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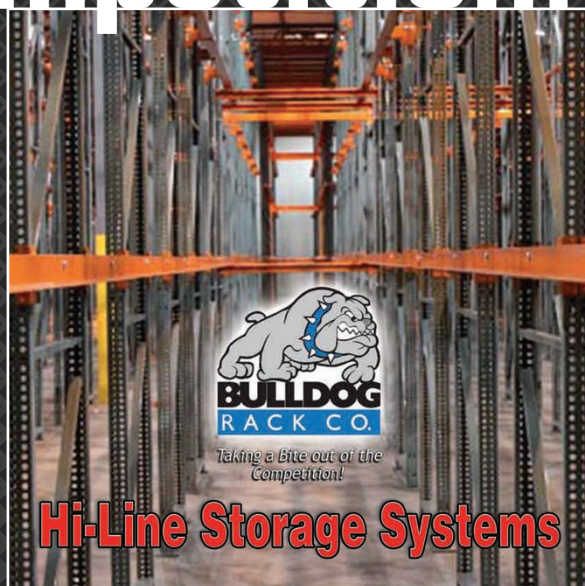


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Max Discrete I/O	156 points including option slot modules and expansion I/O	132 points including base, plug-ins, and expansion I/O
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High-speed I/O	8 inputs 100kHz with up to 6 counters, including option slot modules	8 inputs, 2 outputs embedded w/ 3 optional plug-in inputs 100kHz for embedded I/O, 250kHz for plug-ins with up to 7 counters - 4 embedded counters + 3 plug-ins
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March is not a month that is generally associated with much excitement. It doesn't come with the promise of new beginnings, like January. By the time March rolls around, a weary reality about the new year has set in. Many well-intentioned resolutions have already fallen by the wayside, and the current year reveals itself to be, well, very much like the previous year. March doesn't have the holiday luster of December (although those who celebrate St. Patrick's Day in a big way have the 17th prominently marked on their calendars). It doesn't have the sunshine and green beauty of the summer months that are ahead

of it. In fact, in many parts of the country, March can't decide whether or not it's winter or spring, weather-wise. There's a reason for that well-known proverb: "If March comes in like a lion, it will go out like a lamb."

The theme of the month's prominent events seems to be deprivation. We lose an hour of sleep with the start of Daylight Savings Time and those who observe the Christian tradition of Lent start fasting as soon as "Fat Tuesday" is over. We're supposed to beware of the *Ides of March* – the 15th. Apparently, Julius Caesar didn't heed this advice, because he was assassinated on March 15th back in 44 B.C. The very name of the month has far-from-peaceful origins. March takes its name from Mars, the Roman god of war. Military battles that had been interrupted by winter weather were able to resume during March.

But, there *are* positives this month. Temperatures get warmer. The vernal equinox in the Northern Hemisphere marks the beginning of spring. (For our friends in the Southern Hemisphere, the same date heralds the autumnal equinox - the arrival of fall.) Tulips, daffodils and other bulbs that have been slumbering in the cold ground all winter push upward and bloom, bringing lush color to landscapes that are otherwise still drab. The same Daylight Savings Time that robbed us – temporarily – of sleep gives us more light.

The start of 2022 has been a tough one. Problems related to the pandemic - like supply chain snafus, a labor shortage and inflation - remain front and center. COVID continues to claim lives and strain healthcare resources. The political discord in the U.S. is as loud and uncivil as it was in 2021.

When I feel as if I'm focusing on the negative, I'm reminded of the cache of V-mail I found a few years ago, in a bin of family photos. My grandmother kept every one of the letters my father wrote home while serving in the Army during World War II. My father was an optimist, with an aversion to dwelling on the negative. In his letters home, he was cheerful and even sounded mostly happy, despite the circumstances. He *did* see some action, but said very little about that, probably to lessen the worries of his parents. He did sometimes mention friends lost in the war, and of feeling "a bit blue" now and then, because he was so far from home. Mostly, though, he wrote about how much he enjoyed the camaraderie of his fellow soldiers, of getting to know people from all different parts of the country. Having grown up in a small town in Pennsylvania, he was amazed to be able to spend time in England, France and Germany, and to learn about the people and customs in those countries.

Of course, many people who serve in the military have experiences that prevent them from having the kind of rosy takeaways that my father, in general, wrote home about. I'm mindful of that fact. But when I read his account of enjoying a pint with a fellow soldier in an English pub, or of encountering Ernest Hemingway in a bar in France, I am struck by his perspective. Like the lyrics of the old song: he accentuated the positive.

A good habit to acquire.

Maureen Paraventi
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Jack Paraventi, circa 1943



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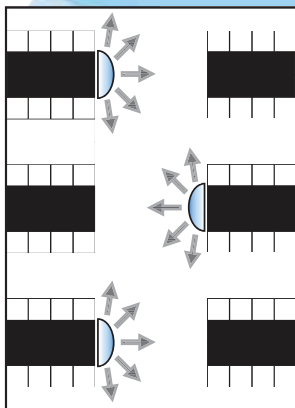


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A System is Only as Smart as its Software

Contributed by : **MHI**

ASRS comes in many forms – vertical/horizontal carousels, fixed-aisle, single- or double-deep pallet racking or multiple-deep solutions. Identifying the right technology for a warehouse comes down to multiple factors including available space, number of SKUs and operating and maintenance budget. This design is critical to meeting the needs of warehouses across industries, but a system is only as smart as the software that controls it.

No matter the design, proper software implementation alongside warehouse automation is crucial to maintaining a competitive advantage and strategic operations. Combining warehouse control system (WCS) and warehouse management system (WMS) functionality, warehouse execution systems (WES) manage both the warehouse inventory as well as movement of the products throughout the warehouse. Pairing an ASRS with the right WES is essential to the overall functionality of the system, providing several key benefits including:

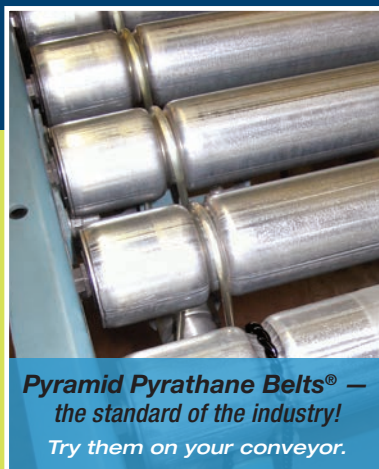
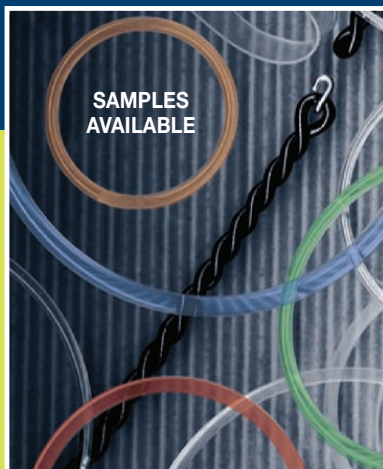
- **Optimized workforce:** Manual, repetitive tasks are eliminated with automation, so workers can spend more time optimizing quality control and safety.

- **Increased traceability:** Real-time product visibility to track product movement and monitor production and inventory levels across the entire network.
- **Improved accuracy:** Costly mistakes are avoided by reducing unexpected stock-outs, backorders and other fulfillment errors. In addition, with automated data collection, inventory or equipment information is no longer delayed or inaccurate.

Whether using a WMS, WES or WCS, the design of an automated system should always originate from a data-centric approach to ensure flexibility, reliability and long-term success. Designing a system encompassing both inventory and process data is the first step in mitigating risk. By using data to identify specific pain points for a company and its industry, the warehouse can be designed to accommodate key challenges such as seasonal demand, a lean workforce or product specifications.

A WES is also a critical piece in long-term data collection. ASRS software collects critical information during warehouse operation, examples include:

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AUTOMATED STORAGE AND RETRIEVAL SYSTEM (ASRS)



No matter the design, proper software implementation alongside warehouse automation is crucial to maintaining a competitive advantage and strategic operations. *Image courtesy of Westfalia.*

- The rotation of pallets within the warehouse
- SKU volume
- Downtime and maintenance needs
- Product movement from dock to pallet to aisle

The data analysis from inventory and order fulfillment is transformed into forecasting and 3D network planning models. Development platforms, like Unity, are available

to create in-depth analyses in an easily digestible format to help predict trends and areas of inefficiency. Providing the right data before design and during operations is critical to an intelligent, agile and flexible system that can accurately handle products, regardless of SKU volume and level of throughput. With the right system design and software to support it, warehouses can optimize space, manage costs and prepare for future disruptions.

CHOOSING THE RIGHT TECHNOLOGY

ASRS technology such as vertical lift modules (VLMs) and vertical/horizontal carousels typically utilize a style of WMS that allows smooth interaction not only with controllers on the automated storage units themselves, but also with other types of solutions such as rack and pallet storage.

This software is often built around three main points: functionality, intuitive user guidance and price-performance ratio. The result is an optimized warehouse management platform. When the software is platform-independent with web applications for all kinds of different clients, often with additional modules to meet the specific needs of every customer, then the overall system can also interface seamlessly with a broad range of ERP and WMS systems.

An intuitive graphic interface quickly maps scenarios involving ASRS systems, shelf storage, racks, pallet bays



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AUTOMATED STORAGE AND RETRIEVAL SYSTEM (ASRS)

and other warehouse locations. A three-dimensional shelf overview even shows the current situation on every storage level. All storage data can be viewed and managed just about anywhere – at the storage system, on a workplace PC or on terminals and tablets.

This system applies inventory management best practices, enabling users to avoid expired items and dead stock while saving money. Tracking can be done by:

- First-in/first-out (FIFO) ensures that the oldest inventory items are used or sold first
- Shelf life and expiration date parameters prevent unnecessary spoilage
- Par levels to determine the minimum amount of inventory items that must be on hand at all times
- Lot numbers or serial numbers to allow products to be traced accordingly throughout their useful lifespans.

