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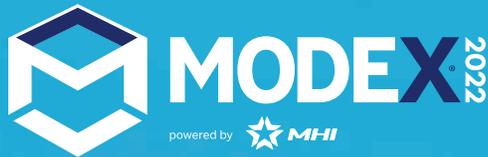
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The background of the entire page is a blue-tinted photograph of an industrial warehouse. In the center, a large robotic arm is positioned, reaching towards the camera. The background is filled with rows of metal shelving units, each containing numerous white boxes. A large, dark blue diagonal shape cuts across the left side of the image.

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One of the more prominent movements that is gaining momentum in the business community is the embrace of Corporate Social Responsibility (CSR) - the idea that corporations have some responsibility toward society and should act on that responsibility in some way. Although CSR sounds relatively new and trendy, it was being discussed as far back as the 1930s. The concept has, naturally, changed over time. What it reflects at present is not what it focused on a century ago. These days, environmental concerns are front and center, along with social issues. CSR is manifesting in many ways. Some companies contribute to worthy organizations. Others take positions on diversity and inclusion – topics that, in the past, were often avoided. Additional CSR actions that would be unthinkable to the industrial titans of the early 20th century include ethically sourcing goods, employee enrichment programs and company-organized volunteer work.

These days, companies who incorporate CSR into their decision-making take care to promote that fact, because it speaks to their values. In addition to doing tangible good, CSR can be a powerful public relations tool, but does it have more tangible benefits as well? CSR can send a message to consumers, who are – according to some surveys – losing trust in companies, generation by generation. More and more people are eschewing traditional factors like price and brand name and engaging in values-based shopping instead.

CSR can also help attract and maintain employees. In this era of #thegreatresignation, workers are stepping away from jobs that aren't satisfying to them and employers who don't reflect their values. Employee engagement leads to employee retention. Seeing that a company is actively striving to be a responsible environmental steward or to be inclusive in its hiring and promotion processes can go a long way toward cementing employee loyalty.

Corporate sustainability is another concept that is gaining a considerable amount of traction. It's a new way of doing business, one that considers the environmental, cultural, ethical and social implications of actions taken by a corporation. Corporate sustainability, as its name suggests, is all about the long-term, about developing initiatives and making business decisions that will last. One way to approach this is to make interactions between corporate partners, customers, the general public, regulators and other stakeholders sustainability based. Responding to climate change effects and helping the environment in general is one benefit of corporate sustainability. It can also improve a company's image and even lead to increased employee productivity, because a positive work culture enhances worker satisfaction.

What's clear about both CSR and corporate sustainability is that companies who stay narrowly focused on purely business objectives run the risk of alienating stakeholders and losing both customers and employees to competitors. It is also evident that companies who make the effort to pursue CSR and corporate sustainability initiatives should clearly and effectively communicate that to the public. Failing to do so represents a lost opportunity.

'til next time,

Maureen Paraventi
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Randy Green, President & Group Publisher

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MODEX 2022: In-Person and Star-Studded



Shaquille O’Neal and Dr. Sanjay Gupta will be among the speakers at MODEX 2022, the year’s largest manufacturing and supply chain event in North and South America. The biennial event is presented by Material Handling Industry (MHI), an international trade association that represents the industry whose members include material handling and logistics equipment and systems manufacturers, integrators, consultants, publishers and third-party logistics providers. It will be held March 28-31, 2022 at Atlanta’s Georgia World Congress Center. Unlike recent industry shows, which have been virtual or a hybrid version, MODEX 2022 will be in person. Recent supply chain difficulties make learning about leading trends, best practices and state-of-the-art equipment and technology solutions vital – and the convention promises to deliver that information.

The event’s 400,000-square-foot + show floor will be filled by more than 900 exhibits representing all segments of the material handling, logistics and transportation industry, from traditional, manual equipment to computerized, automated systems and smart, connected supply chain

technologies. The exhibits will represent solutions that span the supply chain, from traditional, manual equipment to computerized, automated systems and information technologies. Manufacturers, consultants, transportation and logistics providers, and publishers and systems integrators will be there to demonstrate their equipment, systems, software and services to 30,000+ attendees from all around the world.

The Educational Conference component of MODEX 2022 will feature 150 educational sessions focusing on best-in-class solutions for manufacturing and supply chain operations. The industry’s best minds will explain how to transform manufacturing and supply chain operations using key industry trends and innovations. Topics include *Robots: Ready for Real Retail Fulfillment; Small but Mighty: How to Leverage Technology in Smaller-Scale Spaces; How to Mitigate the Risk Associated with Interoperability; Optimizing In-Store and Warehouse Operations for E-Commerce with Reusable Packaging; The Continuing Evolution of ASRS Technology; To Automate or Not to Automate; How to Develop*



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THE FOUR KEYNOTE SPEAKERS ARE:

March 28 Keynote: Women in Leadership

Erika Alexander, Chief Global Operations Officer for Marriott International. Alexander will discuss leadership, strategy and excellence and her approach to people empowerment, diversity, inclusion and organizational purpose.

March 29 Keynote: A Conversation with Dr. Sanjay Gupta

The Chief Medical Correspondent for CNN will outline lessons learned from COVID-19 and what nations across the globe and individual firms can do to prepare and be ready for future pandemic and health-related disruptions.

March 30 Keynote Panel: Preview of MHI 2022 Annual Industry Report

John Paxton, CEO, MHI and Thomas Boykin, Supply Chain Specialist Leader, Deloitte Consulting LLP will present the results of a report on supply chain trends and digital technologies that are transforming supply chains. They will be joined by a panel of manufacturing and supply chain thought leaders to discuss the real-world significance of the report findings.

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March 31 Keynote: A Conversation with Shaquille O'Neal

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OTHER SPECIAL EVENTS AT MODEX 2022 INCLUDE:

March 31: MHI Industry Night with Comedian Preacher Lawson

MODEX will feature an evening of music, food, drinks and entertainment by comedian Preacher Lawson on Wednesday, March 31. Tickets to this event are \$50 and include beer, wine and hors d'oeuvres. The door prize for this event will be a trip-of-a-lifetime vacation valued at \$30,000.

Women in the Supply Chain Industry Forum on March 28 at MODEX

MHI has partnered with Material Handling Equipment Distributors Association and the Warehousing, Education and Research Council (WERC) to bring an afternoon of discussion, education and networking for women in the industry.

MHI Young Professionals Network Reception on March 28 at MODEX

This event gives young professionals in the material handling and supply chain industry the opportunity to network and connect.

MODEX 2022 Student Day

MHI, in partnership with Warehousing Education and Research Council (WERC), College Industry Council on Material Handling (CICMHE), Material Handling Equipment Distributors Association (MHEDA) and the Material Handling Education Foundation (MHEFI) presents Student Day at MODEX 2022 on Wednesday, March 30, 2022.

For more information on exhibiting or attending MODEX, visit MODEXshow.com. **WMHS**

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Case Study:

Autonomous Tuggers Improve Intralogistics for Clinical Lab Automation Company Inpeco

By: **Ed Mullen**, Contributor

Inpeco, a multinational company specializing in automation for clinical laboratories and hospitals, aims to reduce errors in clinical trials while ensuring total process control and better quality of results. At its Val della Torre plant, on the outskirts of Turin, Italy, automation systems are produced to order, or as customized solutions for each individual customer. The company tailors the layouts of customer automation plans, and has over 290,600 square feet of factory space, with more than 129,000 dedicated to production.

About three years ago, this plant decided to review the processes and layout of its entire production flow from a lean perspective. This upgrade required very efficient logistics and timely supply of the production lines, based on a call-up system from the line operators.

