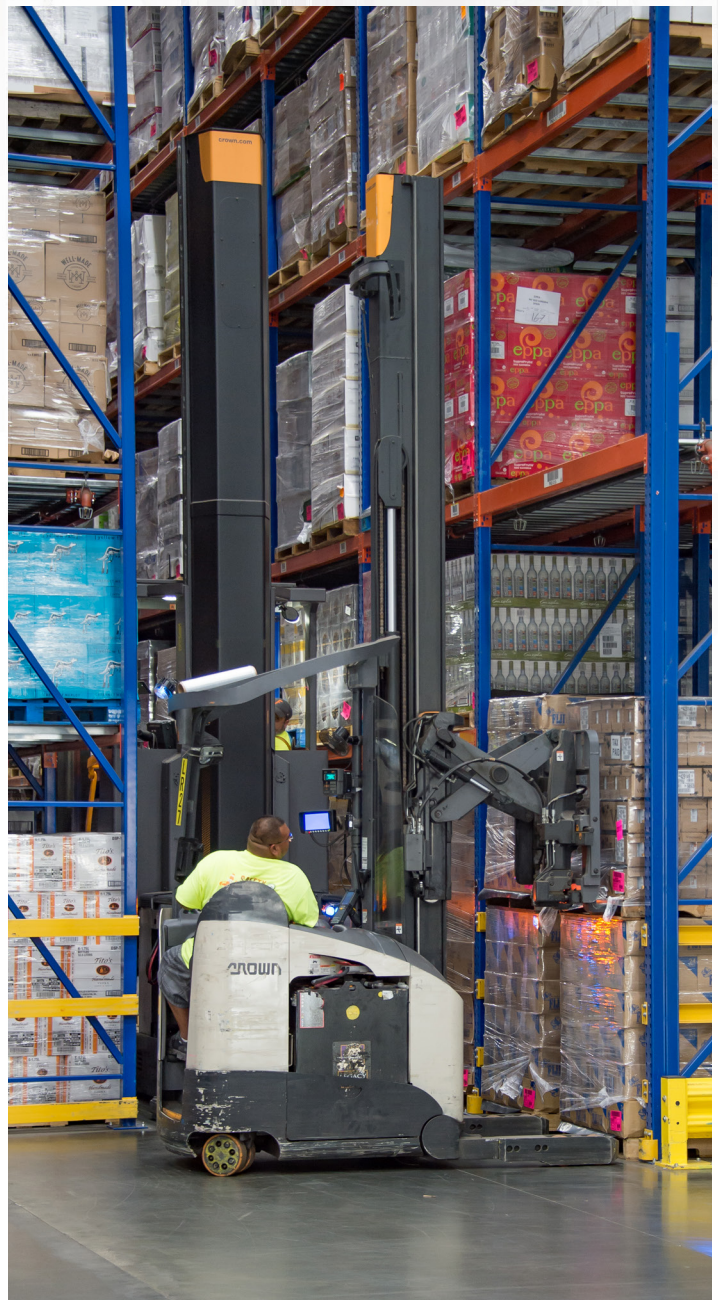


may be damaged in the course of pallet let downs and put aways. This can result in uninformed decisions when storing pallets, which could result in rack or warehouse damage, inventory loss or employee injury.

A common location for a capacity label is on the beam directly under a pallet location. However, affixing labels to the upright may allow easier scanning and more productive pallet movements. Since some uprights have punched holes, you may need to use magnetic labels or label holders to ensure they are secure.

With all of these considerations, a single-source supplier can help develop and implement a more holistic approach to safety, which includes many components beyond the forklift. Look for a supplier that can share best practices culled from broad industry experience and help you apply a more consistent focus to safety management.

Our fourth and final chapter focuses on options available for introducing automation into your warehouse design.



Using Automation to Increase Space Utilization

4

TAKING A HOLISTIC APPROACH TO DEPLOYMENT

Taking a holistic approach to warehouse design is very important when it comes to the complex decisions around introducing or expanding automation in your warehouse.

A fragmented or siloed approach to deploying or expanding warehouse automation technologies could, at best, decrease the ROI realized and, at worst, doom your deployment to failure.

