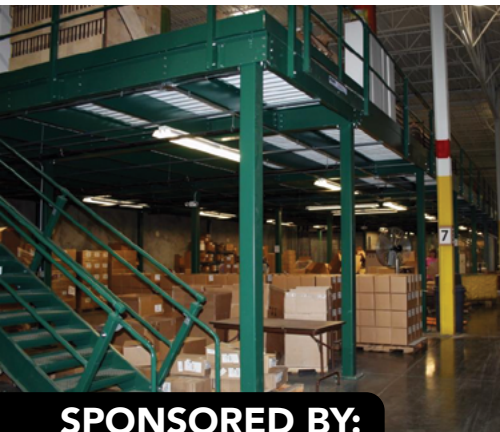




MODEX 2020

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Leading the Way to Faster Fulfillment for Multi-Channel Commerce, Retail, B2B and 3PL Companies Worldwide



6 River Systems empowers operators to transform the entire fulfillment workflow from picking to putaway, sorting, and packing. Recent improvements to the solution's order allocation algorithm and optimizations to batch, zone and other picking methodologies continue to reduce associate walking in the warehouse. With new modular and larger multi-level workspaces, Chuck is the most flexible collaborative mobile robot in the industry.

"Operational efficiency is critical to providing an accurate and fast delivery experience, and the demand for this continues to grow. Our solution from 6 River Systems enables us to increase our throughput and get more orders out the door and into customers' hands. We are excited about their commitment to continually improving and developing their product," said Glen Sutton, SVP Americas, Ingram Micro Commerce & Lifecycle Services.

Chuck enhancements include:

- **Increased capacity:** up to 6 levels for a total of 43.5 ft² / 4.0 m² of workspace, over three times more than the other

providers, handles a broad range of SKUs and a payload of up to 200 lbs / 90.7 kg.

- **Expanded compliance:** patent-pending safety system meets international safety standards, including CE and UL1740.
- **Improved usability:** globally recognized lighting, images, and prompts accelerates training and directs associates through their tasks.

"Our solution transforms fulfillment operations. Chuck replaces cumbersome and dangerous manual carts, eliminates long walks to receive and deliver work and improves associates' jobs. In turn, this helps companies recruit and retain the best workers," said Gillan Hawkes, 6 River Systems' VP of Product. "Unlike traditional automation systems, ours continuously improves through over-the-air software updates and new functionality, helping our existing customers realize year-over-year productivity increases of 10% or greater."

6 River Systems has also been honored with two Red Dot Awards for Product Design. Chuck was lauded in the Smart Products metacategory and Product Design for Robotics category for its best-in-class industrial design. This highly-regarded design recognition from Red Dot further establishes that Chuck is the most configurable collaborative mobile robot and flexible automation solution in the logistics industry.

"These awards are recognition of what we've known all along," says Chris Cacioppo, Chief Technology Officer, 6 River Systems. "Chuck is not only the best collaborative robot for fulfillment operations, it's an integral part of an industry-changing, cloud-based wall-to-wall fulfillment solution that empowers warehouses to solve some of their greatest challenges."

To learn more about Chuck, 6 River Systems and its wall-to-wall fulfillment solution, visit www.6river.com.



Counterbalance Automated Vehicles Safely Boost Efficiencies and Close Gaps in Logistical Applications

By: **Carlos Millan**



Logistics and supply chains continue to be hit hard by huge demand spikes as consumers purchase essential items above their normal consumption levels during the current global COVID-19 pandemic. Additionally, human workers must be removed from warehouse floors to enforce strict health measures including social distancing to combat the effects of the pandemic.

Automated guided vehicles (AGVs) can help pick up where human workers have left off, increasing production efficiencies

and boosting safety for all workers. Oceaneering AGV Systems deliver extremely reliable AGV turnkey solutions to the automotive, manufacturing, and logistics industries.

Oceaneering's MaxMover™ counterbalance forklift AGV, for example, is designed to operate across a broad spectrum of logistic applications, MaxMovers provide material transport solutions trusted to execute operation-critical tasks in single to multiple shift facilities. Counterbalance AGVs are the most ubiquitous and versatile solutions found in production, distribution, and warehousing centers.

The MaxMover is designed to lift and transport racks, pallets, carts, and boxes

from floor level to conveyors, deep and elevated storage or production stations. MaxMover™ AGVs provide the customer with a safe and efficient solution that delivers optimized transportation of goods, supports a reliable workforce, eliminates material damage, and reduces handling costs.