ASRS software can be utilized for these methods and more.

Vertical storage lifts can also interface directly with customer ERP software. Some manufacturers' control systems support data exchange without the need for additional



By using data to identify specific pain points for a company and its industry, the warehouse can be designed to accommodate key challenges such as seasonal demand, a lean workforce or product specifications. *Image courtesy of Hänel Storage Systems.*

middleware. An FTP server, network share or web service interface is all that is required for data exchange between the controller and the customer's ERP system.

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AUTOMATED STORAGE AND RETRIEVAL SYSTEM (ASRS)

The latest generations of controllers also double as a terminal for a wide range of ERP systems using an embedded web browser and web service, which allows for SOAP-based data exchange and a display mechanism, eliminating the need for an external computer. This prevents synchronization problems, such as those stemming from redundant data storage. This also allows for customized interfaces to be displayed directly on the controller, rather than having to utilize external PCs. ERP systems can display their data directly on the controller.

Input data is booked in the ERP system in real time, and then the storage system is actuated. The booking is executed directly in the ERP server, with no data buffering or data conversion in the control system. This means that the storage overview and inventory status control are always updated, regardless of the client used.

There are many available options for software integration for ASRS – Check with your ASRS manufacturer to find out which ones will be right for your solution. For managing various types of automated vertical storage systems, in conjunction with conventional warehouse solutions, WMS software is the perfect inventory management tool for meeting the challenges of the future. **WMHS**

For more information about ASRS, visit <https://www.mhi.org/as-rs>



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CONVEYORS: Moving at the Speed of Light

The conveyors of today and tomorrow are fast and efficient.

Contributed by: **Conveyors & Sortation Systems (CSS) Industry Group**

In the material handling world, you would be hard-pressed to find a niche that has not felt the profound effects of the pandemic. From the way distribution centers manage operations to turnaround times, to the equipment involved, today's operations look different than pre-2020. In many aspects, that's both presented more challenges and more opportunities for businesses.

"COVID changed everything," said Dan Barrera, Segment Manager at Carter Intralogistics. "It used to be that e-commerce customers were content waiting for 48 hours or more for package delivery. Now, they expect to see their orders delivered in under 24 hours."

That's had a radical impact on material handling operations, and conveyors play one of the biggest roles in allowing companies to keep up with customer demands.

"Conveyors need to be faster, more flexible, more mobile and require less maintenance," said Barrera. "Conveyors have had to change to keep up."



Traditional conveyor surfaces like this one will be replaced by surfaces covered with small, activated metal balls managed by smart controls.

PROVING EFFICIENT

In order for your conveyors to keep pace with today's demands, DC managers have had to look for flexible, on-the-go solutions.

"With COVID and the need for social distancing, companies have needed the ability to change configurations on

the fly," said Barrera. "We've been selling many flexible, mobile conveyors that allow for quick changes without interrupting the pace of operations."

Also important in today's quick-fire environment is the ability to remain operational and efficient. This means conveyors coupled with predictive maintenance.

"Say your motor is overheating and consuming too much energy," said Barrera. "You can learn this in advance and be proactive rather than reactive. You can plan to shut down your equipment for maintenance at an off-peak time."

Connecting conveyors to the cloud for both predictive maintenance and for determining bottlenecks and other inefficiencies is also essential today.

"You can compare one shift to another, for instance, and figure out where the inefficiencies lie," Barrera said. "Then you can correct them, keeping your capacity and speed where it needs to be."

Piggy backing on those efficiencies are automated vehicles like AGVs and AMRs, which can work in support of conveyors, taking up less space on the DC floor.

"Nothing is going to replace conveyors," said Barrera, "but engineers can now create flexible, mobile designs backed up with new technology."

LOOKING AHEAD

While the pandemic brought the future to conveyors in quick fashion, smart companies are also keeping an eye on what's to come. Robert Turner, Systems Engineer, Parcel, at Vanderlande Industries, says the future of conveyors is going to look even more sophisticated.

"Conveyors are only going to become smarter and more functional," he said.

Turner sees conveyors changing from equipment that can transport items from point A to point B, into equipment that can also go to point C, adding in higher functionality. For instance, tomorrow's conveyors might also manage sortation, alignment, consolidation and more.

"It might even include palletizing," Turner said. "Conveyors will become a more creative solution without having to add on secondary or tertiary pieces of equipment."

The conveyors themselves, rather than resembling the traditional, flat belt or rollers, for instance, will present as a surface covered with dozens of small, activated metal balls managed by smart controls. “A package will move onto the ball-covered table and roll or rotate 360 degrees, for instance, controlling the direction the parcel needs to go,” Turner explained.

All of the magic occurs when the controls determine which direction the balls roll, sending packages that way.

“So, if you have a parcel on the conveyor and another is headed that way, too, the balls might move one parcel to the left to make room,” Turner explained. “In this way, the conveyors are sorting as well as transporting.”

Right now, roller ball beds like this are still in the pre-adoption phases, says Turner.

“It’s largely in development, but different companies will have different flavors of the technology,” he said. “Ultimately it will become commoditized.”

Turner says that at the moment, there still isn’t a clearly defined business case for these futuristic conveyors. You won’t find them at UPS or FedEx today, for instance. But as with the fast-paced change that kicked into gear in early

2020, it’s a good bet that the conveyors of the future are closer than you think. **WMHS**

Conveyors & Sortation Systems (CSS) Industry Group is advancing the material handling industry through the optimal use of conveyors and sortation systems for the benefit of our members and their end users. <https://www.mhi.org/conv>



Robert Turner, Systems Engineer, Parcel, at Vanderlande Industries, predicts that conveyors are going to become smarter and more functional.

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Know Your Numbers for Narrow Aisle Forklifts

By: **Maureen Paraventi**

A "No Vacancy" sign might be a positive for a motel – an indication that paying customers are filling all of the available rooms and generating revenue for the business' owner. In the warehouse industry, though, falling vacancy rates is an alarming trend, according to the experts. Estimates released late last year by several sources indicated that warehouse vacancy in the U.S. had dipped to 3.6%, largely due to the pandemic-related global supply chain crisis. The space crunch is especially noteworthy in warehouses near U.S. ports, such as the port of Los Angeles, which recorded a record low vacancy of 1%.

This is despite the fact that warehouses used to store merchandise, raw materials and manufactured goods are much larger now than in the past. These storage behemoths previously were, on average, less

than 10,000 square feet. According to government statistics, the average warehouse is now 16,400 square feet, with many in the 25,000 to 50,000 square foot range.

Warehouse managers are using a variety of strategies to pack more product into their available space, such as maximizing vertical space by using taller shelving units and filling those racks to the ceiling. Reconfiguring layouts to make aisles narrower is another option. This warehouse optimization strategy can significantly increase storage space without expanding a warehouse's footprint.

An additional advantage: reducing travel time between picks speeds up the process.

Narrow aisles, however, may require the use of narrow aisle forklifts. To



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make the right choices when it comes to these vehicles, it's important to know the exact measurements of the aisles in which they'll be used. While lift capacities and height ranges are always important considerations when choosing lift trucks for your facility, narrow aisles add a few more factors to the decision-making process. Forklifts must be able to fit in the aisles and also have sufficient room to maneuver and turn without hitting racks and causing damage.

First, know that there are two distinct classifications for less-than-average aisle widths: Narrow Aisles (NA) and Very Narrow Aisles (VNA). Traditionally, aisles in warehouses and distribution centers have been fairly wide, as much as 12+ feet, in order to give conventional, sit-down counterbalanced forklifts the clearance and turning space needed to handle standard 48-inch pallets. NAs trim several feet from that width, and range from 8 ½ to 10 ½ feet wide. VNAs, which are gaining in popularity, are able to take advantage of the growing number of forklifts designed specifically for tight quarters. VNAs may be as little as 5 to 7 feet wide.

While changing aisle widths to increase storage is an appealing notion, making aisles too narrow for your needs can be a costly mistake, and one that is time consuming to correct. Most narrow aisle forklifts can handle the same amount of weight as a standard forklift, from 80,000 lbs. to 105,000 lbs. However, if the choice is between single-reach and double-reach forklifts, double-reach ones (which can access deep racks) are better for heavier loads, while single-reach ones are the more economical option for lighter loads.

Before embarking upon a major reconfiguration effort, check the forklift manufacturer's specifications:

- Will the narrow aisles you're planning have sufficient room for the forklift trucks you will be using to operate safely and efficiently and avoid product damage in the event of operator error? What is the basic right-angle stacking width and the load length? The forklift's turn radius?
- Will the lift trucks have enough power to raise loads to the heights needed?
- Are there other requirements that need to be met? For instance, turret trucks and double-reach forklifts can only be used on level floors. Additionally, turret trucks need to be guided by rails along the aisles, wires or lasers, while double-reach forklifts are not ideal for outdoor use.
- Would order picker forklifts be right for you? They are ideal when the warehouse inventory consists of smaller, lighter items that are stored at considerable heights.

The increase and evolution of forklift models intended for use in tight spaces may make narrow or very narrow aisles a viable solution to warehouse storage challenges. **WMHS**

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It used to be that automation was reserved for the big boys—those deep pocketed corporations with massive distribution centers that could afford the latest and greatest equipment. The smaller and mid-sized distribution centers were generally left out in the cold, unable to afford the efficiencies that automation could provide. Today, however, that landscape is changing.

“With the labor shortage and a big increase in wages for DC workers, suddenly automation makes sense for many more companies,” said Bill Denbigh, Vice President of Product Marketing for Tecsyst. “Automation that might not have looked like a good prospect in the past now sounds like a good idea.”

Adding to the payoff is ever increasing productivity demands, the rise of ecommerce and customer expectations of same-day delivery. Companies need alternatives to manual handling solutions that increase speed, accuracy and productivity.