Specifically, once the materials to be assembled have been emptied from a trolley, the operator could call up a robot with another trolley to deliver more materials to their station and tug away the empty one. This process applies both



The use of tuggers can free employees from repetitive tasks so they can perform higher value activities. Image courtesy of Mobile Industrial Robots (MiR).

to the supply of the raw materials and to the withdrawal of finished products at the operator's request once product testing has been completed.

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These movements, if handled by Inpeco staff, would have involved a full-time commitment to this activity, while the plant's main need was to free workers from transport-only tasks, which were repetitive, of little added value and demotivating.

OBJECTIVE: FREE THE STAFF FROM REPETITIVE TRANSPORT TASKS

After examining various options to automate material transport in the production area, Inpeco decided to implement an autonomous mobile robot (AMR) with a hook (called the MiR200 Hook) as a tugger. The dimensions and load capacity (up to 200 kg or 440 pounds) were perfect for meeting the company's tugging needs and to allow workers to engage in more value-added work.

"We were looking to automate some processes with low-added value in order to be able to redirect resources to operations that are more important and indispensable for the company," said Roberto Ferraro, Project Manager of Inpeco. "We decided the first application should be the transport of raw materials from the warehouse to the production line and finished products from production to the packaging department. Thanks to the MiR robot, we were able to concentrate on the most productive activities for us, always focusing on the safety of workers, the delicateness of the product and the dynamic production environment in which Inpeco is used to operating."

Ease of use was also a determining factor in the choice of the AMR tugger. Due to its simple and intuitive user interface, even less experienced operators can use the robot, always having the opportunity to monitor and manage missions. Warehouse operators can also now devote themselves more to higher value activities such as picking, loading materials in automated storage areas and avoiding wasting time on tasks that simply involve moving goods.

Another reason for choosing the AMR tugger was its ability to move along corridors where it shares space with factory personnel or other means of goods handling. "The robot is able to detect obstacles, even when they are in motion and adjust its path accordingly so as to achieve the goal of its mission," said Stefano Tolomeo, Head of Production at Inpeco. "The MiR robot saved us the space that a traditional solution would require, given that such a solution doesn't allow for the space to be used for other purposes."

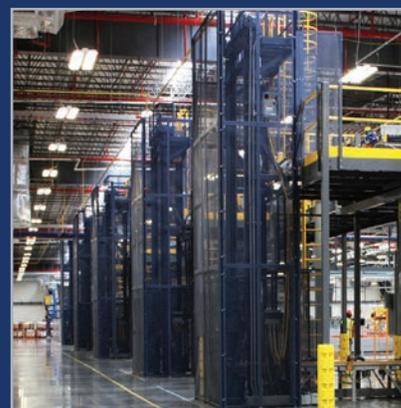
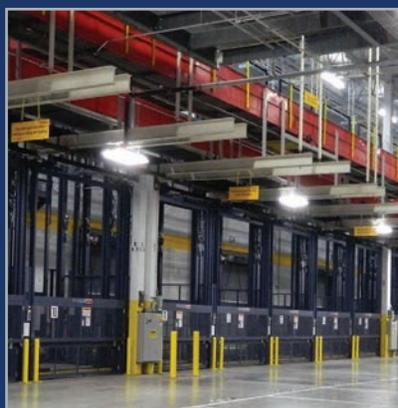
RAPID IMPLEMENTATION AND OPERATIONAL EFFICIENCY

Production orders are prepared from stock by picking up the material and loading up trolleys of variable weight, up to 500 kg (1,102 pounds). Once the job is completed, the robot can tug the trolley.

When a job in production is finished, operators activate the call-up software by scanning a QR code assigned to

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their work area to request the delivery of a trolley with materials for the next job and the collection of the empty trolley currently at the station. This way, the destination of the robot's mission is registered as the location of the operator who made the call-up. The software also automatically retrieves the correct production order from the management system, making the on-screen information available and allowing the warehouse managers to know which trolleys are being collected by the robot.

Once all the assembly phases of the product have been completed, the finished article must be transported to the packaging department. The operator then registers on the management system the end of the process and packets of information are automatically sent to the robot software, including the size of the article to be moved and its initial position on the map.

Currently in the Inpeco production area, the AMR tugger currently tows 16 different objects of varying length, from 3.25 feet up to 8 feet.

The AMR tugger has contributed not only to the optimization of Inpeco's internal logistics but also to the security of the production area. During its journey, it makes several detours, travelling along the corridors that delimit the production operator stations. Each time it enters the corridors, as well as turning and automatically hooking up a trolley, the robot communicates via flashing lights and sounds that alert operators to its arrival. In addition, during its journey, thanks to 3D cameras and precision sensors, the robot always places the trolley it is tugging in the center. When it encounters an obstacle, be it a person or a forklift truck, the MiR robot stops and assesses whether an alternative route is available. This ensures maximum safety along the way, eliminating the risk of accidents.

A FUTURE OF LOGISTICS AUTOMATION

Inpeco predicts that the implementation of more AMR tuggers will be easy and quick since it will only be necessary to identify the areas on the factory map where the robot will have to deliver the raw materials and withdraw the finished products, while the system will inherit all the configuration logics already implemented. **WMHS**

Ed Mullen is Vice President of Sales, Americas, for Mobile Industrial Robots (MiR), where he is responsible for establishing and managing the company's distribution channels and marketing activities in the Americas. Previous roles include VP of Sales and Marketing for Simplimatic Automation, and National Sales Manager in North America for Universal Robots. Mullen is a seasoned business development executive with more than 25 years' experience in industrial automation sales management and engineering roles. www.mobile-industrial-robots.com



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Maximize Dumpster Efficiency, Minimize Waste Disposal Costs

By: **Stefan Nielsen**, Contributor

Every year, companies spend huge sums of money just to get rid of trash. Most companies deal with waste by contracting a waste-hauling company. In many cases, the waste hauler provides large, open-top containers/dumpsters in which to collect the trash. They drop off an empty dumpster at the customer's premises; pick it up at a regularly scheduled time (usually once a week or even more frequently); and replace it with another empty dumpster.



Rolling compactors consist of a two-ton steel roller drum at the end of an articulated boom. The surface of the drum is covered with sharp, spiked, teeth-like protrusions. There are many options available to help minimize waste-disposal costs. (photo courtesy Epax Systems, Inc.)

The cost of this type of service varies from one company to another, but in almost every case, it is charged on a per-haul basis. Factored into the cost is the distance the waste disposal service has to travel to retrieve the full dumpsters, plus the distance it has to travel to the disposal site—as well as fees the company must pay to dispose of the trash. Depending on the number of dumpsters a company has, and how quickly they are filled, the expense can easily be tens of thousands of dollars per year.

The best way to reduce these expenses is through the implementation of a thoughtful waste-reduction program. These types of programs involve educating employees to

think about what—and how much—they are putting in the dumpster. It encourages them to make every possible effort to reuse or recycle as much “trash” as possible. However, even with such programs in place, there is still a need to throw things into a dumpster, so companies still have waste-hauling expenses.

In most instances, trash haulers charge based on the size of the dumpster, regardless of how full it is. And, because most dumpster hauls happen at a preset interval, more often than not, dumpsters are replaced when only a very small percentage of their volume capacity is used. That means a large percentage of what customers pay to hauling companies is for unused volume capacity. Estimates suggest that often times, dumpsters contain as much as 80% air and only 20% waste. By simply reducing this air-to-waste ratio, companies can dramatically reduce the cost of waste disposal.