The MaxMover's design conforms to an industry standard configuration that includes a modular base platform providing a cost-effective, efficiently manufactured, and scalable solution. Our standard line replaceable units (LRU) and internal configurations significantly reduce turnaround time for maintenance, repairs, and spares. This results in a solution that maximizes operational availability and minimizes total life cycle costs.

Free-range navigation technology and smart control algorithms enable full flexibility and redundancy of vehicle routing. The vehicle's durable industrial design and opportunity charging provide 24/7 availability and a long life span.

With safety as a priority, the MaxMover laser sensor technology guarantees the protection of personnel and

increases collision avoidance. Vehicles are equipped with four e-stop buttons and three sensors. This ensures compliance with the American National Standards Institute (ANSI) 56.5 standard and the European and VDI standards. The AGVs feature a user-friendly onboard interface and are easily installed and integrated with other Oceaneering AGVs.

Having over three decades of experience, Oceaneering can support production, distribution and warehousing centers looking to either implement or expand their automation processes. The adaptable MaxMover counterbalance is an industrial workhorse with a broad range of capabilities meant to reduce costs and increase overall efficiency and safety in 24/7 operational environments.

Automated technologies have much to offer during these uncertain times. Logistics and associated supply chains must plan for the future to close gaps that cause shortages of much needed supplies. Oceaneering is available to provide an analysis of your current operation or to assist in the automation of a new process for your business.

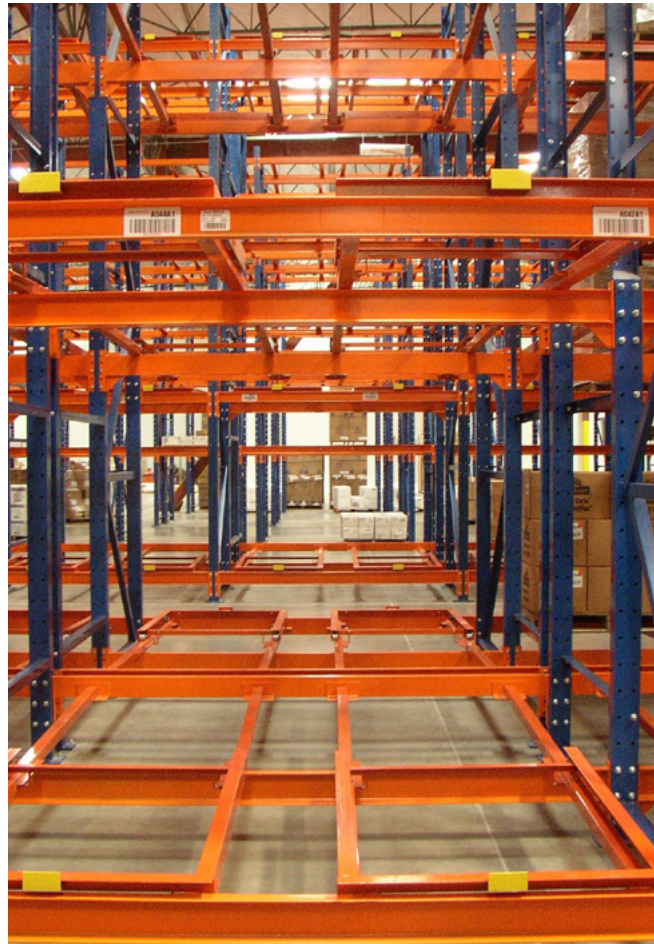
For more information: oceaneering.com/agv



Hannibal Industries, Inc.

Hannibal Industries, Inc., headquartered in the Los Angeles metro area, is a pallet rack and steel tube manufacturer with a diverse product line that enables the company to offer material handling products to the most massive operations in the world. This employee-owned company is the largest U.S. manufacturer of steel pallet rack west of the Mississippi River.

The company's industry leading product offering includes TubeRack, Structural Pallet Rack, Roll-Formed Selective Pallet Rack, Hybrid Systems, Cantilever Systems, Pushback Systems, Pallet Flow Systems, Case Flow Systems and Drive-In Systems. Engineering and design services offered by the company include system design; seismic engineering; permit administration; in-house installation and custom fabrication. A true innovator, Hannibal Industries was awarded a patent in 2006 for a pallet rack system adjustable safety restraint, and a patent for its TubeRack in 2015.