Rupesh Narkar, Director of Sales at Swisslog Logistics Automation, agrees, and adds that scalable solutions provide for more options for companies of all sizes. “In the previous decade, the approach towards automation was ‘one size fits all,’ hence only large organizations thought of implementing automation,” he explained. “This has significantly changed in past few years. Automation solutions are now more specific to each industry, segment, or even specific challenges. This is all possible due to the modular, scalable and flexible nature of new concepts in automation solutions”

As a result, Narkar says small-, mid- and large-scale companies have plenty of options to implement automation solutions specific to a certain challenge, or to apply it over complete operations. “Today’s automation solutions are by nature modular and highly scalable; even flexible,” said Narkar. “Companies implement small systems on a pilot basis, and then up- or down-scale as their business needs change. Many have even utilized the flexibility to move or



Automated storage and retrieval systems can improve material flow and enhance speed, accuracy and productivity. © navintar - stock.adobe.com

relocate as their operations strategy changes, making use of the same solution, just re-arranged in the new setup.”

HOW AUTOMATION SOLUTIONS PLAY OUT

With automation opening up to a wider customer base, how it is implemented and used varies from company to company. “The old idea of throwing out the old and bringing in the new isn’t the rule any longer. It’s often augmenting or optimizing what you have,” said Denbigh.

For instance, a customer might start small by adding in a carousel or a vertical lift module. “We’re seeing many organizations who say they have enough fat in the processes and that if they add some automation, they can drive enough value to negate the need for hardware automation,” said Denbigh. “The first layer of automation projects is generally the automation of processes—really, software automation.”

Narkar said that digitalization of existing processes can provide big payback. “Intelligent, reactive, data-drive and flexible software forms the backbone of digitalization. This is the bridge that connects existing processes to automation.”

There's also a role for automated vehicles in these scenarios. From Narkar's perspective, they help put control back into processes. "Technology like ASRS, AGVs and AMRs are improving material flow and delivering significant improvement to speed, accuracy and productivity," he explained. "These solutions also deploy a WMS to effectively monitor and control each step in the process."

Denbigh adds that tools like AI-based picking, slotting and other tasks provide for a low-risk solution. "The infrastructure requirements are almost zero," he said. "Understand your problem, find the data and add the piece in the middle to optimize the heck out of machine learning. You'll get the most of what you already have in place."

While taking the step to automate can feel overwhelming, with today's incremental options and lower costs, it's well worth the investment of time and resources. Working with automation solution providers, you can determine your requirements and tailor solutions specific to your operations. "Automation can transform your warehouse into a facility that does exactly what you want when you want," said Narkar. "Today, warehouse operators are aiming to reach higher capacities in terms of better space utilization, higher productivity in terms of maximum goods inbound/outbound and improved efficiency in terms of better resource utilization."

Regardless, the old adage of not automating for automation's sake still holds true. "Just automating without alignment to long-term strategy can result in diminished returns," reminded Narkar. "You must correctly identify the current problems, think through end-to-end processes and then look at automation for solutions. The technology, in the form of intelligent warehouse management software and flexible automation, is available today and can help create a competitive advantage by reducing costs, increasing throughput and responding faster to changes in market demand." **WMHS**

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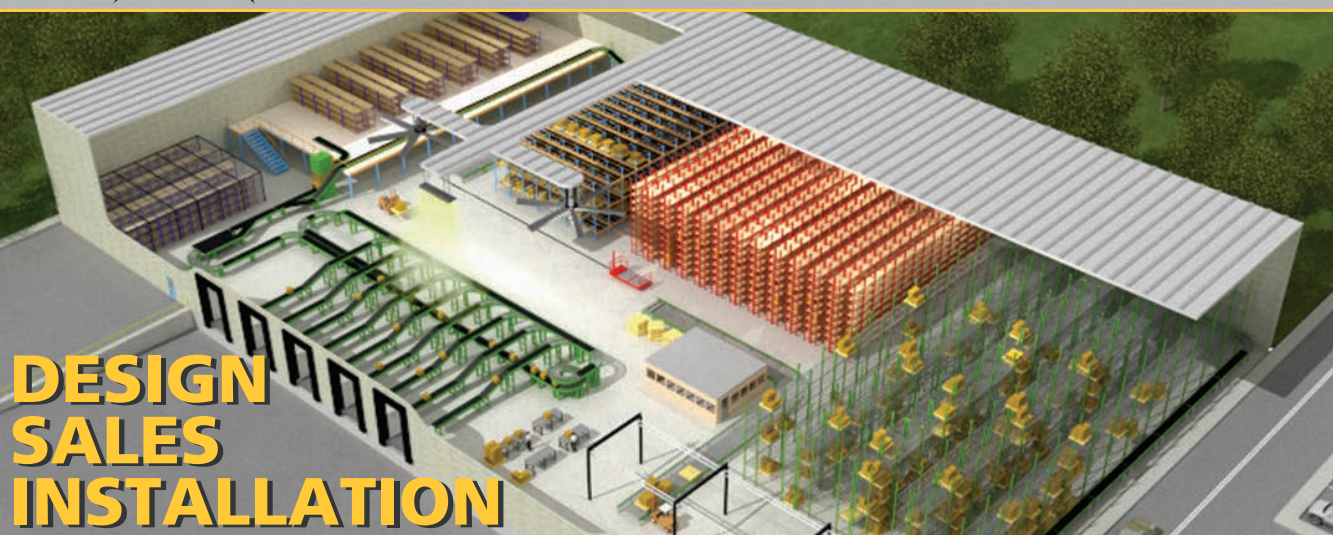
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Robots are Becoming the Norm

For a variety of reasons, the ROI for robotic implementation has never been better.

Contributed by: **MHI's Solutions Community**

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For years, the idea of robotics in the warehouse had something of a Star Wars-esque connotation. Machines that could take on the complicated tasks humans performed every day seemed wildly impossible. And even once robotics made their debut, they were big, expensive, and few and far between.

Today, the scene is much different, and robots are becoming part and parcel of many distribution center operations. Multiple factors and trends have played into that fact. "It's always been about the ROI," said Ed Romaine, Vice President of Marketing and Business Development of Conveyco Technologies. "Before, the ROI was out of reach for many companies. Today, the returns are here."

Achieving an ROI with robotics is easier in part because the pricing has decreased dramatically, said Romaine. "These used to be big machines that ran companies \$100,000 per

robot," he said. "Now you can find some models for under \$10,000 per robot."

These next-gen robots are not the behemoth automotive manufacturing machines of yesterday, but smaller, lower-cost versions. The costs have come down thanks to less expensive parts and more advanced intelligence. All combine to make robots much more affordable.

In addition, companies now better understand the roles robots can and cannot play in a typical DC, said Douglas Card, Manager of System and Integrator Sales, at Kardex. "People used to worry about robots replacing humans as pickers, taking away good jobs," he said. "Picking is an example—we know now that it's not always a good application for robots due to the various shapes and sizes they must handle." But robots are fast learners and with some system modifications robot picking is a fast-growing application.

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Robots are also serving in collaborative roles with humans. They often take on the role of transporters within a DC. “Robots might move goods from the storage area to the pickers, for instance,” said Card. “Or from trucks to storage.”

These are jobs that humans are happy to relinquish, as they prevent repetitive motions that might result in injury, can be prohibitively heavy to move and require a good deal of travel time. Humans instead stay positioned at high-speed work stations or ergonomic picking stations where they can remain safe, comfortable and focused on the job at hand. “This has helped in the shift in acceptance of robots,” said Card.

Beyond collaboration with humans, robots are also partners to other types of technology within a DC, said Romaine. “Rather than considering them in a singular way, robots are now mingling with multiple types of technology,” he explained. “For instance, an AMR with a robotic arm. All these systems are at the genesis of working together to create a highly efficient and effective operation, with minimal labor requirements.”

Other examples include using a robot to replace case cutting and decanting, which can be a risky and tedious job for humans. The robot cuts the cases and then decants them, placing them in totes. “That’s a lot of labor and when you have an automated module to do it, you can experience up to 80 % labor savings,” said Romaine.



Robots are part and parcel of many distribution center operations.

This is key right now, as DCs struggle to find enough workers to fill the floor. “Growth in robotics is outpacing labor availability by three- or four-fold,” said Romaine. “There’s a point where the labor shortage amounts to decreased customer satisfaction, so robots make it feasible to fill orders and keep those customers happy.”

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With some system modifications, robot picking is a fast-growing application.

other verticals are taking hard looks at their value, as well.

Looking ahead, robots will only continue to evolve, and their costs will continue to decrease. “The systems are

Robots also offer the advantage of better cube utilization, which saves costs. “Robots can help you avoid the need to expand your facility or move to a bigger one,” said Card. “For companies just adding in ecommerce to their operations, robots can also help prevent the need for a separate DC to process those orders.”

Romaine said the grocery and retail industries are adopting robotics at the highest rates, although many

getting smarter and learning,” said Card. “Look for AI components that are built in, learning how to handle more product over time.”

They will also become more adaptive. “When you put down conveyor systems, they’re fixed in place,” said Card. “Robots allow for programming to learn alternative paths within the warehouse floor. They’ll become dynamic, with the intelligence built in.”

Robotics also offer a facility redundancy, helping to keep operations moving nearly all the time. “If you have multiple robots and one shuts down, the system will continue to run without a hiccup,” said Card. “They’re also scalable—if your business is growing and you need higher rates of performance, just add more robots. That’s a big benefit you don’t get from other types of automation.” **WMHS**

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MATERIAL HANDLING SOLUTIONS

Delivering Effective Safety Training: Going beyond OSHA's requirements

By: **Mark Stromme**, *Contributor*

Safety professionals understand the importance of following OSHA's training requirements. They know that training takes time and effort. But not just any training will do; it must be delivered in a way that overcomes seven common training hurdles. Only then will the worker understand and get what is needed from it.

Many of OSHA's standards have specific training requirements. It's important to meet these requirements, but remember, OSHA only describes the minimum training required. Many employers choose to go beyond the requirements to meet a higher standard — which includes meeting industry best practices and trends.