THE GREATER THE TRASH/ AIR RATIO, THE LOWER THE COST OF WASTE DISPOSAL

Most companies do not give much thought to how they fill a dumpster. They simply throw boxes, crates, construction debris or other waste into it until it is “full.” This haphazard approach can lead to large voids and empty spaces. Waste may be stacked higher than the dumpster sides, giving the appearance that it is full when, in fact, it still has a significant amount of unused volume capacity. This is especially true

for bulky items, like shipping crates and cardboard boxes, or in the case of construction debris, kitchen cabinets, furniture, etc.

If waste is broken down and compacted, the amount of material thrown into a dumpster gets much closer to the dumpster's actual volume capacity.

HOW MUCH MONEY CAN WASTE COMPACTION SAVE?

The best way to save money on trash hauling is to reduce the number of hauls required. So, if compaction means you can fit two times more waste in a dumpster, it also

means that same dumpster only needs to be collected half as many times. And, with higher compaction ratios (which are often achievable), the frequency of hauls can be reduced even further—saving even more money. In some cases, a business may even be able to reduce the total number of dumpsters on site, gaining even greater savings.

ACHIEVING MAXIMUM COMPACTION OF OPEN-TOP CONTAINERS

Trash compactors are not a new concept. Drive around any industrial park, and you'll see big, enclosed metal boxes that use hydraulic rams to compress waste. But many people are unfamiliar with rolling compactors. These extremely effective devices are designed specifically for compacting waste in open-top containers.

Rolling compactors consist of a two-ton steel roller drum at the end of an articulated boom. The surface of the roller drum is covered with sharp, spiked, teeth-like protrusions.

As the compactor's articulating boom moves from one end of the dumpster to another, the 4,000-lb drum rolls over the contents—tearing, shredding and mangling them—creating smaller and smaller pieces with each pass. At the same time, the massive weight of the roller

drum crushes and compacts items, eliminating air pockets and allowing the dumpster to be filled to near-maximum volume capacity.

With this type of compaction, the open-top containers can achieve an extremely efficient ratio of 80% waste and only 20% air—a 400% improvement vs. non-compacted containers.

CHOOSING A ROLLING COMPACTOR FOR YOUR FACILITY

There are a handful of options for any business that wants to utilize a rolling compactor to minimize waste-disposal costs.

- ★ The first option is to purchase, lease or rent a rolling compactor for installation onsite. The most common systems are permanently installed and service a single dumpster.
- ★ If multiple dumpsters are used, a traversing rolling compactor can be employed. These units are mounted on steel rails with several dumpsters placed next to them at a 90° angle. The rolling compactor then moves up and down the track, compacting waste in each dumpster, as necessary.

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COMPACTORS/WASTE REDUCTION

- ★ When several dumpsters are used but are situated in different locations on a property, a mobile rolling compactor should be considered. These mobile compactors can be driven around a property to service dumpsters wherever they are located.
- ★ The final option is to contract with a service company that uses a truck-mounted rolling compactor to visit a site and compact waste on either an on-demand or contract basis. This option is extremely popular with building contractors using dumpsters for a short period of time to dispose of construction debris.

Whatever option is chosen, the amount of waste in each dumpster is maximized, and the waste disposal cost is minimized.

ADDED SAFETY AND PRODUCTIVITY BENEFITS

Because the benefits of getting more trash in the same container are so obvious, some companies attempt home-grown compaction techniques. Unfortunately, in most cases they waste employees' time and can often be downright dangerous. Here are just a few safety and productivity advantages of a rolling compactor.

1. *No need to pre-break waste:* Many employees take it upon themselves to break down cardboard boxes,

wooden crates, etc., prior to disposal, in an effort to get more into the dumpster. The goal is worthwhile, but the time and effort expended can be a real productivity drain. There's also a safety concern, as workers use saws and other power tools that may not be well-suited to the task. Even worse, they might try to kick, stomp or smash items with their feet—which can lead to serious injury.

2. *Load dumpsters at will:* While enclosed industrial compactors offer similar benefits to rolling compactors, they can't be fed during the compaction process. This can mean workers often stand idly by, waiting for the compaction cycle to end, so they can load additional items. With an open-top dumpster and rolling compactor, items can be added continuously—even during the compaction process. This means workers waste no time standing around waiting to load additional items.

3. *Makeshift compaction tools don't work well and waste a lot of time:* We've seen concrete-filled tubs placed in dumpsters to compact waste. Unfortunately, the process is time-consuming and only marginally effective. We've also seen front-end loaders and backhoes used to crush waste. This, too, is only somewhat effective, and it takes a trained equipment

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operator away from his or her primary duties. Finally, there's the most dangerous, least effective practice of all: employees climbing into dumpsters to rearrange contents for better space utilization. This is a huge safety and liability issue, not to mention ineffective and a huge time suck.

Whether a business has one dumpster or 20, a thoughtful waste-reduction program, paired with a rolling compactor, can provide huge savings and measurable ROI. Often, the equipment pays for itself in just a year or two. **WMHS**

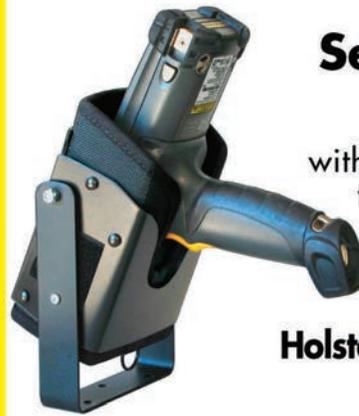
ABOUT THE AUTHOR

Stefan Nielsen is Vice President and Chief Operating Officer of Epax Systems, Inc. The company specializes in waste-reduction solutions, including the popular ROPAX Series of Rolling Compactors designed to save money and reduce landfill usage by maximizing dumpster-utilization efficiency (www.epaxsystems.com).

Want to contribute to *Workplace Material Handling & Safety*? Let us know if you have an interest in writing an article for an upcoming issue.

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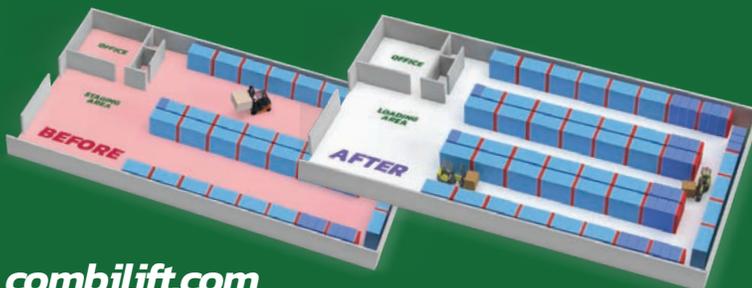
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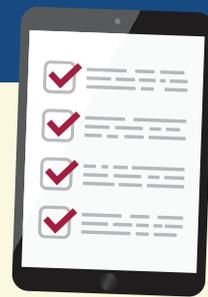
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Safety Requirements for Full Body Harnesses

Full body harnesses (FBH) are critical elements of effective fall protection systems. This type of harness was introduced in the 1940s and drew inspiration from military parachutes. Unlike the body belts that preceded it, during a fall a FBH distributes forces throughout the body, leading to fewer fall protection-related injuries.

Among the industries in which they are used: construction. Workers in that industry make up only 5% of the total workers in the U.S., but they account for about 20% of on-the-job fatalities, with falls being the most common cause of death. Hundreds of construction workers die from falls each year in the U.S. When properly fitted and worn and used correctly, FBHs can help prevent serious injury or death at worksites.

OSHA requires workers to wear a full-body harness, (one part of a Personal Fall Arrest System) when they are working on a suspended scaffold more than 10 feet above the working surface, or when they are working in bucket truck or aerial lift.