When planning for deployment of automation technologies, it is important to determine how

automation technologies can be integrated into your environment as well as how they can affect, and can be affected by other systems, characteristics and components of your warehouse. This includes product flow, existing processes, employee perception and training.

You may encounter opportunities to integrate automation with other technologies to enhance productivity and ROI. As with the many other components of warehouse design, exploring automation with a single-source supplier can help ensure that these considerations are addressed and streamline the process.



There are two basic types of automation categories: digital automation and physical automation.

CHOOSING AN AUTOMATION PATH

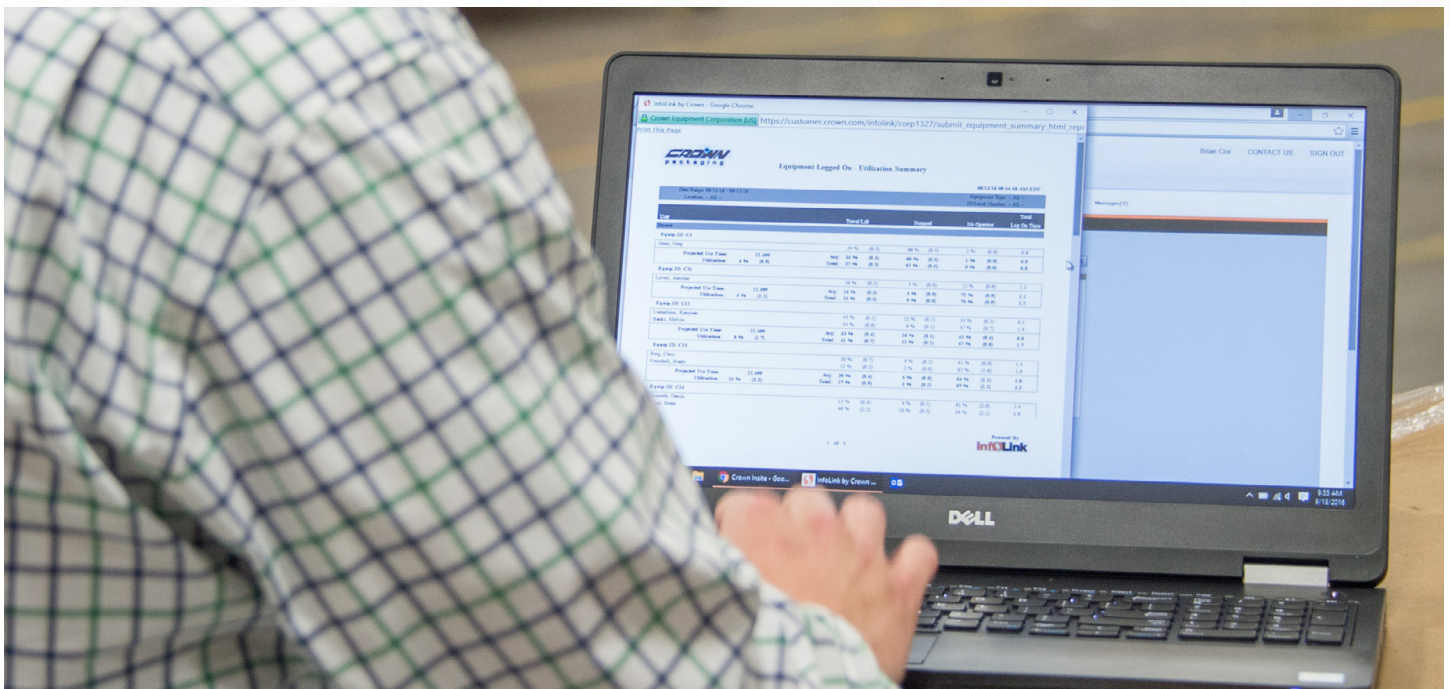
When viewed across the warehouse, there are two basic types of automation categories: digital automation and physical automation.

DIGITAL AUTOMATION uses data and software to automate manual workflows and processes. Examples include warehouse management systems and automatic identification and data capture (AIDC) technology, such as mobile barcoding. It also includes telematics, such as Crown's InfoLink® operator and fleet management system that collects data to provide insight into the performance and utilization of connected equipment, people and processes.