OSHA'S REQUIREMENTS

Staying just with the OSHA requirements, over 60 standards mention training. Determining if OSHA has a training requirement is the first step in analyzing training needs. In manufacturing, some of the most common training topics include:

- Bloodborne pathogens
- Hearing protection
- Respiratory protection
- Emergency action plans
- Lockout/tagout
- Forklifts
- Hazard communication
- Fall protection

To complicate matters, while OSHA specifically outlines training requirements in many standards, some standards say to “inform” or “instruct” workers on something, but don't use the word “train.” For example, the Machine Guarding standard doesn't specifically mention training, but training is clearly useful and even necessary. Training workers to recognize pinch points, or how to spot a defective guard, is important. Another example is only designated personnel can operate an overhead crane, and the employer must determine if a worker can be “designated” — which sounds like training is certainly needed.

TRAINING 101

Effective training starts with proper planning. Most trainers say they need up to eight hours of prep time for every hour of training. That includes research time, preparing written materials, gathering props, setting up the classroom and inviting the learners. Which means an 8-hour training program requires a lot of preparation work.

Keep in mind most people have relatively short attention spans, even for the most exciting content. It's recommended to limit content to 45-50 minutes per hour, with a 10–15-minute break before starting up again. That way employees can have time to ask questions.

Remember, not everyone is comfortable asking questions in front of a crowd. A good trainer sticks around after the session to answer questions. That might require the trainer to leave a half-hour block of time for this after the training session.



Limit training sessions to 45-50 minutes per hour, with a 10–15-minute break before starting up again.

SEVEN TRAINING HURDLES

Trainers must understand the issues and frustrations that trainees encounter. Here's a common list of hurdles that must be overcome:

1. Content isn't relevant — Trainees must feel the training is important and applicable to them. Does the material provide what they need and relate to what they're doing, or is it too general?
2. Material is outdated — Images and information used in training must be current. Photos from the 1990s and outdated slang or wording must be replaced. They're a distraction and hard to take seriously.
3. Information is too technical — Not all trainees need the same level of detail. Know their reading ability, math skills if needed, and vocabulary level. It's easy to get carried away with jargon or government-speak when talking about the OSHA standards.

4. Material isn't in the trainees' language — One common challenge is trainees who do not speak English, or who do not speak English as their first language. This is where an interpreter is needed or trainers (or training helpers) who speak the trainees' language.
5. Trainer isn't qualified to teach the material — Some OSHA regulations require the trainer to have specific knowledge and experience. The powered industrial truck regulation says that training must be conducted by persons who have the knowledge, training and experience to train operators and evaluate their competence. OSHA clarified that the instructor must have experience with the equipment (truck type) or attachment to provide training. The bloodborne pathogens standard says the trainer "shall be knowledgeable in the subject matter covered" as it relates to the workplace. OSHA clarified that the trainer need not be a health care professional, but if there are deficiencies in the quality of the training, OSHA may question the trainer's background.
6. Material is boring/not interactive — To be effective, training should be interactive, requiring the trainees to answer questions, solve problems or get hands-on time using equipment. Just sitting and listening is a challenge for many people.
7. Material isn't in the trainees' preferred learning style — Some people learn best by seeing. Others need to

hear the material. And many are hands-on learners who need to handle equipment to really understand a concept. Effective training incorporates all three learning styles.

Finally, determine if any trainees have special needs. Some workers may have a vision or hearing impairment that requires extra planning and awareness.

TAKEAWAYS

Understanding which of OSHA's training requirements apply to a facility is often a challenge for safety professionals and is complicated by standards that say to "inform" or "instruct" workers on something.

And when it comes to the actual instruction and training, seven common training hurdles must be addressed to provide effective employee training. Only then will employees understand and get what is needed from it. **WMHS**

Mark Stromme is Senior EHS Editor with J. J. Keller & Associates, Inc., which addresses nearly 1,500 compliance topics with a diverse portfolio of solutions, including cloud management tools, customizable training programs, managed and consulting services, online and print compliance manuals and instructional publications. For details, visit <https://www.ijkellersafety.com/>

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Intrinsically Safe Lighting in Explosive Environments

By: **Derek Box**, Contributor

When your employees need portable lighting in order to accomplish their work tasks, it's important to consider the safety of the lighting equipment they'll be using – if the environment is potentially explosive. The danger is obvious in the petroleum and chemical processing industries, but many other industries can create explosive atmospheres that are not as obvious but still represent a serious danger.

Examples illustrating this are in facilities that process grains, sugar, metal powders and wood products. In 2018 grain handling facilities in Nebraska and eastern France were destroyed or seriously damaged by grain dust explosions. In 2008 an explosion wrecked a sugar refinery in Georgia, killing 14 people and injuring another 40. Five workers were fatally injured in an iron dust fire in Tennessee in

-01/-11 standard for European Union ATEX certifications and the remaining countries IECEx certifications.

For an explosion to occur, five components must be in place: oxygen, confined space, ignition source, dispersion and a fuel source. These elements make up the explosion pentagon. The three elements needed for a fire — fuel source, oxygen and an ignition source — can create a flash fire within a confined space, resulting in the ingredients for an explosion. Eliminating one of these five elements will prevent an explosion, but eliminating these hazards is not a simple process. Oxygen in confined spaces typically cannot be eliminated. Therefore, managing fuel sources and the use of properly rated equipment to prevent ignition is essential.

As an example, using the ATEX classification system, a Zone 2 environment could quickly become a Zone 1 or even a Zone 0 environment, and your equipment must be rated appropriately as you may not be aware that the environment has changed until it is too late. If you are unsure, analyze the work environment, determine the worst-case scenario, and equip your workers based on that.

ATEX ZONES EXPLAINED

Three components are necessary to create an explosion:

1. **Flammable material** – A gas, vapor or mist.
2. **Oxygen** – Regular breathable air is sufficient.
3. **Ignition Source** – Extreme heat or a spark.

In a flammable atmosphere environment, special precautions must be taken to prevent catastrophic explosions. All portable lighting must be specifically engineered to avoid a spark from occurring and igniting any flammable vapors or explosive mists. In some cases, these vapors and mists can be colorless and odorless, making them especially dangerous.

Commercial worksites have different hazardous areas classified at a specific level called a “Zone.” All equipment safety ratings must be carefully selected based on the most dangerous Zone it may encounter; therefore, it is critical to identify the Zone in which you will be working.

Let's take a look at the specific characteristics of each Zone.

Zone 0: An area in which an explosive atmosphere is always present.



The lighting and other equipment you are using must meet or exceed the standards for the most explosive environment you could face under known or unknown situations. *Photo courtesy of Nightstick*

2011. It is essential to understand the conditions that can create explosive environments and the proper equipment required to enter them safely.

The lighting and other equipment you are using must meet or exceed the standards for the most explosive environment you could face under known or unknown situations. In the United States, Intrinsically Safe (IS) products are tested to the UL 913 5th or 8th edition standards with the UL 913 8th edition being harmonized to the EN/IEC 60079



All portable lighting must be specifically engineered to avoid a spark from occurring and igniting any flammable vapors or explosive mists. Photo courtesy of Nightstick

Zone 1: An area in which explosive atmospheres are **likely to occur** during regular operation. This may be due to leakage, scheduled maintenance or emergency repairs.

Zone 2: An area in which an explosive atmosphere does not occur during normal operation, or for a short period of time only. This is usually the result of an accident or other unusual operating conditions.

The quality of your equipment is vital in explosive environments. You must ensure it is manufactured by a reputable company with documented experience in creating intrinsically safe products. The ideal situation would be to purchase all of your IS products from a single manufacturer rather than mixing and matching products from several companies. A single source manufacturer ensures consistent quality and safety across the entire product line. Because of the knowledge, time and expense required to engineer and produce IS products, a very limited number of companies can achieve this. **WMHS**

Derek Box is Marketing Manager, Industrial Division, of Nightstick, a global brand of professional portable LED lighting products that adheres to the ANSI/PLATO FL 1 standards. Nightstick's intrinsically safe products are UL 913 certified for Class I DIV 1; most also carry a Zone 0 IIC ATEX and IECEx certification with T3 and T4 temperature ratings. Nightstick has more than 50 safety-rated LED lighting products, from pocket-sized penlights to wide-area floodlights, for use above ground or below ground (www.nightstick.com).

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Material Handling Safety Systems Are More Important Than Ever

By: **Aaron Conway**, Contributor

Employees truly are a business' most important assets. I recently read that more people quit their jobs in November than any other month in the last 15 years and most are not planning to re-enter the traditional workforce. Add the stress of Covid in the workplace, which is also causing sick days and disruptions in day-to-day output, it's no wonder the labor market is extremely tight. Another big stressor is inflation and the ability to get the materials as quickly as needed. Not to mention that everywhere you go you hear about "the problem in the supply chain."

It may seem the material handling and distribution industry is under siege. But we believe it's healthy and that the industry is just having some growing pains, which we can get around.

Temporary workers are one solution that many organizations in the industry are using to increase staff because of the extreme pressure to get products into the hands of businesses and consumers. With a lack of personnel, time and a laser focus on productivity, safety must be built into the culture of the organization

While safety has always been important, the factors above make it extremely important in material handling facilities and operations now. Many material handling facilities and applications have also expanded upwards, with taller structures or modules for employees to work on.

Training new and temporary employees is imperative, and in today's fast-paced environment it can be rushed in order to get employees up and picking. If the employees are

working to pick from pallet drop areas or working on upper levels, fall protection is a key part of the safety equation. To make sure that your employees are using safety equipment correctly and away from any risks while working on upper levels, there are a few measures you can take.

CHOOSE THE RIGHT SAFETY SYSTEMS

There are a variety of safety systems for employees working on upper levels. However, some work much better than others in material handling. For example, lanyards are a personal fall protection device, but they are not recommended for securing pallet drop areas because it depends on employees not only wearing them correctly, but they must be fitted to each employee. Lanyards on their own in this instance also don't address OSHA's mandate for a fall protection barrier on upper levels where employees are working around open pallet drop edges.