Contact:

<https://hannibalindustries.com>

Phone: (866) 513-1200

HANNIBAL
Industries Inc.

Locations:

- **CORPORATE HQ & FACILITY:**
3851 S. Santa Fe Ave.
Los Angeles, CA 90058
323.588.4261
- **HOUSTON:**
6501 Bingle Road
Houston, TX 77092
866. 513.1200
- **STOCKTON:**
3838 Imperial Way #100
Stockton, CA 95215
209.948.8082



Global Traceability in the Marketplace with Warehouse Management Software

By: **Westfalia Technologies, Inc.**

Traditional warehousing operations are typically managed using either a warehouse management system (WMS), a warehouse control system (WCS), or both. The WMS is used to manage the workflow of the operation, while the WCS is used to execute the workflow by controlling the automation. When tightly integrated within the same software application, they make up a warehouse execution system (WES). However, the effective use of these systems often requires complex integrations. If the systems are not properly integrated, companies risk inventory inaccuracies, misrouted products and confusing workflows, all which have an impact on the order fulfillment process.

A WES helps manufacturers and distributors direct, control and optimize material flow and order picking through a single application. Facilities of any size would benefit from a WES to manage their internal and external processes. The WES gives the facility's staff the ability to implement automation on both small and larger scales within the WMS' warehouse inventory tracking control functions. Once the facility's staff are prepared to expand their automation initiatives, the WES helps facilitate repetitive tasks through ERP integration, billing or ordering systems. This level of automation increases staff efficiency and prepares the facility for future growth.

With its modular capability, the WES gives companies of any size the ability to utilize the functions they need to manage their warehousing processes. These modules range from managing invoices and tracking inventory, to supporting full automation within the warehouse. As the additional pieces of automation are integrated into the facility, the WCS features can be activated within the WES, preventing the need to implement an entirely new system. The continuous use of a WES for warehouse management tasks helps staff

become more familiar with the software and its functionality. As additional automation is applied to warehouse control functions, staff can adopt new automation into the day-to-day processes instead of needing to learn new applications.

By integrating a high-density automated storage and retrieval system (AS/RS) with a WES, manufacturers can better manage their inventory to obtain accurate, real-time information on products moving throughout the warehouse to increase efficiency and decrease the time to market for its brands. Every business has its own processes and solutions, so a "one-size-fits-all" system will not always work. A high-density AS/RS has the ability to simplify and execute different processes inside of the same building footprint. Combining different picking strategies, automated and manual order fulfillment technologies, and warehouse management software, such as a WES, often best sets the business up for success.

CONNECTING UPSTREAM AND DOWNSTREAM

The ability to easily integrate a WES with both upstream and downstream systems within the supply chain provides a significant advantage for manufacturers. This adds a level of traceability that allows manufacturers to respond to problems within the process faster, while also

ensuring that they are meeting regulation standards. This high degree of product traceability can also help manufacturers discover and react to recalls in a timelier manner. Earlier detection of recalls allows for quicker identification of affected product and full understanding of the affected products, which could significantly reduce the scope of the recall effort.

SCALING FOR SIZE

The adaptability and scalability of a WES help warehouses avoid extra time and cost of purchasing a separate WCS and the need to totally relearn applications. In doing so, companies can enhance their automation initiatives with minimal resistance from staff. By adopting automation, distributors have the ability to more easily optimize internal material flow and order picking to ensure complete product traceability, staff efficiency and cost savings.

MEETING JUST-IN-TIME ORDER FULFILLMENT

The combination of a WES and automation allows warehouses to quickly and efficiently retrieve products as they are needed. Software replaces the mundane process of staging orders with its ability to more easily identify products that are necessary to fulfil an order and fulfil the order in a timely fashion.

Learn more at westfaliausa.com.



LEADERS in Material Handling



HUNTER FAN COMPANY'S INDUSTRIAL DIVISION FEATURES PURPOSE-BUILT HVLS FANS

Since 1886, the Hunter Fan Company's focus has been on providing and enhancing comfort for consumers. Commitment to quality, craftsmanship and innovation is what sets the brand apart—and why their fans last for generations. Hunter Industrial is part of that heritage, and its high-volume low-speed (HVLS) fans embody the company's passion for pioneering breakthroughs in ceiling fan technologies.

Based in Nashville, Tenn., Hunter Industrial's fans are designed with everyone in mind—from the installer to the facility manager. The company's designers, engineers and technicians work together to test, prototype and fine tune the fans to perfection. Every fan is pre-assembled and tested in their facility before being shipped in one convenient package to the customer's door.