Telematics can be valuable in planning for physical automation and ongoing management and optimization of certain automated equipment. The operational data captured by telematics can be analyzed to help you

understand product flow, equipment utilization and performance. You can use this insight to identify the tasks and equipment within your operations that are ideal candidates for automation.

Once automated equipment is deployed, a telematics system can help provide a broad view of equipment utilization and performance. It also can be a valuable tool as you develop plans to expand the adoption of automation to other areas of the warehouse and scale it strategically to prioritize opportunities where it can deliver the most value.



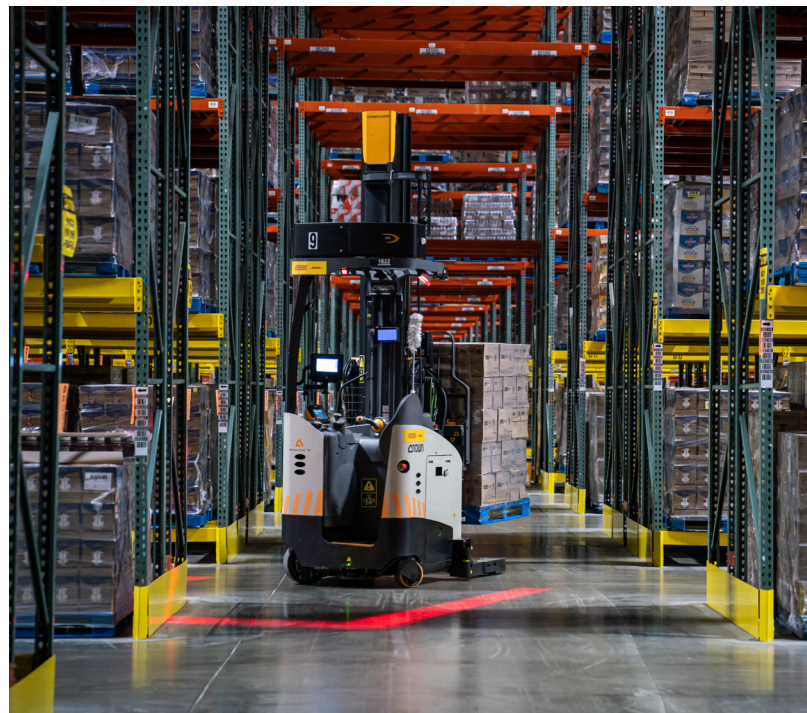


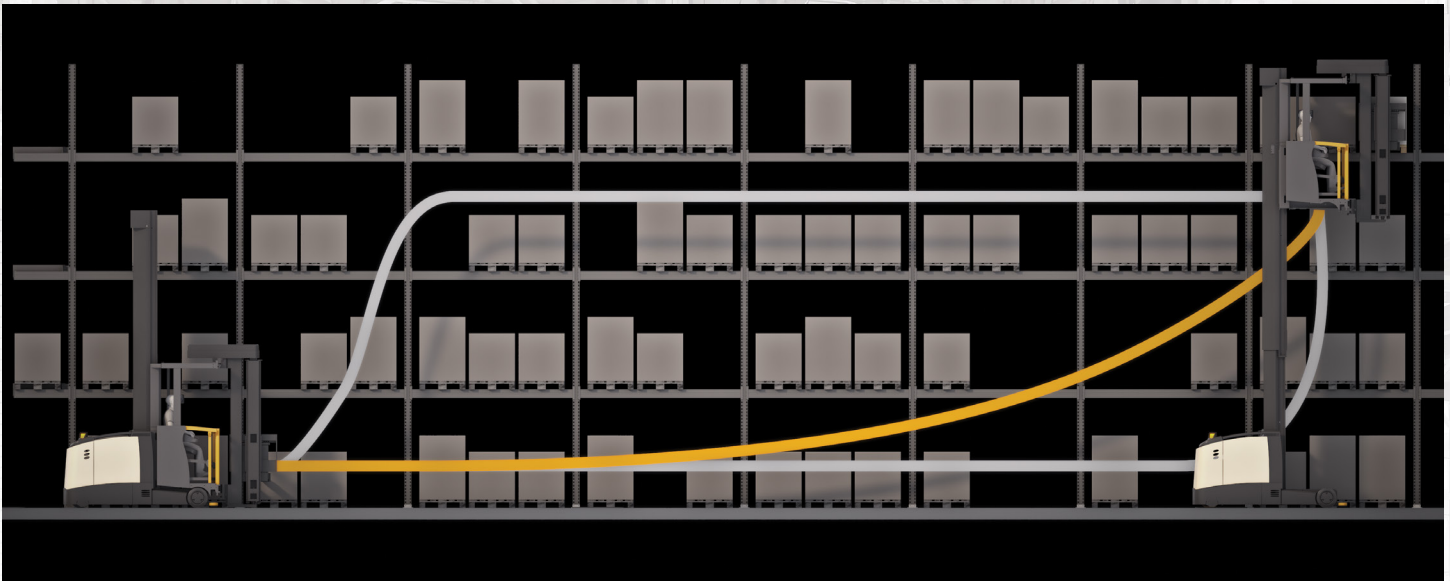
Pallet shuttle rack systems are another example of fixed automation. These semi-automated deep lane systems utilize an integrated cart to transport pallets loaded by the lift truck at the lane entry into the deep lane. They work well in high-volume SKU applications, helping to increase productivity by reducing lift truck travel.