Fall protection safety systems also come in a variety of designs and sizes. It's important to talk with your safety gate provider to discuss the application to get the right design and fit. If your safety gate does not provide adequate protection around the pallet drop area, employees can still be at risk. OSHA mandates that all elevated work platforms of 48 inches and higher be protected, and ANSI recommends guarding platforms at heights of 36 inches or more. Dual-gate systems are the best way to ensure compliance with ANSI and OSHA standards.

ENSURE SAFETY BARRIERS ARE IN PLACE AT ALL TIMES

Safety barriers should be set into place and be stationery. Depending



The right protective guarding equipment can safeguard employees and help with plant productivity. Shown: Mezzanine Safeti-Gates' Roly model safety gates.

on employees, especially new ones that may not have been properly trained, to move a safety barrier in and out of place creates a very high risk—movable “guarding” like chains are often never moved into place, leaving employees working at exposed elevated ledges. Additionally, these “barriers” don't provide the level of safety needed for employees working at height, let alone allow for the time for employees to move the barriers multiple times a day during peak operations. Bottom line is that the safety barrier just will not be moved into place every time it's necessary, which exposes tired workers to the risk for falling.

ANSI fall protection guidelines mandate a barrier is in place at all times, even while pallets are staged, being picked or in the process of being delivered or removed. The best solution for these areas is dual-gate fall protection system, which provides a barrier on elevated ledges and keeps employees from pallet drop areas when they are in use. These structures are secured into the flooring or racking, providing a fall protection system that workers do not have to move in and out of place.

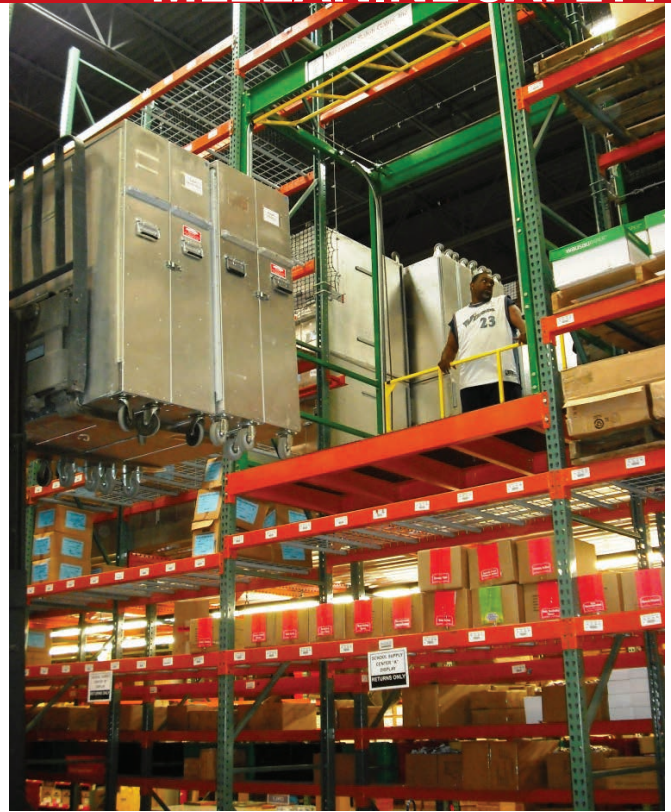
ADD-ONS CAN INCREASE SANITATION AND ROI

While manual operation of dual-gate safety systems is very ergonomic and easy for employees to understand, adding power stations and remote frequency operation can help to increase sanitation in the facility by making these systems virtually touch free.

Sensor and other technologies can also be added to safety systems to help increase plant efficiency and material tracking; this can equate to added ROI for each safety gate. Facility managers can integrate power stations with facility software to record when the safety gates were operated, which can determine what products have been delivered and processed, and identify areas to be replenished, as well as the time to complete each task.

While it can be easy to lose sight of safety in the crosshairs of the workday, fall protection for employees can be made very simple and help with plant productivity, all with the right protective guarding equipment. **WMHS**

Aaron Conway is President of Mezzanine Safeti-Gates, Inc. The company can be reached at www.Mezzgate.com or via email at sales@mezzgate.com.



Talk with your safety gate provider to discuss the application to get the right design and fit. Shown: Mezzanine Safeti-Gates' Roly model safety gates.

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Keeping Workers' Eyes Safe During Emergency Response & Disaster Recovery

Contributed by: **National Institute for Occupational Safety and Health (NIOSH)**

After the structural collapse of a large building, emergency responders and support personnel are often exposed to hazardous agents and conditions. These workers are at high risk of injury and illness at such a site. Luckily, information about common eye hazards and injuries, protective eyewear recommendations and first aid information is readily available. All safety eyewear should comply with the American National Standards Institute Occupational and Educational Personal Eye and Face Protection Devices Standard Z87.1.

COMMON HAZARDS:

The most common eye hazards faced by emergency workers at the structural collapse of a large building are the following:

- Dust, concrete and metal particles
- Falling or shifting debris, building materials and glass
- Smoke and noxious or poisonous gases
- Chemicals (acids, bases, fuels, solvents, lime and wet or dry cement powder)
- Cutting or welding light and electrical arcing
- Thermal hazards and fires
- Bloodborne pathogens (hepatitis or HIV) from blood, body fluids and human remains

COMMON INJURIES:

Injuries commonly suffered by emergency response and recovery workers at a structural collapse include the following:

- Corneal abrasions and conjunctivitis (red eyes)
- Concrete or metal particles or slivers embedded in the eye
- Chemical splashes or burns
- Welder's flash
- Eyeball laceration
- Facial contusions and black eyes

RECOMMENDED EYE PROTECTION:

Before selecting appropriate eye protection for emergency workers at a site, assess the conditions and hazards and follow these recommendations:

- At a minimum, wear safety glasses with side protection.
- Wear goggles when more protection is needed.

- Consider using hybrid eye safety products with the comfort of glasses, the enclosure of goggles and better breathability.
- Add a faceshield over glasses or goggles for even greater protection.
- Use a full-facepiece respirator for the best overall protection.
- When cutting or welding, use a welding helmet, goggles or welding respirator with the appropriate lens shade.
- Make sure that cutter's and welder's helpers, other workers and bystanders are protected from the light and sparks coming from torch cutting or welding.



Emergency workers face a number of eye hazards at the structural collapse of a large building.

RECOMMENDED EYE PROTECTION:

1. Safety glasses, including hybrid safety glasses or goggles—minimum protection required

Consider each of the following types of eyewear when selecting one for emergency workers at a structural collapse site:

- Wear safety glasses for general working conditions when there is some risk of exposure to dust, chips and flying particles. Use safety glasses that have the following:
 - Side protection (such as side shields or wrap-around lenses)
 - Treatment to prevent fogging

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- A retainer to keep the glasses tight to the face or hanging from the neck when not in use
- For added protection, use one of these types of glasses:
 - Hybrid glasses with foam or rubber around the lenses to protect against dust and flying particles (these protect workers better than conventional safety glasses with sideshields only).
 - Wrap-around hybrid safety glasses that convert to goggles with a soft plastic or rubber face seal for better peripheral vision than conventional goggles.

Take these precautions if you use safety glasses with prescription lenses:

- Use polycarbonate or Trivex® lenses for prescription safety glasses. These lenses provide the best impact protection in prescription safety glasses.
- Make sure that new safety glasses with polycarbonate lenses are hard coated to reduce scratching.
- Make sure that you are using ANSI Z87.1-compliant safety eye protection.
- Do not use prescription safety lenses with tempered glass or acrylic plastic lenses for protection from high impact unless they are covered by goggles or a face shield.
- If you wear prescription safety glasses without goggles, use glasses with side shields

2. Goggles—better protection

Goggles are needed to protect workers from high impacts, dusty environments, chemical splashes and torch cutting or welding light (see item 5 below for welding protection). Consider the following characteristics when selecting goggles:

- Use goggles with indirect venting to protect workers from splashes or fine dust. Use goggles with direct venting for less fogging when working with large particles.
- Use safety goggles designed with high air flow, minimum fogging and maximum particle and splash protection (for example, ski-type goggles).
- In dusty environments, wear tight-fitting goggles over normal streetwear glasses, contact lenses or prescription safety glasses.
- If you wear contact lenses, wear tight-fitting goggles or a full-facepiece respirator to avoid corneal abrasions in dusty areas.

3. Face shields—additional protection

Use face shields to protect workers from high-impact hazards that may be present during chipping and grinding operations. Use full-face protection to prevent contact with

chemical or blood-borne hazards that may be sprayed or splashed onto the face. Also do the following when selecting and using face shields:

- Use face shields that are tinted or metal-coated for heat and splatter protection.
- Always wear safety glasses or goggles under a face shield since the curve of the face shield directs particles or chemicals from the side into the eyes.

4. Full-facepiece respirators—best eye protection from dust, chemicals and smoke

- When respiratory protection is required, use full-facepiece respirators for the best eye protection against dust, chemicals and smoke.
- Note that not all facepieces are Z87-compliant for impact protection.
- Full-facepiece respirators do not seal properly over streetwear glasses or safety glasses. Therefore, if you wear glasses and must wear a respirator, use prescription inserts designed to be compatible with a respirator and approved for use with your specific respirator.
- If a worker wears a half-mask respirator, select the proper eye protection and make sure that — the half mask does not interfere with the proper positioning of the eye protection, and — the eye protection does not affect the fit of the respirator.

5. Welding helmet, goggles, face shields and welding respirators

- Exposure to cutting or welding light can cause severe burns to the eyes and surrounding tissue (welder's flash). The lenses for protection from cutting or welding light must be marked with the shade number—1.5 through 14 (the darkest).
- Protect cutter's or welders' eyes with a helmet, goggles, face shield or welding respirator equipped with lenses of the correct shade number.
- Always wear safety glasses or goggles under a welding helmet or face shield to protect workers from particles.
- Also protect the eyes of the cutter's or welder's helper and bystanders with lenses designed to protect against cutting or welding light.
- Use the darkest shade of lens possible:
 - Torch soldering 1.5–3
 - Torch brazing/cutting 3–6
 - Gas welding 4–8
 - Electric arc welding 10–14
- Use ANSI Z136 eye protection for laser light hazards (*not* Z87).