About the standard

The original edition of ANSI/ASSP Z359.1 - one of the first standards in North America to require the full body harness in a fall arrest system - was published in 1992. This standard, which is applicable to fall-from-height situations, was recently updated. It establishes requirements for the performance, design, marking, qualification, instruction, training, test methods, inspection, use, maintenance and removal from service of FBHs. Z359.11 defines a full body harness as “a body support designed to contain the torso and distribute the fall arrest forces over at least the upper thighs, pelvis, chest and shoulders.” FBHs are used for fall arrest, positioning, travel restraint, suspension and/or rescue applications for users within the capacity range of 130 to 310 pounds.

This standard applies to FBHs used in occupations requiring personal protection against falls from heights and if required, allows for the specialized functions of travel restraint, positioning, suspension and/or rescue. This standard applies only to FBHs and auxiliary equipment designed specifically for use as part of the FBH.

ANSI/ASSP Z359.11-2021 will be useful to manufacturers, distributors, purchasers and users of FBHs, along with relevant testing, certifying and regulating bodies. Purchasing an ANSI-rated harness can give safety professionals assurance that the device has certain design requirements and has been rigorously tested.

Revisions and new requirements

The updates to Z359.11 include:

- A modified, headfirst, dynamic test procedure
- New stretch-out requirements for frontal connections
- Alternative fall arrest indicator testing and new label requirements
- Allowance for harnesses with integrated energy absorbers
- Changes to labeling requirements

Z359.11 also requires harness label packs to have pictograms showing the approved usage of different connections along with diagrams that explain the difference between deployed and non-deployed visual load indicators.

Revised test procedures allow manufacturers of harnesses with frontal connections to use innovative designs. Harnesses that have an integral (permanently attached) energy absorber

on the back D-ring can now be ANSI-compliant when they have an integral (permanently attached) energy absorber on the back D-ring.

Fit and Function are Vital

According to the American Society of Safety Professionals (ASSP), function is one the two key elements to focus on when using FBHs. Different applications and working environments call for different types of harnesses. FBHs used in welding must have back D-rings serving as the main fall arrest attachment points. Harnesses worn during confined space operations must be able to hold and suspend the wearer securely during rescue operations. Consulting with the manufacturer can help safety professionals determine which FBH types are best for their employees.

The other key element: fit. FBHs must be properly fitted to the workers who will be wearing them. Ill-fitting harnesses may not provide protection from falls. Personal fall limiters or self-retracting devices, for instance, could slip down the user's back and end up in the wrong position. FBHs that are not fitted properly could also be uncomfortable, which discourages use. Most manufacturers have sizing charts available that suggest harnesses based on a worker's height and weight. Trying on multiple harnesses to find the best fit is a good idea.

Workers must also be trained on how to properly wear and use full body harnesses when operating at height. **WMHS**

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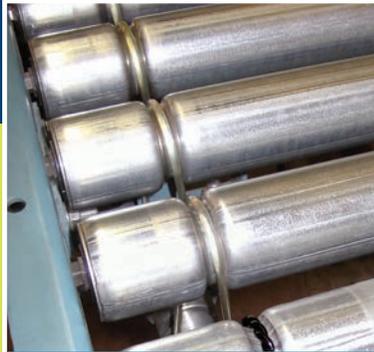
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Identify Combustible Dust Risks Lurking at Your Facility

By: **Andy Thomason**, Contributor

Many manufacturing and processing operations generate dust particles that can ignite and cause a fire or explosion. Combustible dusts include food ingredients, seed and grain, metals, paper, pulp, plastics, textiles, biosolids, wood, rubber, dyes, pharmaceuticals and pesticides.

by an enclosure, the resulting pressure rise may cause an explosion.

DETERMINE IF DUST IS COMBUSTIBLE

To determine whether the dust is combustible, you need to have explosibility testing done, in accordance with ASTM test methods, as stipulated by the National Fire Protection Association (NFPA). Unless the dust is completely inert ($K_{st} = 0$), you must incorporate explosion protection into the dust collection plan. This dust testing will tell you if your dust has a K_{st} and P_{max} value; how much pressure an explosion will generate; and how fast the explosion will travel.

The NFPA requires owners of facilities that engage in dust-producing activities to conduct a combustible dust hazard analysis (DHA) to assess risk and determine the necessary fire and explosion protection. You can conduct the analysis internally or use an independent consultant. Whichever you chose, the authorities having jurisdiction will review the findings and grant approval. These can include federal, local or state inspection or fire officials, and your insurance company.

IDENTIFY POTENTIAL IGNITION SOURCES

Because ignition is one of the ingredients for a dust explosion, you want to identify heat sources near areas where



Because each plant, factory and facility is different, identifying and understanding unique combustible dust risks is necessary to design and implement an effective safety strategy. Here are a few considerations to help you determine your combustible dust risks.

UNDERSTAND WHAT TRIGGERS A DUST EXPLOSION

A dust explosion occurs when oxygen, heat (ignition source), fuel (combustible dust), dispersion of dust particles and confinement come together. A primary explosion is the first point where an explosion occurs and is often an isolated incident.

A secondary explosion occurs when the primary explosion pressure disturbs dust that has collected in the workplace, resulting in a much more extensive explosion. Rapid combustion resulting from this combination of factors is known as a deflagration. Think of it as an expanding ball of flame that is rapidly consuming a cloud of dust. If the event is confined



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dust could be present. Look for potential ignition sources, like friction heat on surrounding equipment, open flames, smoking, sparks, static electricity, and malfunctioning wiring or electrical equipment.



Industrial dust collector with explosion vents

CLEAN DUST PROPERLY

Do not attempt to remove dust by using compressed air, air wands or brooms. These methods will disperse the particles into the air, allowing them to settle again on surfaces at your facility and remain an explosion hazard. A high-efficiency dust collector, equipped with full explosion protection designed specifically for your

application, is an accepted and proven engineering control that will filter hazardous contaminants and combustible dusts to make indoor environments safer.

TAKE A LOOK AROUND

A simple, yet effective way to identify possible combustible dust danger is to look around the facility. Train personnel to regularly check obvious areas for dust accumulation, such as equipment and floors. Also check any hidden areas where dust may build up—i.e., inside ductwork and on ceiling joists. Dust thickness of 1/32 of an inch, about the thickness of a dime, is a warning sign that the accumulating dust is becoming a potential explosion or fire hazard. Keep in mind that the smaller the dust particle size, the greater the danger or volatility of the explosion.

IMPLEMENT DUST SAFETY MEASURES

A dedicated dust management program must include employee education that includes training equipment operators, maintenance personnel and other workers in dust hazard awareness, and job-specific safeguards. In addition to the dust hazard analysis mentioned above, safety measures should include:



Dust accumulation in the workplace

All images courtesy of Camfil

DUST COLLECTION SAFETY GAMEPLAN

[Editor's Note: This sidebar first appeared as a blog on Camfil APC's website. For the original article, go to: <https://bit.ly/2OYAw9Z>.]

If your facility's manufacturing processes generate hazardous dust, one of your priorities is ensuring air quality. Dust, especially airborne dust particles, must be safely collected and contained to protect worker safety and meet regulatory compliance. Here are key considerations for your dust collection safety game plan.

Comply with OSHA PELs

Your dust collection system must enable your facility to meet OSHA's permissible exposure limits (PELs) for the dusts produced at your facility. OSHA established these PELs based on an eight-hour, time-weighted average (TWA) for hundreds of dusts—ranging from nonspecific or

“nuisance” dust to highly toxic substances. They are listed in OSHA's annotated PELs tables. Note that:

- The OSHA PELs requirements determine the minimum level of filtration efficiency your fume collector must achieve.
- It's important to request a written guarantee from your dust collector supplier stating the maximum emissions rate for the equipment over an eight-hour TWA. Filter efficiency stated as a percentage is not an acceptable substitute, even if the supplier promises 99.9% efficiency. That's because OSHA only cares that the quantified amount of dust in the air is below the PEL.