Conversely, **mobile automation** works within existing warehouse infrastructures to automate manual processes. Examples include autonomous mobile robots (AMRs) and automated guided vehicles (AGVs). Automated forklifts, such as Crown's DualMode forklifts, are another example. Today's automated forklifts can address many processes where a manual forklift is being used, including horizontal travel applications such as pallet transport and order picking or vertical applications such as pallet putaway and retrieval.

PHYSICAL AUTOMATION uses fixed or mobile automation to automate repetitive tasks and product movement. This type of automation is often designed to reduce employee movement, increase efficiency, improve performance levels and/or create a more comfortable working environment.

Fixed automation, such as goods-to-person (GTP) systems, are often semi-permanent and may even become part of the assumed infrastructure of a facility. Vertical lift modules (VLMs) are a good example. These enclosed, vertical, automated storage and retrieval systems use trays to store objects and can be an excellent way to save space and bring products to the operator to increase order picking productivity. VLMs are also easy to combine with other automation systems. For example, you can pick from the VLM and then move the product onto a conveyor system for transport to a shipping area.





Certain manual forklifts also contain operator assist technologies that are designed to enhance safety, increase productivity and enrich the operator experience. These include end aisle control that automatically decreases the forklift's travel speed at the end of busy aisle ways where pedestrians or other vehicles may be present. It also includes auto positioning technology that interfaces with the warehouse management system to automatically guide the forklift along the most efficient route to the next rack location.

NAVIGATING THE COMPLEX AUTOMATION DECISION

Given the complexity of the automation decision, a single-source supplier can work with you to identify (1) tasks that are ideal candidates for automation and (2) which automation technologies can provide the best ROI. The right supplier can also help identify process or system changes required to ensure safe, effective integration of automation into warehouse workflows and other technologies.

For instance, the growing dominance of the omnichannel supply chain requires a more flexible and efficient approach to order picking to keep up with changing demand. Many companies have to move a higher volume and diversity of products to more locations, with varying delivery times to meet the needs of retailers and channel partners. This often requires all-new processes, technologies or equipment.

A single-source supplier can work with you to identify tasks that are ideal candidates for automation and which automation technologies can provide the best ROI.

One type of mobile automation technology applied to low-level order picking is an operator assist feature that allows operators to remotely advance the lift truck while using various sensors to safely travel down the aisle to the next pick location. Crown's [QuickPick order picking technology](#) is an example of this mobile automation technology. By reducing the strenuous nature of low-level order picking, it allows operators to maintain a smooth workflow pattern while picking behind the lift truck.

With the proper combination of solutions and experience, a single-source provider can help guide you through planning, selection and deployment of automation technology, creating a scalable and flexible platform for growth that considers workflow, storage efficiency, safety and innovation as important performance indicators within a complete warehouse solution.



CROWN

crown.com