For more information, visit www.cdc.gov/niosh. **WMHS**

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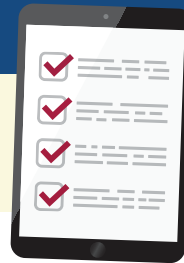
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Safety Of Machinery-Design Risk Assessment & Reduction



“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, <https://Ansi.link/RDG>*

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

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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://Ansi.link/ISO12100>. **WMHS**

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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PRODUCTS YOU SHOULD KNOW ABOUT

Trelleborg XP1000 Tires: Maximum Performance, Minimum Waste

Trelleborg looks to significantly improve material handling operations with the launch of its latest tire solution for maximum intensity applications, the XP1000. The tire provides customers the ability to move materials around ports, warehouses and shop floors, with optimum traction and minimal vibration to bring greater comfort, increased safety, lower fuel consumption and a longer tire life for more cost effective and sustainable operations. Side-by-side performance comparison tests against competitive tires show that the XP1000 tire lasts up to 9 % longer with 21 % improved endurance and offers a reported increase in comfort of up to 13 %.



Its three internal layers have also been designed for sustainable success: the lightweight tire features an innovative fiber compound made using recycled materials, saving 866 tons per year on materials alone, while decreasing CO₂ emissions by up to 110 tons per year. The XP1000 also includes Trelleborg's Pit Stop Line technology which lets operators know the right time to replace their tires so they can get the most out of them, plus reduce waste.

www.Trelleborg.com

Creform Rolls Out Heavy-Duty Mobile Flow Rack

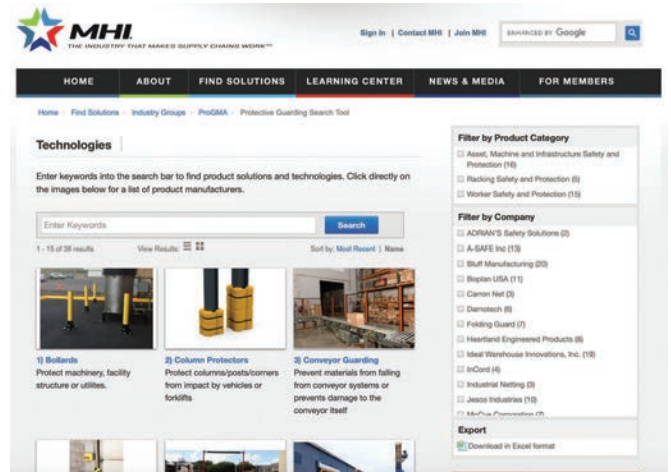
Creform Corporation has designed and produced a mobile heavy-duty flow rack for use in the body shop of a large automotive assembly plant. The flow rack is used to "flow" in production parts on their assembly line. The rack is built using Creform 42 mm pipe and joints for extra capacity and rigidity, as well as providing for flexibility and

reusability. The unit features wide Creform Placon® roller conveyor for excellent flow characteristics and strength, while the low-friction skate wheel conveyors allow for shallow flow lane angles that are suitable for both plastic returnable totes as well as cardboard boxes. The gravity flow rack assists in first-in, first out (FIFO) inventory management. The flow rack is configured with a stair step design to improve access to parts in plastic totes presented at the two supply levels. Each level features lane dividers to ensure that the totes are loaded within their lane and stay in their lane. Each of the flow rack's levels can be repositioned or whole flow rack customized with only simple tools. www.Creform.com



ProGMA Technology Tool Helps Find Protective Guarding Equipment

MHI's Protective Guarding Manufacturers Association has launched the ProGMA Protective Guarding Search



Casella Schedules Webinars on Noise, Air Sampling and Vibration

Global occupational health and workplace hazard monitoring expert will hold free-to-attend, accessible webinars in the months ahead on workplace monitoring for noise, dust, gas and vapor hazards, as well as instrumentation usage and best practice. Each webinar will conclude with a Q&A session.

Upcoming webinars include:

- March 16 – Introduction to Air Sampling
- April 13 – Introduction to Noise at Work
- May 18 – Introduction to Asbestos Sampling
- June 8 – Setting up Air Sampling Pumps
- July 6 – Introduction to HAV Monitoring
- August 24 – Environmental Boundary Monitoring in Construction: Best Practice
- September 14 – Introduction to Dust Sampling
- October 19 – Use of SLM's and Noise Dosimeters
- November 24 – Introduction to Sampling Gases and Vapors

For more information, visit www.casellasolutions.com.

PRODUCTS YOU SHOULD KNOW ABOUT

Tool—a search engine for protective guarding equipment. The tool is intended to serve as a one-stop-shop for anyone looking for the guarding solutions to keep people and products safe. It addresses the myriad of protective guarding solutions that are available in the market and supports end users looking for the right products for their varying facilities. It is an environment where off-the-shelf products do not always work, and custom-engineered guarding is required in many scenarios. Most industrial facilities use multiple pieces of protective guarding as employee safety is of utmost importance. The key is to identify the hazards and the solutions for those dangers, and then follow that with purchase and eventual installation. There is a solution for every industrial facility—and now it can all be found in one place. To access the ProGMA Protective Guarding Search Tool, go to www.mhi.org/progma/technologies.

Caldwell Custom Posi-Turners for Automotive

The Caldwell Group Inc. has partnered with distributors on the east and west coasts of the U.S. to deliver Posi-Turners to heavy truck manufacturers at either end of the country. The patented Posi-Turner, designed to rotate bulky and hard to handle objects during manufacture or assembly processes, is widely utilized throughout the automotive industry. The standard version is targeted at anyone looking to make certain material handling processes more ergonomically efficient and safe while resulting in less product

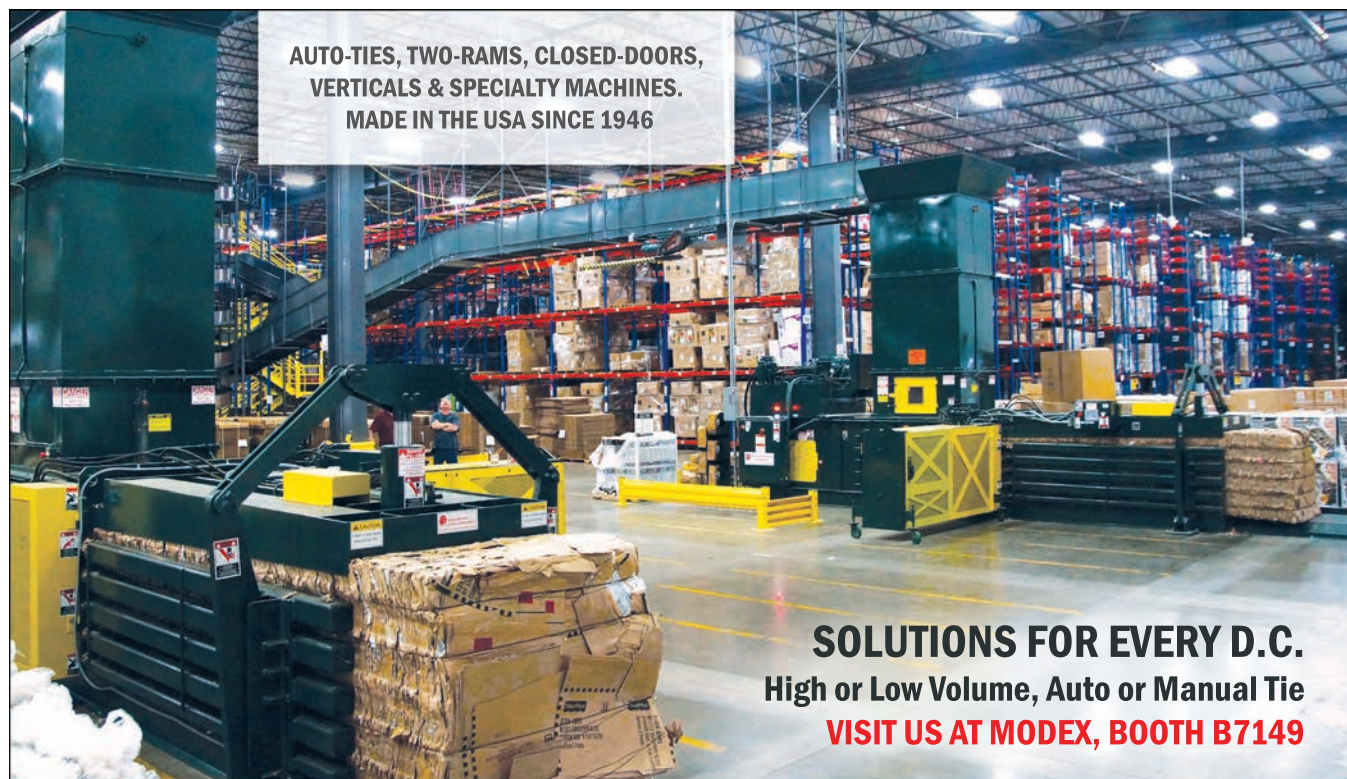


damage. The Posi-Turner is used by companies around the world to lift, suspend, rotate and position hard-to-handle objects. However, they are frequently

customized or modified for specific end-use requirements. The optional patent-pending Auto-Leveler is an easy way to keep a load level during these rotations. The product can easily be added to the Posi-Turner at the time of the order or be field-mounted to existing units. The leveler automatically activates leveling adjustment. An independent drive system, meanwhile, combines with chain slings and two powered drive units suspended from a pair of cranes or hoists. For more information, visit www.caldwellinc.com.