THE TITAN HVLS SERIES

Hunter Industrial launched in 2016 with its debut product, the Titan HVLS series fan. This HVLS fan is available in sizes that range from 14–24 feet and allows for widespread air movement, low operating costs and year-round savings. Purpose built for the HVLS fan industry, all of the Titan fans come with pre-wired

downrods and pre-aligned mounting brackets to ensure the installation process is smooth. The Titan fan is operated by touchscreen controls that easily integrate with a facility's BMS and can control up to 30 fans with one touchscreen panel. More importantly, the Titan is built with a direct-drive motor that replaces the traditional gearbox motor used in most industry products.



Hunter Industrial's XP HVLS Series



Hunter Industrial's ECO HVLS Series

THE ECO HVLS SERIES

The company's ECO HVLS series is one of the most lightweight and economical industrial fans on the market. With blades ranging in diameter from 8–24 feet, this superior HVLS solution uses a custom direct drive motor and blades designed by aerospace engineers. The ECO offers a full range of control options, including Hunter Industrial's standard 1:1 analog control and touchscreen controls with network capability and the flexibility to manage up to 30 fans. Plug-and-play technology and lightweight components also make this fan quick and easy to install with no ongoing maintenance required. This affordable HVLS fan is crafted to deliver unmatched performance and built to last.

THE XP HVLS SERIES

Hunter Industrial's industrial and commercial product—the XP HVLS series—is engineered to deliver year-round HVAC cost savings and the easiest installation features on the market to date. Dubbed the “XP,” this new HVLS solution delivers a highly efficient performance with a featherweight design and includes a uniquely streamlined plug-n-play, pre-assembled installation process that does not require any guy-wires. Available in five sizes—including 7, 8, 10, 12 and 14-foot diameter models—the XP product line is engineered with a direct drive motor for a quiet, virtually maintenance-free operation. The XP's pre-assembled components and plug-n-play wiring provide a quick and easy install.

For more information, call 1-844-591-FANS (3267), or visit www.hunterfan.com/industrial.



Hunter Industrial's Titan HVLS Series

Hunter Industrial Fans 2434 Atrium Way, Nashville, TN 37214 | (844) 591-3267 | www.hunterfan.com/industrial

LEADERS in Material Handling



TRANSFORMING WORKPLACE COMFORT

Our fans don't just move air—they also started a movement. Before Big Ass Fans came along, summer was grueling and unproductive in facilities where air conditioning was not an option.

Over the last 20 years, we've introduced millions of people to the benefits of Big Ass overhead fans for effective cooling, transforming spaces everywhere from airplane hangars to warehouses—even zoos!

THE WORLDWIDE LEADER IN AIRFLOW



OVER
225

COMPANY
AWARDS



**WORLD'S
LARGEST**

MANUFACTURER OF

HVLS FANS



44,000
SQ FT LEED GOLD
R&D FACILITY

ONLY ONE IN THE WORLD
FOR TESTING
LARGE AIR MOVEMENT



MORE
THAN

70%

OF FORTUNE 500
COMPANIES

USE BIG ASS PRODUCTS

ISO

9001:2015

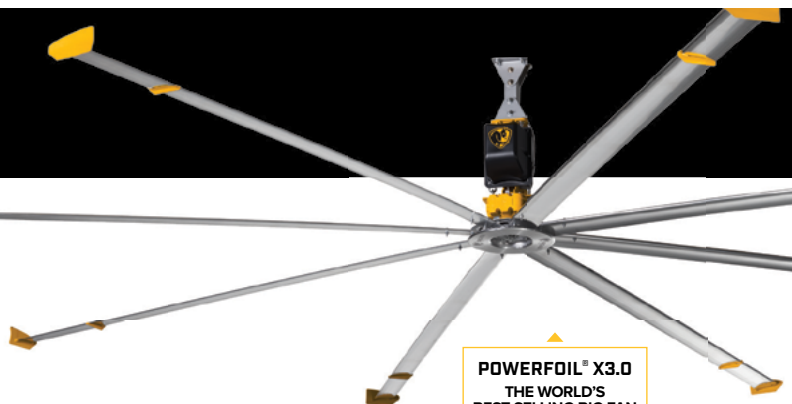
CERTIFIED

268

PATENTS

140

PATENTS
PENDING



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BEST-SELLING BIG FAN

YEAR-ROUND COMFORT, ENERGY SAVINGS

Big Ass fans are known for summer cooling but are equally effective in winter, mixing warm air trapped at the ceiling down to where workers need it and saving up to 30% on heating costs.