Address Combustible Dust Issues

If your facility produces or processes combustible dusts, chances are you already have a dust collector. This

dust collector must be equipped with deflagration protection, such as explosion venting. The National Fire Protection Association (NFPA) 68 Standard on Explosion Protection by Deflagration Venting provides stringent and mandatory requirements for dust collection applications involving explosive dusts. Note that:

- NFPA 68 focuses on explosion venting of combustion gases and pressures resulting from a deflagration within an enclosure or dust collector.
- The safety objective of NFPA 68 is to prevent structural failure of the enclosure and minimize injury to personnel in adjacent areas outside of the enclosure.

To determine if your particular dust is combustible, you must have it tested for explosibility, following ASTM test methods. The explosive power of a dust is denoted as “K_{st},” the rate of pressure rise. Any dust with a K_{st}

- A detailed program to deal with combustible dust hazards in the facility
- A defined process on how to execute and manage the changes required to meet the life-safety goals set in place by the combustible dust program
- A process hazard analysis, which OSHA requires on each process point generating dust
- A plan specifying how you will remove the dust hazard from each process
- A housekeeping strategy outlining cleaning processes to keep combustible dust from becoming a problem
- An ongoing maintenance and inspection plan to keep equipment operating properly, inspected and in compliance

ADD IT ALL UP

Dust control is one of the most difficult challenges in industrial manufacturing and processing. Keys to managing combustible dust include implementing the proper controls and procedures, as well as educating personnel to recognize and address warning signs of a potential dust explosion. Regular housekeeping and operating a dust collection system that is designed for your specific operation can significantly reduce airborne dust in the work environment and help to mitigate the risk of a primary or secondary explosion. **WMHS**

Andy Thomason is Senior Applications Specialist at Camfil Air Pollution Control (www.camfil.com).

value greater than “0” is considered to be potentially explosive.

Explosive dusts can be organic or metallic in nature. They are present in a long list of manufacturing industries including agricultural, chemical, food, paper, pharmaceutical, textile and woodworking.

Optimize for Safety

In addition to having systems to safely collect and contain hazardous dusts, make sure to install equipment that ensures safe operation. Here are some examples:

- OSHA-compliant railed safety platforms and caged ladders can prevent slips and falls when workers access the dust collector for service.
- Lockout/Tagout doors prevent injury or exposure caused by inadvertently opening doors during a pulsing cycle.

- Where highly toxic dust is being handled, a bag-in/bag-out (BIBO) containment system may be required to isolate workers from used filters during change-out.
- Filter cartridges should be positioned for ease of access, and they should readily slide in and out of the housing. Pulling out a 100-lb, dirty overhead filter can result in neck, back and foot injuries, so make sure the collector you choose is service-friendly.

To optimize fire and explosion protection, you can use a range of features and technologies. These include using flame-retardant filter media; installing spark arrestors; and installing sprinkler systems.

You might also want to equip your collector with a safety monitoring filter. This high-efficiency air filter prevents collected dust from

re-entering the workspace if there is a leak in the dust collector’s primary filtering system. A safety monitoring filter is a required component of a dust collection system that recycles air downstream of the collector.

Consider Vertical Cartridge Mounting

Some pleated filter cartridges are mounted on their sides inside the dust collector. This can be a safety hazard, because a cake of dust often remains on top of the filters. Also, heavy or abrasive particles often don’t get separated from the air stream. This situation can shorten filter life. But more importantly, in spark-generating applications, horizontal filters can pose a fire or explosion hazard. It is safer to use vertically mounted cartridges, which reduce the load on the filters and make the system safer and more efficient.

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First Aid Procedures For Chemical Hazards

By: **Maureen Paraventi**

Exposure to chemical hazards and toxic substances can cause health effects ranging from mild to severe, from irritation and skin rashes to disease and loss of function. Prevention of such incidents is paramount, but when exposure *has* occurred, it is vital that first aid be rendered quickly – and that it be effective for the specific chemical involved. Being prepared to take quick action when first aid is needed requires taking inventory of the hazardous chemicals in the workplace *before* an incident occurs. That list can be used to search the database in the National Institute for Occupational Safety and Health's (NIOSH) ***Pocket Guide to Chemical Hazards*** for information that will be helpful in the event of an exposure. The *Pocket Guide* is designed to provide chemical-specific data to supplement general industrial hygiene knowledge. It has data on 677 chemicals or substance groupings (e.g., manganese compounds, tellurium compounds, inorganic tin compounds, etc.) that are found in the work environment.

For instance, searching for aminopyridine returns details about:

- **Exposure limits** [NIOSH REL- TWA 0.5 ppm (2 mg/m³), OSHA PEL- TWA 0.5 ppm (2 mg/m³)]
- **A physical description** of the substance (white powder, leaflets or crystals with a characteristic odor)
- **Incompatibilities and reactivities** (Strong oxidizers)
- **Exposure routes** (inhalation, skin absorption, ingestion, skin and/or eye contact)
- **Symptoms** (irritation eyes, nose, throat; headache, dizziness; excitement; nausea; high blood pressure; resp distress; lassitude (weakness, exhaustion); convulsions; stupor)
- **Target organs** (central nervous system, respiratory system)
- **First aid**
 - Eye: Irrigate immediately
 - Skin: Water flush immediately
 - Breathing: Respiratory support
 - Swallow: Medical attention immediately

GENERAL RECOMMENDATIONS

While first aid procedures should be appropriate to the chemical, the following indicate the range of actions that can be taken when specific parts of the body are involved.

Eye: Immediately wash (irrigate) the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. If frostbite has occurred and the eye tissue is frozen, seek medical attention immediately; if tissue is not frozen, immediately and thoroughly flush the eyes with large amounts of water for



Eyes that have come in contact with a hazardous chemical should immediately be irrigated with large amounts of water.

at least 15 minutes, occasionally lifting the lower and upper eyelids. If irritation, pain, swelling, lacrimation or photophobia persist, get medical attention as soon as possible.

Skin: If irritation occurs, gently blot or brush away excess. If a solid chemical contacts the skin, dust it off immediately and then flush the contaminated skin with water. If this chemical or liquids containing this chemical penetrate the clothing, promptly remove the clothing and flush the skin with water. Get medical attention immediately. If frostbite has occurred, seek medical attention immediately; do NOT rub the affected areas or flush them with water. In order to prevent further tissue damage, do NOT attempt to remove frozen clothing from frostbitten areas. If a molten chemical contacts the skin, immediately flush the skin with large amounts of water. Get medical attention immediately. If this chemical (or liquids containing this chemical) contacts the skin, promptly wash the contaminated skin with soap and water. If this chemical or liquids containing this chemical penetrate the clothing, immediately remove the clothing and wash the skin with soap and water. If irritation persists after washing, get medical attention.

Breath: If a person breathes large amounts of a harmful chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. When breathing is difficult, properly trained personnel may assist the affected person by administering 100% oxygen. Keep the affected person warm and at rest. Get medical attention as soon as possible.

Swallow: If a toxic chemical has been swallowed, get medical attention immediately.