Gorbel Highlights New Hybrid Workstation Crane

Gorbel®'s new Hybrid Workstation Crane, an extension of its industry-leading, enclosed track workstation crane, combines the strength and durability of patented track with the lightweight advantages of Gorbel's aluminum enclosed track bridges. Utilizing these two features together allows for greater installation flexibility to meet longer support



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centers. It also allows for multiple higher capacity bridges to be utilized on a single crane, with no buffers. Key features include support centers up to 50 feet, which means fewer floor obstructions; multiple bridges with no buffer; manual push/pull for easy movement, with a custom motorized solution available as well. Gorbel says the Hybrid Workstation Crane fits a unique but growing niche in the industry. For more information, visit www.gorbel.com.



The Creform cart is designed with three-levels. Each shelf features a solid plastic surface and was factored into the cart's design. The surface is light weight, but the strong plastic corrugate provides enough capacity and is strong enough for the light aerospace parts and further helps keep the overall weight of cart down for easy movement. The top two levels of the cart feature a Creform pipe lip around the perimeter to ensure that product stays on the shelves during transit. Aerospace parts are fragile and expensive; loss or damage must be prevented as in many cases these parts are hard to replace.



Creform Kitting Cart: An Efficient Way To Organize, Kit And Transport Parts

Creform Corporation has designed and produced a kitting cart that is used in the assembly department of an aerospace assembly manufacturer. The cart provides an efficient way to organize, kit and load transport in-process materials from the logistics area to the assembly floor. It helps the manufacturer kit parts in the warehouse super-market area and provide them to floor associates for efficient installation.

The cart features four, 5 in. diameter casters with urethane wheels for easy positioning, stability and safe movement. Two of the casters are fixed for directional control while two others feature brakes that can be engaged for secure positioning. www.creform.com

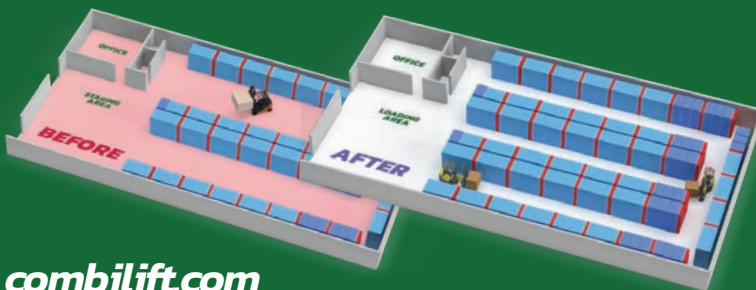
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Princeton Tec Introduces the Alloy-X for Industrial Task Lighting

Princeton Tec has introduced a new dual-fuel penlight, the Alloy-X. The light features a stunning 400 lumens and a 28-hour runtime all in one sleek, compact design. "The Alloy-X dual-fuel penlight is the perfect pocket carry light that is slim and packs a 400-lumen punch, allowing industrial workers and contractors quick and easy task illumination," said Princeton Tec Director of Industrial Sales, John Luchka. Alloy-X's innovative dual-fuel technology allows the light to be powered via the included rechargeable lithium-ion battery, and to also function with two AAA alkaline batteries, so a low charge never stands between the user and getting the job done. Luchka said, "Since Alloy-X offers the convenience of both USB recharge-ability, and accepts two AAA batteries, this is the ideal work light for DIY or professional use." For more information call 1-800-257-9080 or visit www.princetonotec.com

Milwaukee® Introduces Retractable Lanyard to Their Tethering Lineup

Milwaukee Tool expands its tool tethering lineup by introducing a 5lbs 50" Quick-Connect Retractable Tool Lanyard. As jobsite safety demands continue to grow to keep users safe, tradesmen are increasingly required to tether tools when working at a height or near sensitive equipment. The Milwaukee® 5lb 50" Quick-Connect Retractable Tool



Lanyard furthers the commitment to help keep users safe on the jobsite while working at heights by reducing the risks associated with dropped tools without hindering productivity. This retractable lanyard survives more drops and provides lasting durability. It is constructed with stainless steel components to maintain retraction and prevent dropped tools. Equipped with a push-to-lock design for greater control users can easily lock the lanyard cord at the desired length within the 50 in. working range. This lanyard also features an abrasion-resistant cord to withstand the harsh demands of the jobsite. It meets ANSI/ISEA 121, the American National Standard for dropped object prevention solutions. www.milwaukeetool.com/ppe.

Rockford Systems Introduces Protector Series Light Curtains

Rockford Systems, LLC has unveiled new Protector Series Light Curtains for safeguarding personnel near industrial machinery with the potential to cause injury. Protector Series Light Curtains feature bi-color alignment indicators, simplified resolution settings, automatic diagnostics, remote fixed blanking, and can be interconnected in a cascading configuration. Built for ease-of-use, they also

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and maintenance time, Protector Series Light Curtains feature bright bi-color alignment indicators that run the length of the receiver window. In the event a sensor is not aligned properly or if the window requires cleaning, green lights will switch to red to instantly identify the problem area. Optional remote indicators can be purchased for long distance monitoring of light curtain status to further support safety and productivity goals. For more information, visit www.rockfordsystems.com.

OZ Lifting Launches Spark Resistant Range

OZ Lifting has launched two spark resistant products—a chain hoist and push beam trolley—both available from 0.5-ton to 10-ton capacity. The products are for applications where there are gas or dust particles that could create

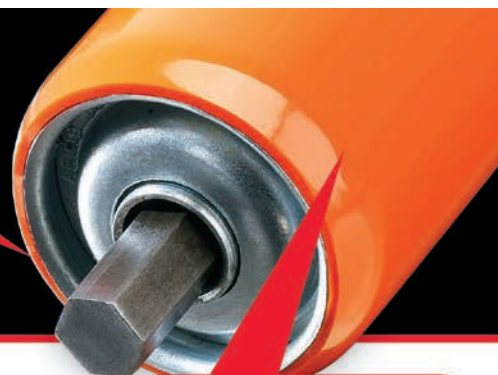
provide for hassle-free installations that eliminate software, DIP switches and expensive components from the process. Brackets and connecting cables are all included, as a kitted solution, for faster, more cost-effective light curtain installations. Designed to reduce setup

a spark. Typical markets include oil and gas, wastewater, paper, mining, and others where an explosive atmosphere exists. The chain hoist and push beam trolley are launched as a complete capacity range—0.5 ton, 1 ton, 2 ton, 3 ton, 5 ton, 10 ton—that covers most likely applications. As with other manual chain hoists in the catalog, 10 foot, 15 foot, 20 foot, and 30 foot heights of lift are offered as standard, but custom lengths are available on request. All chain hoists and push beam trolleys are painted white, but distributors and end users might re-color them to suit protocols at specific facilities. Both products are manufactured in compliance with the EU's explosion-proof standard ATEX94/9/EC and Machinery Directive 2006/42/EC. They can operate at explosion levels EX II2 GD c IIIC T135 C and are suitable for use in Zones 1 and 2 (gas) as well as Zones 21 and 22 (dust). The term "explosion proof" usually applies to electric-driven products, versus "spark resistant" for those operated mechanically. The hoists require minimal load lifting effort. The push beam trolleys boast copper-plated trolley wheels and lifting bale. For more information, visit <https://ozliftingproducts.com>.



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An active Bumper cushioning system for safety shoes developed by BIG Arbeitsschutz GmbH is aimed at enhancing the comfort level of workers who are

on their feet all day. The VESTAMID® PEBA cushioning system provides support and comfort to the wearer by returning the impact energy normally absorbed by the shoe back to the wearer. The cushioning layer remains elastic over lifespan of the safety shoe with no signs of material fatigue. It's rebound effect, 73 %, is significantly higher than comparable products, which lessens fatigue and wear and tear on joints. PEBA foam is resilient and up to 50 % lighter than comparable expanded thermoplastic polyurethane (ETPU) foams, making every step easier.

www.vestamid.com

Malta Dynamics Rolls Out a Powered X1000E Mobile Grabber

Malta Dynamics has added a new powered X1000E model to its lineup of XSERIES Mobile Grabber mobile fall arrest



systems. The X1000E model upgrades the manual operating system to an electric-driven hydraulic lift system operated by remote control. It also enables the addition of various power features such as high-efficiency solar panels and wireless controls, available as options. The X1000E Mobile Grabber is affordable and offers options previously only available on other, larger units in the Malta Dynamics lineup. The X1000 XSERIES Mobile Grabber is a mobile fall arrest system that provides portable overhead anchor points for personnel working at heights. The X1000 and X1000E models each offer two overhead anchor points up to 22 feet in height and support a maximum anchor capacity of 310 pounds. XSERIES units are road-towable and can be towed by nearly any vehicle on the market, and also feature built-in fork pockets for easy transport indoors. For more information, visit maltadynamics.com.

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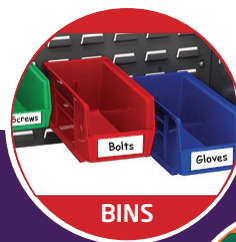
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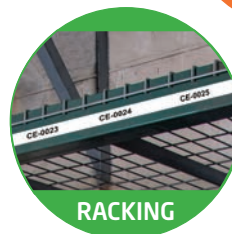
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CLARK Material Handling Company's New TWLi20 Three-Wheel Electric Lift Truck is Lithium-Ion Powered

CLARK Material Handling Company, a top-ten global manufacturer of forklift trucks and aftermarket parts, has introduced the TWLi20 Three-Wheel Electric Lithium-Ion forklift truck. Built around the powerful 48V lithium-ion battery, the TWLi20 boasts many excellent operator-focused features, including a spacious cabin; intuitive

dual-joystick controls; a "plug and play" battery charger; an interactive LCD dash with audio/visual warnings; and 4,000-pound capacity. This highly efficient lithium-ion forklift provides both new and experienced operators an easy to maneuver and handle lift truck. The longer service lifespans

available through lithium-ion batteries requires less maintenance compared with lead-acid batteries; along with the ability to opportunity charge. The narrow profile and tight turning radius make the TWLi20 perfectly suited for a wide range of applications and operations. Visit www.clarkmhc.com/ for details.