While we made our name solving comfort problems for industrial and manufacturing facilities, we also make silent, beautiful fans for commercial and residential spaces. For lighting improvements, we manufacture the industry's toughest, brightest, and longest-lasting LED fixtures to illuminate any space and significantly lighten the monthly electric bill.

At Big Ass Fans, no comfort challenge is out of reach. By developing new technologies from silent fan motors to environmental sensors to automated controls, we're all about finding new ways to meet customers' needs, making work more productive and life more comfortable.

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LEADERS in Material Handling

RAMGUARD™ COLUMN PROTECTION

RAMGUARD™ Column Protector Designed for Maximum Impact Resistance

RAMGUARD™ provides superior rack column protection with its patented **Rubber Armored Metal** design. Molded of energy absorbing rubber with a “U-shaped” steel insert and force distributing rubber voids, **RAM Guard** absorbs significantly more energy during impact than most column protection devices offered today.

- Significantly outperforms most plastic guards commonly used today

MAXIMUM IMPACT RESISTANCE BY DESIGN

After nearly two years of development, testing and proto-type designs, the new patented **RAMGUARD™** de-



livers the **greatest impact resistance** available in after-market column guards. Through extensive testing and evaluation, a specific rubber compound was formulated to

provide a balance between durability, density and impact absorption qualities. A “U-shaped” steel plate was selected to maximize impact protection from multiple angles. Finally, rubber voids were introduced to assist in the distribution of impact forces.



Available in 12-inch heights, RAM Guard snaps onto rolled or structural steel columns 3-inches wide and up to 3-inches deep.

ADVANTAGES:

- Protects rack structures from frontal, angled and side impacts
- Significantly lowers impact damage to pallet rack columns
- Requires no hardware or straps to retain the guard on column.
- Endures many impacts with no loss of performance

RIDG-U-RAK Phone: 814.347.1174 | Email: sales@TheRamGuard.com | TheRAMGuard.com

martor USA

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- ✓ Cuts different materials
- ✓ Compatible with current Martor knives

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LEADERS in Material Handling

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ANSI MH29.1-2012: Safety Requirements For Industrial Scissors Lifts

“Over 20 years ago, Advance Lifts and a number of other leading manufacturers of industrial scissors lifts formed a group that worked on developing the first version of Safety Requirements for Industrial Scissors Lifts. This became known as the ANSI MH29.1 standard. Advance Lifts has continued to be active in the development of the subsequent revisions to the standard and, in 2015, the International Code Council (ICC) incorporated ANSI MH29.1 as a reference standard in Section 3001.2 of chapter 30 of the International Building Code (IBC). All of the Advance Lifts scissors lift products are designed, tested and manufactured to comply with ANSI MH29.1. Consequently, when we ship a product to a customer, we are confident that we are providing them with reliable, durable and safe products.” ANSI MH29.1 is a very important part of our company’s business philosophy. Advance Lifts, Inc., 800-843-3625, www.advancelifts.com

Standard Requirements:

Mobile and stationary industrial scissors lifts raise, lower and position materials and personnel in various applications but are different from other conveyances, such as aerial work platforms (AWP) and elevators. MH29.1 has been revised to better illustrate that personnel operate and may themselves be raised or lowered by industrial scissors lifts.



Photo courtesy: Advance Lifts Inc.

This standard now defines dock lifts, work access lifts and lift tables as the three categories of industrial scissors lifts and identifies their differences and similarities. The responsibilities of manufacturers, users, owners and operators have been reordered, consolidated and enhanced. Lastly, the requirements within the standard have been revised, where needed, to ensure they are stated using mandatory language.

The over-arching goal to the latest version of MH29.1: 2012 is to better conform to other equipment codes recognized by the ICC board and the International Building Code (IBC) by establishing mandatory and unified language. IBC now recognizes ANSI code MH29.1:2012 as the authority over industrial scissors lifts.

The second goal is to provide clarity to the definitions contained within the code and further delineate between industrial scissors lifts and the aerial-type scissors lifts. The modifications to the definitions describe and define which type of scissors lifts may have riders on-board and the ones upon which riders are not allowed.

The final goal for establishing these new safety standards is that users of industrial scissors lifts are insured that the manufacturers who design and build are releasing products that hold to the highest of regulated standards and safety requirements.