RESOURCES

Prevention - NIOSH recommends appropriate preventive measures to reduce or eliminate the adverse health and safety effects of chemical hazards. To formulate these recommendations, NIOSH evaluates all known and available medical, biological, engineering, chemical, trade and other information relevant to the hazard. More information can be found at: www.cdc.gov/niosh/npg/firstaid.html

Hazard recognition - Many workers are unaware of chemicals that create potential hazards in their work environment, making them more vulnerable to exposure and injury. OSHA offers an abundance of information about recognizing hazards associated with chemical hazards and toxic substances. A list can be found at: www.osha.gov/chemical-hazards/hazards

Standards - Chemical hazards and toxic substances are addressed in specific OSHA standards for general industry, maritime and construction:

- General Industry (29 CFR 1910): 1910 Subpart Z - Toxic and Hazardous Substances
- Maritime (29 CFR 1915, 1917, 1918): 1915 Subpart Z - Toxic and Hazardous Substances; 1917 Subpart B - Marine Terminal Operations; 1918 Subpart I
- Construction (29 CFR 1926): 1926 Subpart D; 1926 Subpart Z - Toxic and Hazardous Substances **WMHS**

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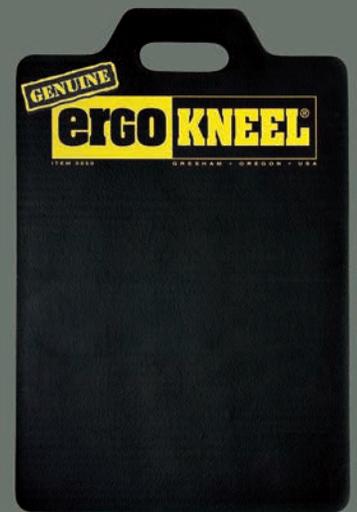
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New Year, New Safety:

3 Ways To Cure Signage Mistakes

By: **James Strohecker**, Contributor

Keeping workers safe isn't just the right thing to do. There's a cost for accidental workplace injuries. Each incident can lead to OSHA inspection and citations, as well as an increase in insurance costs.

Safety signs are an essential part of any workplace safety program. Signs draw attention to important information, remind workers about hazards, reduce incidents, establish compliance and help prevent unsafe behavior.

Common mistakes can make signs less effective or even cause workers to ignore them completely. These mistakes include placing signs in the wrong place, using vague messages and failing to maintain signs.

MISTAKE: IN THE WRONG PLACE

A sign that warns of a hazard too soon may be overlooked or ignored completely because workers can't yet perceive the hazard. Each time workers see a safety sign, they perform an internal risk assessment to determine if they should comply with the sign's message. If the hazard isn't apparent in the environment, workers are less likely to comply with the sign.

Another problem occurs when signs are placed too close to the hazard or can't be seen from a normal point of view. In both cases, these signs are unlikely to be seen, or if they *are* seen, it may be too late for workers to comply with the warning.



SOLUTION

Safety signs should be placed where they can be seen and where they are needed.

When a hazard is identified the safest approach is to perform a redesign, which removes the hazard. If redesign is not feasible, then the next best approach is to employ a guard or barrier to separate the user from the hazard. If the guard is not feasible, then the next step is to use a warning.

Use of the Safety Hierarchy is standard safety practice. The International Ergonomics Association says that application of the safety hierarchy is a "core competency" for professionals. The baseline for a Safety Hierarchy includes:

1. Design
2. Guard
3. Warn

General rules that can help reduce the challenge of sign placement include:

- Place signs at safe viewing distance from the hazard.
- Ensure signs can be seen from the normal point of approach.
- Provide sign placement that gives workers enough time to respond to the sign before they encounter the hazard.
- Review placement and make sure that signs are not obstructed.
- Assess the area and evaluate whether the signs can be seen in low-light conditions. Use lighting and reflective tape products¹ as needed, to make sure the signs are viewable in all conditions.

MISTAKE: VAGUE MESSAGES

Another common mistake occurs when safety signs don't clearly communicate their intended message. Messages may be vague or use jargon that may not be widely understood.

Marc Green, in his paper: Safety Hierarchy: Design vs. Warnings, states that the effectiveness of the warning depends largely upon the knowledge and experience of each viewer.

This sign, for example, that reads "Warning: Crush Hazard," is vague. The sign requires workers / viewers to have prerequisite knowledge of the required action and the exact consequence: What exactly gets crushed and how do you avoid being hurt?

If the sign is on a loading dock, workers will likely interpret the sign differently:



- One interpretation could be that the sign is a warning about overhead loads, which could fall and crush workers.
- Another interpretation might be that the sign is a warning about being caught between a truck and another object.
- Both hazards exist, but the sign relies on the knowledge of each worker to complete the message. Which hazard is it referring to?

SOLUTION

To create an effective message, make sure it communicates essential information that can be widely understood. This can be done by following some simple guidelines. These guidelines include:

- Clearly stating the required action (“Keep Clear,” “Do Not Operate,” etc.)
- Using precise language to communicate the source of the hazard (what does the crushing?)
- Using an image to help communicate the hazard (what gets crushed?)

Each of these elements will help bridge the knowledge gap and create a clear understanding of the hazard, its source and how to increase safety.



PROBLEM: LACK OF MAINTENANCE

All too often, signs are put up and then forgotten. This leads to faded, obstructed and outdated signs. At best, signs become difficult to read. At worst, signs cannot be read or provide inaccurate information.

One common mistake revolves around electrical safety signs. When equipment is updated, voltages may change, altering arc flash and other hazards. A panel that once required CAT 2 personal protective equipment (PPE) may require CAT 4 PPE. The outdated sign could mislead electricians and create safety risk.

SOLUTION

Workplace risk reduction can be improved by updating and maintaining your facility’s safety signs. Make sign updating part of your safety program:

- Replace worn or damaged safety signs
- Move signs that have become obstructed by equipment or other items
- Update safety signs when systems are changed
- Track regulations and new hazards are identified

These simple steps will eliminate safety issues caused by poorly maintained signs and help keep workers safe by providing clear, accurate information.

The proper use of labels and signs will aid your efforts to reduce and eliminate waste. For example, they communicate needed information such as new or revised operating procedures at the place and time where the information is needed. Correctly placed labels and signs provide directions, critical safety information and identify the locations of safety equipment. However, signs and labels only work if they are posted, their message is clear, they remain in place and are readable. **WMHS**

Resources

- Safety Hierarchy: Design Vs. Warnings, by Marc Green, PhD: <https://www.visualexpert.com/Resources/safetyhierarchy.html>
- Practical Guide to Arc Flash Hazard PPE: <https://www.graphicproducts.com/guides/arc-flash-ppe-chart/>
- Five ways to meet osha requirements for safety signage: <https://www.graphicproducts.com/articles/five-ways-to-meet-osa-requirements-for-safety-signage/>
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James Strohecker is Director, Growth Marketing, Graphic Products/DuraLabel. Strohecker is a professional who has contributed more than 14 years to the implementation of strong worker and asset safety programs, insight and product solutions for industrial, utility, energy, manufacturing, responder and remote worker operations. For more information about Graphic Products, visit www.graphicproducts.com.

Savings, Productivity and Sustainability from New Extended Use Gloves

By: **Laura Proctor**, Contributor

There is extensive use of single-use gloves in industrial workplaces from light and heavy manufacturing to the oil & gas, and mining industries. Disposable gloves are often used by workers to prevent direct skin contact with common industrial oils, chemicals and cleaners. Due to the COVID-19 pandemic, many companies have now mandated the use of disposable gloves to also help prevent direct contact with shared items or surfaces. This has resulted in supply issues, higher prices due to the increased demand and safety professionals looking for glove alternatives to support cost savings efforts. But is there a viable alternative? New extended use gloves with advanced technologies are now helping these same companies reduce costs while improving worker productivity, safety and waste reduction.