Vader Combo Offers Anti-Fog and Full-Face Protection

Brass Knuckle's® Vader Combo is a goggle and face shield in one, with industry-leading BK-Anti-Fog for the best visibility available. Its integrated face shield offers 180-degree peripheral vision and face coverage. Ultra-soft conditioned rubber forms a splash barrier. Because the face shield isn't attached to a hard hat, it provides unprecedented mobility and visibility — the shield goes wherever the wearer's head goes. BK-Anti-Fog reportedly exceeds the industry's most stringent anti-fog standard and makes Vader Combo a great face protection choice for construction, grinding, water and wastewater, jan/san or any application with sprayback that can cause lens fog. The ANSI-rated, military-style splash goggle also includes a durable anti-scratch treatment and



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is D3 rated for droplet and splash protection. The built-in venting system helps reduce the potential for moisture buildup, helping to maintain clear vision. Vader Combo protects from the sun, from impact, from splash—and even from dangerous, temporarily impaired vision caused by fog. For more information, visit www.brassknuckleprotection.com.

Milwaukee® Introduces M18 FUEL™ 6, 9 & 12 Gallon Wet/Dry Vacuums

Milwaukee Tool has expanded its line of corded job-site cleanup vacuums with performance driven wet/dry vacuum solutions. The company's M18 FUEL™ 6 Gallon Wet/Dry Vacuum, M18 FUEL™ 9 Gallon Dual-Battery Wet/Dry Vacuum and the M18 FUEL™ 12 Gallon Dual-Battery Wet/Dry Vacuum. Each vacuum comes equipped with the POWERSTATE™ Brushless Motor, REDLITHIUM™ technology to deliver more power and run cooler, and REDLINK PLUS™ Intelligence Hardware and Software, providing unmatched performance and delivering more cleaning power than corded 3.5 – 4.25 Peak HP wet/dry vacuums. The M18 FUEL™ 6 Gallon Wet/Dry Vacuum



outperforms 3.5 Peak HP wet/dry vacuums, which is ideal for cleanup of dry-wall dust, concrete dust and wood/metal shavings.

For increased performance and capacity, the M18 FUEL™ 9 Gallon Dual-Battery Wet/Dry Vacuum outperforms 4.25

Peak HP wet/dry vacuums. Finally, the 12 Gallon Dual-Battery Wet/Dry Vacuum provides the performance to outperform 4.25 Peak HP wet/dry vacuums. With the Premium Wet/Dry Vacuum Cart, there is increased durability and unmatched mobility on jobsites with four storage spaces for vacuum accessories. To alleviate common failure points with existing wet/dry vacuum solutions, the new cordless wet/dry vacuums are built with the most durable wheels and hoses to survive the most demanding jobsites. Reinforced casters increase the longevity of the wheels, which results in more mobility through jobsite terrain. www.milwaukeetool.com **WMHS**

If you have an interest in contributing an article for an upcoming issue or would like to have WMHS on your PR list, please email: maureenp@rdgmedia.net.



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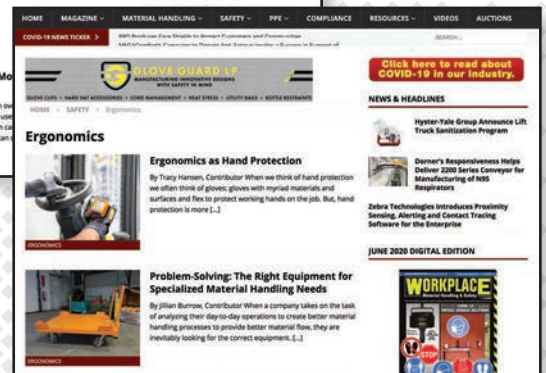
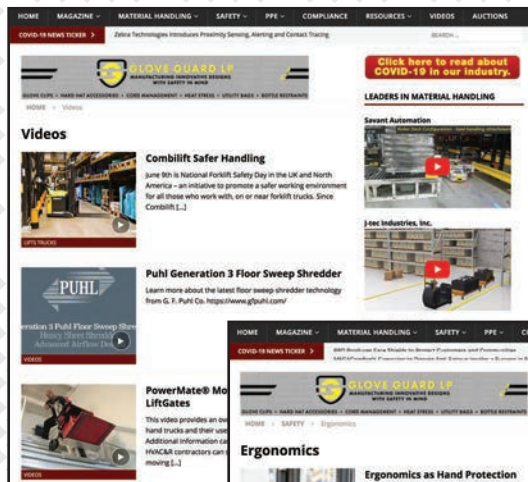


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Warehouse Mirrors

Indoor Convex Detection Mirrors



Indoor Convex Detection Mirrors are designed to prevent intersection accidents in an industrial application.

Convex mirrors can be positioned to reflect a hidden area to a forklift operator. These mirrors can also be directed to allow equipment operators to view co-workers approaching from behind to reduce accidents.

Convex mirrors should be mounted at the end of alternating aisles to reflect the view of the traffic moving from the neighboring aisles.

Small convexes can be used in offices to view hallways or reception areas for visitors or moving pedestrian traffic.



Model No.	Dia.	Bracket(s)	Ships	Unit Price
SCVI-12Z*	12"	Z	UPS	
SCVI-18Z*	18"	Z	UPS	
SCVI-26T	26"	Telescoping	UPS	
SCVI-30T	30"	Telescoping	UPS	
SCVI-36T	36"	Telescoping	UPS	
DCVI-48T	48"	Telescoping	Truck	

*CVI-12 & CVI-18 Are Available with Telescoping Brackets

- 20% Brighter Than Glass Mirrors
- Available in Polycarbonate
- Mounting Hardware Included
- Less Distortion
- Economical

Easy to Install

Mounted Easily with the Provided Hardware

Security & Theft Prevention

Retail Convex Mirror Usage Benefits:
Prevention of Shoplifting & Security from Entry Doors with Poor Viewing Access

Wide Angle Vision

Permits You to See Around Corners, Over Center Aisles & Blind Corners



Our Unique Wide View Design 180° Low Distortion Viewing

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16" Dia.



24" Dia.



32" Dia.



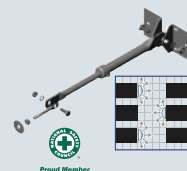
42" Dia.

- Shatter Resistant Acrylic Mirror
- Excellent Visibility- Low Distortion
- Easy Installation
- Hardware Included
- **DomeVex** Models Mount Like **AIConvex** & **Protect Like A Mirrored Dome**

INDOOR/OUTDOOR 42" MODELS
DCVO-42T-8DP-PB 2-Brackets
TCVO-42T-8DP-PB 3-Brackets

Item No.	Dia.	Description	Brackets
SCVI-16Z-4DP	16"	Indoor DomeVex Wide View Mirror	1
SCVI-24T-5DP	24"	Indoor DomeVex Wide View Mirror	1
SCVI-32T-7DP	32"	Indoor DomeVex Wide View Mirror	1
DCVO-16T-4DP-PB	16"	Outdoor DomeVex Wide View Mirror	2
TCVO-24T-5DP-PB	24"	Outdoor DomeVex Wide View Mirror	3
TCVO-32T-7DP-PB	32"	Outdoor DomeVex Wide View Mirror	3

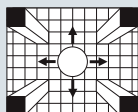
1" of Diameter Equals 1 Foot of Viewing Distance



360° Full Mirrored Domes



is the most versatile mirrored product for intersections in warehouse and industrial applications. Se-Kure Domes and Mirrors produces domes from 18" to 60" that are suspended by a 3 point chain set, which is included with each unit. The customers will have varying distances from the ceiling, so we do not include additional lengths of chain beyond the top of the chain's tri-pod point.



Four way intersections are the most common application for the domes. The ratio of viewing distance is estimated at one foot of viewing distance for each inch of dome diameter. In a warehouse setting, a wider viewing distance would help provide a safer view due to increased vehicle speed. The dome should be suspended as low as possible, yet taking into consideration elevated material activity. Available with Hardboard Back.

MFG#	DESCRIPTION
ONV-360-18	Acrylic Dome Mirror, 18"
ONV-360-26	Acrylic Dome Mirror, 26"
ONV-360-32	Acrylic Dome Mirror, 32"
ONV-360-36	Acrylic Dome Mirror, 36"
ONV-360-48	Acrylic Dome Mirror, 48"
ONV-360-60	Acrylic Dome Mirror, 60"
HB	Add Suffix for Hardboard (18" thru 48")
PB	Add for Plastic Back (18" thru 36")
PC	Add for Polycarbonate Mirror (18" thru 36")

The view distance ratio is about 1 foot of viewing distance to each inch of the diameter of the dome.



The view distance ratio is about 1 foot of viewing distance to each inch of the diameter of the mirror.

Convex

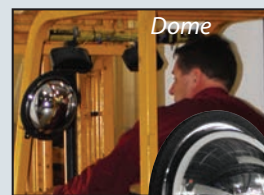


DM-CFM-8

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- Hardware Included

Provide your employees with Fork Lift safety mirrors. Reduce blind spots in tight loading dock areas. Convex or Dome models available.



MFG# DESCRIPTION

DM-CFM-8	8" Convex Fork Lift Truck Mirror
DM-DFM-8	8" Dome Fork Lift Truck Mirror

DM-DFM-8

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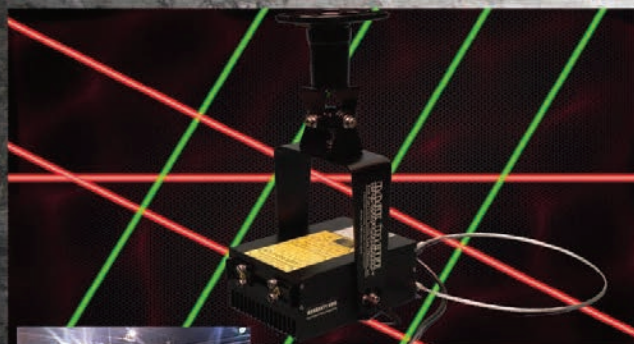
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