Increase Your Knowledge:

- To order a complete copy of the ANSI MH29.1:2012 Standard of Safety Requirements visit MHI.Org-LMPS industry section: <https://bit.ly/2PBxSBI>
- The Lift Manufacturers Product Group (LIFT) members are the resource for industry best practices, standards, information and equipment that lifts, rotates, tilts and otherwise positions materials. Industry scissors lifts and tilters can also improve the working interface between people and the materials they must move to reduce injury, increase productivity, and eliminate wasted motion, while providing a significant return on investment.

In 2017, LIFT made an excerpt from the MH29.1 standard (ANSI MH29.1:2012-Industrial Scissor Lifts Safety Requirements) available for free download on the MHI website.

LIFT members wanted to ensure access to the key responsibilities in safety requirements for owners and users of scissor lifts. The sections referring to these responsibilities have been extracted and made available. Download the free excerpt at <https://bit.ly/2C3YMOm>

Did You Know?

In 2014, the International Building Code (IBC) officially recognized ANSI code MH29.1:2012 as the authority over industrial scissors lifts.

The reference can be found in Chapter 30, section 3001.2. This

was considered a big win at the time, since some states and municipalities go strictly by the IBC, and it clearly separates industrial scissors lifts from elevators. Rider mezzanine lift approvals should be much easier. This recognition helped those who had

problems getting job approval by empowering them to let their inspectors know that industrial scissors lifts are now included in the IBC.

ISO 12100:2010 Safety of Machinery—Design Risk Assessment & Reduction

“Moving parts, extreme temperatures, constant noise and sharp edges comprise only a few of the hazards innate to machinery. Accidents involving machinery incur high costs, both in human terms and also economic and societal ones. Helping to assure the safety and health of consumers is a key component of ANSI’s goal. Vast reduction of injury can be accomplished by considering safety hazards from the initial concept and design of machinery. ISO 12100 Safety of Machinery-General Principles for Design-Risk Assessment and Risk Reduction, available through ANSI, establishes basic terminology, and is used to aid in decision-making through the design process.”
Julie Wallace, Sr. Product Manager, American National Standards Institute (ANSI), 212-642-4900, www.ansi.org

Important to Know:

ISO 12100:2010 (Safety of Machinery—General Principles for Design—Risk Assessment and Risk Reduction) substitutes ISO 12100-1:2003, ISO 12100-2:2003 and ISO 14121-1:2007. The new standard will benefit designers who identify risks during the design stage of machine production, decreasing the potential for accidents.

The risk-assessment procedures provided in ISO 12100 are offered as a series of logical steps, helping designers to methodically define the limits of the machinery; identify risks of hazards, such as crushing, cutting, electric shock or fatigue; and estimate potential dangers, fluctuating from machine failure to human error.

By providing a best practices framework at the international level, ISO 12100 will help eradicate technical barriers to trade, while at the same time upholding the safety and health of users of machinery, in line with necessities of national legislations of countries around the world. This is an especially important standard for machine builders.

Differences Between ISO and ANSI Standard:

Before a manufacturer can reap the benefits of safety practices, they need to understand which machine standards to follow. When undertaking a risk assessment, a company should understand the differences between ANSI B11.0 and ISO 12100. In terms of performing a risk assessment, the international standard ISO 12100:2010 and the North American standard ANSI B11.0-2010 are similar in many ways, but they also differ.

ANSI B11.0 is a significant document for machinery safety and for the safety of end-users. The scope of the standard focuses on new, modified or rebuilt power-driven machines, not portable-by-hand, used-to-shape and/or form metal, or other materials by cutting, impact, pressure, electrical or other processing techniques, or a combination of these processes. The ISO 12100 standard is geared more toward original equipment manufacturers (OEMs), while ANSI B11.0 covers not only machine builders, but also end-users.

This means there may be some subtle terminology in ANSI B11.0 geared for end-users that may not have a direct correlation with the ISO standards. Other than that, the risk-assessment principals and requirements of documentation are almost the same for both standards.

The ANSI B11.0 standard references the similarities between the two:

“This standard has been harmonized with international (ISO) and European (EN) standards by the introduction of hazard identification and risk assessment as the principal method for analyzing hazards to personnel to achieve a level of acceptable risk. This standard integrates the requirements of ANSI/ISO 12100 parts 1 and 2, and ISO 14121 (now combined into a single standard—ISO 12100), as well as selected U.S. standards. Suppliers meeting the requirements of this ANSI B11.0 standard may simultaneously meet the requirements of these ISO standards.”