There is a high usage rate of single-use gloves from workstations and labs within factories to service and fleet maintenance departments. In manufacturing settings, workers encounter lubricants, grease and common solvents to spot clean parts. They use disposable gloves to help protect their skin while preventing the absorption of any dangerous chemicals into their skin. These workers who have contact with lubricants and bench solvents typically have a minimum of four changeouts, or eight gloves, per day. Disposables are ubiquitous within labs as engineers and lab technicians conduct quality control testing and research as well as development work. Lab workers' glove usage can vary greatly based on their testing and research work, but it is often higher than the usage and changeouts seen at manufacturing workstations.

Service departments that support the repair and maintenance of their products employ technicians that make service calls. They have a large demand for disposable gloves as their work environments are ever-changing, so using single-use gloves helps ensure their hands stay clean. This also gives the service technicians an extra layer of protection and confidence when working off-site and with dirty equipment and parts. These technicians can easily use one box of 100 single-use gloves per week.

Extended use gloves have superior durability and grip, with equal dexterity to disposable nitrile gloves.

Companies with vehicle fleets that require maintenance are typically equipped with onsite mechanics shops to support their company cars, vans and trucks. Their mechanics require high dexterity, but are in constant contact with grease, oil, dirt and grime, making barrier gloves a must-have. Most mechanics use an average of 16 to 20 gloves per day which equates to about one box of 100 single-use gloves per week, so costs can add up quickly.

NEW EXTENDED USE GLOVES

New extended use gloves can last up to five times longer than regular disposable gloves in these industrial applications. They are designed for light to heavy-duty applications with a thicker mil proprietary nitrile formulation that helps provide comfort and protection against oils, proteins and incidental chemical contact. Some include advanced technologies, such as a fish scale grip pattern, to provide excellent grip against grease and oils while creating better traction and significantly reducing hand fatigue. A rip-stop design is engineered into some gloves to reduce contamination and help protect users from exposures.

These new extended use gloves address key pain points associated with single-use gloves which are not well suited for industrial applications. Single-use gloves are designed for light-duty applications and not for the all-day or heavy use that most industrial workers need. Disposables often rip and tear and expose workers to contamination. Disposable gloves often have poor grip which can cause repetitive stress disorders and lead to safety concerns due to their lack of secure positioning on objects. That lack of grip can slow productivity and cause injuries. There also is a lack of durability with single-use gloves, which generates an ongoing waste stream that can be reduced up to five times by using extended use gloves. With extended use gloves, there is no need to make the compromise of wearing disposable gloves just to have the dexterity and tactile sensitivity needed on the job.



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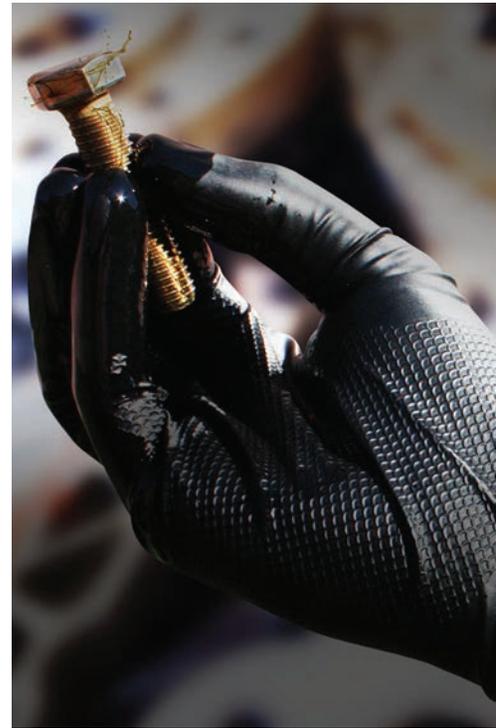
The durability of these slightly thicker, extended use nitrile gloves means lower cost of use and increased savings compared to 3 or 4 mil disposable gloves. Disposable gloves tend to rip and tear when donning or split from rubbing on a bench edge or tool. This is due to the thinner mil and because the 4.0 AQL allows for more defects compared to the extended use gloves' 1.5 AQL. Extended use gloves also are more cost-effective in use because the gloves last up to five times longer than standard disposable nitrile gloves.

These new gloves are designed to allow wearers to work more confidently and effectively due to the superior durability and grip with equal dexterity to disposable nitrile gloves. They improve worker productivity and efficiency with enhanced grip and less doffing and donning to replace broken disposable gloves.

Extended use gloves help keep workers' hands safer due to the unique rip-stop design pattern to reduce skin exposure and contamination. The thicker, proprietary nitrile blend protects users against oils, chemicals and cleaners.

Ultimately, companies can generate cost savings from extended use while offering a more sustainable alternative to disposable gloves. By switching to extended use gloves, companies can also improve worker productivity and safety. It's a win-win for workers and their companies. **WMHS**

Laura Proctor is Director of Marketing at Protective Industrial Products (PIP), a leader in hand protection and other types of personal protective equipment (PPE). PIP is a U.S.-based company with a diversified product line of more than 10,000 products and a relentless focus on customer satisfaction. Visit <https://us.pipglobal.com/> to learn more.



Some extended use gloves have a fish scale grip pattern that provides excellent grip against grease and oils.



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When is it Time to Replace Your Work Gloves?

By: **Rick Pedley**, Contributor

All gloves will eventually need to be replaced, especially if you're wearing them all the time. In general, they shouldn't be wearing out daily, but getting a few weeks out of a regularly used pair of gloves is considered a pretty good life.

The length of time your glove lasts depends on several factors, including the type of glove it is, the work you're doing while wearing it, how often and how long you're doing that work, and how well you take care of your gear. This also makes it very subjective—you might use your gloves faster than your coworkers because of differences in how you work. So, consider these factors when you suspect it might be time to replace your work gloves.

KNOW WHAT DURABILITY MEANS FOR YOU

When workers and manufacturers use the word "durability," they generally mean "longevity," which is just another way of saying how long a worker can wear the glove before it's considered "worn out" and no

longer able to do its job. Unfortunately, this is a difficult quality to measure because there aren't objective tests or standards, and often the wear life is determined by the job the glove is used for. When you're looking at gloves to wear, look at measurable performance qualities like cut protection or resistance to chemicals and abrasion.

BRUSH UP ON YOUR SAFETY SKILLS

Workers should be trained on all aspects of their job, and this includes equipment. There should be training for glove features, job applications, the impact of proper gear, how to identify wear and damage and recognizing when PPE is no longer able to do its job. This training will become even more crucial as the years go on and manufacturers develop new fabrics, technologies and methods that can help increase product durability and functionality.

Organized training through a workplace will make workers more likely to understand and therefore use work gloves, which lowers risk. Make training a continuous process for new and veteran employees alike to keep everyone's skills fresh.

LOOK FOR SIGNS OF WEAR AND TEAR

While you may get away with holey or over-used gloves when doing basic house chores or DIY projects, job sites may hold gear to higher standards to best protect its workers. Generally, there are visual signs of when gloves have reached the point of being worn out. Look for color variations in the coating and liner, for instance. Some



workers will throw out a pair of gloves when the coating wears through, and some when the glove itself is full of holes or the surface is completely abraded off—use your best judgment. It can only take a moment for a workplace accident to happen, so spend a few extra moments at the start of each shift to ensure that you're ready to go.

PROPER CARE AND KEEPING

While all gloves will eventually wear out and need to be removed from service, you can prolong the life of your gloves with proper care and maintenance. Make inspecting them for damage a regular part of your workday routine, especially if they've encountered a lot of abuse. Look especially for breaks in the glove where skin is left vulnerable to temperatures, cuts, punctures, chemicals and other hazards. Make sure that you follow the manufacturer's laundering directions as well. Launder the gloves as often as recommended and according to their



directions, especially if they're flame-resistant and need to be clean to be safe. And really, you should be washing your gloves anyway—you wouldn't wear other clothes over and over without ever washing them, so why would your gloves be any different?

ACCEPT THAT SOMETIMES IT'S NECESSARY

Just like some gloves are designed to last for a long time, others are designed to be used once before being thrown out. If you're using disposable gloves, it's for a reason—specifically, that proper disposal of the glove and what it came in contact with is safer than reusing it. Medical, food service and janitorial work make use of disposable gloves. Sanitizing these gloves would be too intense of a process for the materials to handle, so they're disposed of after use regardless of whether they're worn out or damaged.

If it's almost time to replace your gloves, choose a company of safety experts you can trust. Your hands are one of your most valuable tools, so make them a priority and keep them protected. **WMHS**

Rick Pedley is CEO of PK Safety, a company that has been helping people stay safe in the workplace for more than 70 years. For information about PK Safety's safety gloves, gas detection devices, fall protection, respirators, confined space equipment and more, visit www.pksafety.com.

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Questions & Answers

A Deep Dive into Cut Resistant Gloves

Hazard Evaluation Is the Key To Selecting The Right Cut Resistant Hand Protection

In this interview, *Workplace Material Handling & Safety* explores the evolution, applications and rating scale of this innovative form of hand protection with SHOWA Gloves.

1. Can you describe some workplace injuries that could be avoided with the use of cut resistant gloves? Are there applications and industries where they are especially necessary?

In most cases, cut resistant gloves are worn in today's workplace to prevent an array of injuries occurring. With all of the development over the last 25 years in yarn and knitting technology, we now have products that can protect workers from an array of hazards. From the very basic "band aid" type cuts, like those present from cardboard in warehousing environments or plastics in an injection molding facility, all the way up to the most demanding protection in extreme high laceration hazards such as food processing in the protein industry or plate glass manufacturing/handling. As we see the face of on-the-job safety continue to evolve over time, we see hand protection manufacturers changing right alongside of it. End users now have access to affordable cut protection for nearly any job that requires repetitive use of one's hands in a hazardous environment. You are also starting to see commoditization of more traditionally lower cut resistant type gloves (eg: A2-A3 levels) as producers find ever increasing ways to produce gloves at these levels more efficiently at lower costs. What once were applications that typically required

a general purpose style glove are now seeing low level cut gloves become the norm – offering end users piece of mind for the same price.

2. Is the cut resistant scale specified in ANSI/ISEA 105-2016 commonly embraced by major industrial glove manufacturers?

For the most part today, the majority of the safety industry has embraced the ANSI/ISEA 105-2106 standard as it is written. Like any other sweeping industry regulation change, however, the first few years were filled with tremendous amounts of confusion, incorrect information or just plain wrong understanding of the actual test methods and standards which govern cut resistance testing in the U.S. In my humble opinion, there still remains some areas for improving the standard overall, but for the most part it is fairly comprehensive in its scope and efficacy.

3. Can you explain the nine different levels of that scale? (Do they refer to specific hazards?)

Within the ANSI/ISEA 105/2016 standard, in the section concerning cut resistance (5.1.1), there lies the rules for classifying the cut resistance level of a glove. It is clearly stated which ASTM testing method must be used to obtain the empirical data necessary to then be classified against the table of levels A1 through A9. Each level has a specific threshold weight that must be obtained during testing to reach that level of cut resistance. Whatever the final result obtained during testing is (sometimes referred to as the Rating Force - which is reported in grams) this weight can then be compared to table in the standard to determine its corresponding cut level.

Now what does that mean to lay person, the world outside the lab? Because the testing is performed in a controlled environment, with few variables and very strict testing procedures, the results become more of a guide than a gospel. We do find some industries prefer to use or find better results using certain levels of cut protection (eg: automotive stamping tends to use gloves ranging from A4-A6 for the most part) however there is no set rules for what level should be used in a particular job. While



When selecting a cut resistant glove, it's important to evaluate the hazards, environment and contaminants the wearer may be exposed to.



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Brian Moseley - R&D/Technical Manager: Showa Group



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most manufacturers will make basic recommendations for cut levels used in certain types of applications, each application is unique and should be treated as such. Proper evaluation of the hazards present, the time of use, environment, contaminants present, even sizing are some of the key factors to consider when selecting the right cut level for a particular end use application.



4. How do safety managers use the scale to choose cut resistant gloves that are most effective for their workers?

For quite some time now the “time honored,” completely absurd tradition of using a particular cut level glove until recordable injuries become a problem, and then increasing the cut level 1 or 2 levels to combat that problem continues to be an issue. What is unique about this however is it does usually help solve the problem (at the expense of whomever was injured, of course.) This firsthand experience, albeit archaic and nonsensical, can help safety managers understand their application hazards more thoroughly and unfortunately is still rampantly in use in today’s workplace. Many larger corporations have adopted higher than typical cut levels be mandated across their entire network of facilities to lessen risk of injuries as a whole and this is helpful yes, but not always the answer. Good news is end users who partner with trusted glove producers and distributors can

help properly educate safety managers on proper cut resistance protection selection. When in doubt, talk to your hand protection specialists to aid you in making these crucial decisions. Unfortunately, the OSHA standard revolving around hand protection is incredibly vague and offers little assistance to make those educated and calculated selections. Allow the experts to guide your decision making process – your employees will thank you for it.

5. Can you provide insight into the evolution of cut resistance in hand protection?

When Stephanie Kwolek at DuPont invented Kevlar back in 1965, I doubt she had cut resistant gloves on the top of her list of practical uses for her incredible new yellow fiber. However, that was one of the eventual evolutionary uses of Kevlar and that kick started the “cut resistant glove renaissance”. This period of textile enlightenment birthed many new fibers that are household terms in our industry now like Kevlar, Twaron, Dyneema, Spectra etc. Overtime yarn spinners and engineers found more creative ways to blend fibers of all types with rigid core materials like filament fiberglass and steel to constantly achieve higher and higher levels of cut resistance. Back in the mid 90s, gloves made from 100% Kevlar fiber ruled the roost and commanded top dollars to purchase. Now in 2022, very few single fiber cut resistant gloves remain and blended fiber products have reached levels of affordable cut resistance unthinkable 30 years ago.

6. Can cut resistant gloves be comfortable?

Of course! They should be. And the majority nowadays are very comfortable. Still the single most common reason workers get recordable hand injuries from cut hazards on the job is because they were not actually wearing gloves. If your glove is not comfortable, your employees will not want to wear them – and you can see where that leads.

7. Beyond the levels, what do purchasers need to know about cut resistance in gloves?

Numerous things, that again revert back to the statement “each end use is unique.” Purchasers should be aware of many critical factors when selecting hand protection to protect against cuts. It is not only sharp ended objects that can cause injuries in the workplace. All hazards that are present should be quantified and understood prior to making any decision for proper hand protection. For instance, the ANSI/ISEA 105/2016 mentioned above covers more than just cut resistance. Included in this standard are specifications for classifying abrasion resistance, puncture resistance, chemical protection, heat and flame protection, vibration reduction, etc. There is not one end use application on earth that has only cut hazards present and nothing else; there is always more to that story.

8. Can you discuss gloves that combine cut resistance with other features, in order to protect workers against a number of hazards?

This all goes back to understanding your application. Every single cut resistant glove has more than cut resistance as its only feature. Typically it’s the addition of abrasion resistance being the most common co-feature to cut, as repetitive use is the name of the game. But everything from hypodermic needle protection to anti-vibration, to chemical permeation protection can be added co-features to cut resistant gloves and some may have four, five, six or even more features to boast about. Know your application hazards, and you will know what features to look for beyond the obvious cut level. **WMHS**



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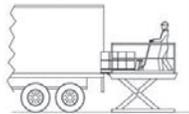





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