Effectively, there is an equivalency between the two standards. If a builder designs a machine to ANSI B11.0 and ships it to Europe or any non-North American country, it would, for all practical purposes, have met ISO 12100 or EN ISO 12100 requirements because of the harmonization. The same is true for machines built offshore that meet ISO 12100 specifications before being shipped to North America. Both standards are globally recognized.

Standard Requirements:

ISO 12100:2010 (ISO 12100) specifies basic terminology, codes and a methodology for achieving safety in the design of machinery. It stipulates principles of risk assessment and risk reduction to aid designers in reaching this objective. These principles are grounded on information and experience of the design, use, incidents, accidents and risks related to machinery.

Within the standard, procedures are defined for identifying hazards; approximating and evaluating risks throughout relevant stages of the machine life cycle; and for the elimination of hazards or sufficient risk reduction. Direction is provided on the documentation and verification of the risk assessment and risk-reduction process. ISO 12100:2010 is additionally intended to be utilized as a base for the preparation of type-B or type-C safety standards. It doesn’t contract with risk and/or damage to domestic animals, property or the environment.

Increase Your Knowledge:

→ Designers who are interested in purchasing the full guide for *ISO 12100:2010 Safety Of Machinery - General Principles For Design - Risk Assessment And Risk Reduction Standard* can visit: <https://www.iso.org/standard/51528.html> <https://bit.ly/2E4XsfA>

Did You Know?

According to the WTO/TBT Agreement of 1995, member nations are required to create standards, such as compulsory standards, voluntary standards and conformance assessment processes,

by integrating said standards with international standards—like the ISO and IEC standards. Facilities and machines conform to ISO/IEC standards. This makes it possible to, in general instances, make these

facilities and machines conform to the technical criteria of various countries in order to increase unity around the world. Thus, allowing for fewer restrictions to worldwide trade.



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Important to Know:

An industrial steel work platform, as defined in the ANSI MH28.3-2009 standard, is a prefabricated, elevated platform located in an industrial environment, which is predesigned using a steel framing system. Flooring may include other structural or non-structural elements such as, but not limited to, concrete, steel and/or engineered wood products. ANSI MH 28.3-2009 is a specification intended to be applied to the design, manufacturing, installation and maintenance of such structures.

This specification is intended for work platforms made from steel. All structural components in the framing system shall be made from steel, as specified in section 7.0 of the standard. The non-structural walking surface of the deck may be composed of a variety of material, including combustible material such as, but not limited to, engineering wood flooring.

Standard Requirements:

This specification is intended to apply to the design, manufacturing, installation and maintenance of steel work platforms.

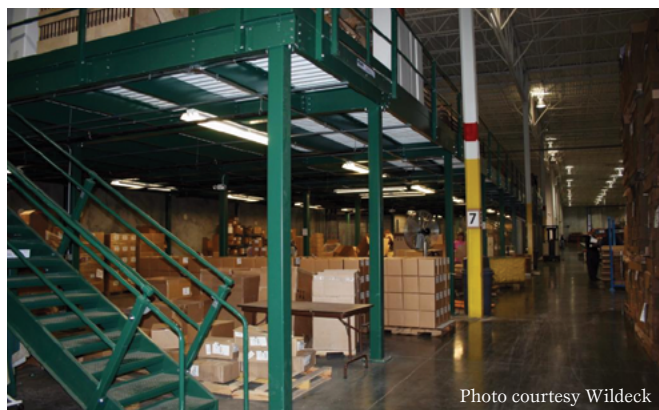


Photo courtesy Wildeck

ANSI MH 28.3-2009 Design, Manufacture & Installation of Industrial Steel Work Platforms

The standard states that the owner shall maintain the integrity of the installed work platform by assuring proper operational housekeeping and maintenance procedures, including but not limited to, the following:

- Prohibit overloading at any one area of the overall platform.
- Keep the guardrail and handrail in place under normal conditions.
- Keep access and egress stairways free of debris.
- Properly enforce application restrictions as stated in the scope of the specification.
- When damaged, immediately unload the appropriate area of the structure, then repair or replace the damaged component(s).

"This standard states that the owner shall maintain the integrity of the installed work platform by assuring proper operational housekeeping and maintenance procedures."

The work platform should include plaques of less than 50 sq ins displayed in the following locations:

- Clearly visible on at least one riser of each stairway or other means of access
- At each access gate
- The plaques shall show in clear, legible print the maximum permissible uniformly distributed live load for the work platform. Special loads shall also be indicated on the plaque(s).

Increase Your Knowledge:

- Copies of the standard can be downloaded for free at <https://bit.ly/2Xa5USx>.
- Visit ANSI online at www.ansi.org for more information.

Did You Know?

This specification was developed under material handling industry procedures and approved by ANSI on October 27, 2009, for guidelines applied to industrial steel work platforms—a

prefabricated elevated platform located in an industrial environment, predesigned using a steel framing system. The people working on such a platform should be properly trained

employees, accustomed to a manufacturing or warehouse environment. Additionally, workers' clothing and PPE should be compatible with safety regulations.

Assessment, Repair or Replacement of Damaged Rack (ANSI MH16.1-2012)

Mac Rak specializes in custom-engineered pallet rack repair kits, column protection and protective guarding for warehouse equipment. It has the nation's most complete line of the finest custom-engineered, guaranteed, bolted and welded rack repair products available to solve all rack repair needs. *Mac Rak, Inc., 815-723-7400, www.macrak.com*

Know the Requirements:

ANSI MH16.1-2012-Specification for the Design, Testing and Utilization of Industrial Steel Storage Racks applies to industrial pallet rack systems. This is a revision of MH16.1-2008 and is considered the voluntary industry consensus; it applies to industrial pallet rack systems, movable shelf racks and stacker racks made of cold-formed or hot-rolled steel.

The standard does not apply to other types of racks, i.e., cantilever, portable or racks made of material other than steel; nor does it apply to so-called "drive-in" or "drive-through" racks. ANSI MH16.1 has also recently been incorporated into the more general International Building Code (IBC), which now includes the ANSI requirements in the construction of all warehouses in the U.S.

Standard Requirements:

ANSI MH16.1-2012 has language that is specific to inspection and maintenance. The standard states the following:

In section 1.4.1 Owner Maintenance, the following is pertinent: "The racking system operator is responsible for maintenance and repair of the storage systems."

Section 1.4.9 Rack Damage states that, "upon visible damage, the pertinent portions of the rack shall be unloaded immediately and removed from service by the user until the damaged portion is repaired or replaced."

Inspection Specifics

It is important to have steel storage racks inspected regularly, in order to assess/check for any damage or potential faults. If an event occurs that might have resulted in a damaged rack, an immediate inspection should take place. Owners have complete control over how often to inspect their steel storage racks, but such inspections should be documented. It is recommended that inspections be conducted once a year, at least.

The Rack Manufacturers Institute (RMI) recommends four conditions for which pallet racking systems should be

inspected. They are plumb and straight; visible rust or corrosion; load capacity; and damage.

The maximum top to bottom out of plumb ratio for a loaded rack is Total Rack Height/240in, according to ANSI MH16.1-2012. This is measured from the centerline of the column upright at the floor to the centerline of the column upright at the top of the shelf elevation.



Any rust or corrosion can indicate weakening metal. If paint is scraped, a rack may have suffered a collision and should be checked for plumbness and straightness of the upright columns.

Applicable information from the manufacturer's capacity specs should be prominently displayed on a plaque or sign at the end of each aisle (see "Did You Know?" section, below). Engineering should always be involved, if there is a change in the original weight load/configuration. Beam deflection can occur if overloaded, with the maximum allowable deflection, according to the 2012 standard, as follows: Length of the Beam/180in.

The most commonly damaged components are beams, upright columns and anchors. Separate damage to the components within the racking system is a common problem and can affect the entire system's safety.

Increase Your Knowledge:

→ Rack Manufacturer's Institute www.mhi.org/rmi

→ ANSI MH16.1-2012 can be purchased at the ANSI webstore: <https://bit.ly/336Wecl>

Did You Know?

Signage matters! ANS MH16.1-2012 states that the owner is responsible for displaying a plaque or sign in one or more "conspicuous locations." This permanent sign "shall have an area of not less than 50 sq ins. Moreover, "plaques shall show in clear,

legible print the maximum permissible unit load and/or maximum uniformly distributed load per level; the average unit load (Section 2.6.2), if applicable; and maximum total load per bay." It is also specified that "storage levels having multiple stacking of

unit loads shall be so identified." It is considered the owner's responsibility to "ensure that the rack system is not altered in a manner that the plaque information is invalidated."

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