Industrial Safety & Hygiene News
February 2017

ISHN

INSIDE this eBOOK:

All about selection, standards & innovations

- Gloves as a "business enabler"
- Evaluate your hand protection needs
- The new ANSI/ISEA glove standards
- Misconceptions about cut-resistant gloves

Volume 2

Your guide to

hand protection safety

introduction

Welcome to *ISHN's* second volume of feature articles and sponsored content relating to workplace hand protection. Safety and health professionals in every industry will benefit from the latest updates and innovations in work gloves. Think about it. Almost everyone uses their hands on the job, especially in manufacturing and construction.

Here a just a few "hands on" disciplines: Maintenance technician, nurse, dentist, physician, plant inspector, machinist, mechanic, heavy equipment operator, plumber, electrician, plant inspector – and yes, safety and health officers.

Injuries to hands – cut, lacerations, abrasions, punctures, chemical burns, thermal burns and skin absorption of harmful substances are all too common and many times life-altering. The U.S. Bureau of Labor Statistics reports that hand injuries send more than one million workers to the emergency room each year. About 30,000 people, both kids and adults, are rushed to U.S. emergency rooms each year because they've amputated a finger.

We take for granted all the ways we use our hands: to grasp, lift, feel, touch, grip, type, eat, exercise, play sports, and many times make a living. Lose a finger, a few fingers, or a hand and life is never the same.

According to the BLS, 70 percent of workers who experienced hand injuries were not wearing gloves. And the remaining 30 percent of injured workers that did wear gloves experienced injuries because the gloves were inadequate, damaged or the wrong type for the type of hazard present.

Articles in this eBook cover the following:

- **Four essential features**

Select gloves that protect & offer comfort, usability & improved productivity

- **A cut above**

Clearing up misconceptions about cut-resistant gloves

- **When hands go cold and clumsy**

How to identify a true winter work glove

- **ANSI/ISEA 105-2016 American National Standard for Hand Protection Classification**
- **Making the cut**

What you should know about new ANSI/ISEA glove standards

- **Safety at hand**

Hand injuries can restrict movement, cause serious damage

- **Shedding fibers a cause for concern**

Cut-resistant sleeves evaluated for respiratory hazards

- **Beyond glove performance**

Instruction & training should be standard procedure

- **Evaluate your hand protection needs**

Assess hazards, worker likes & dislikes & current usage

- **Gloves as a "business enabler"**

Keep employees on the job, productive & motivated

ISHN thanks all the subject-matter experts who contributed articles and the contributions of *ISHN's* Hand Protection eBook Volume Two sponsors.

This eBook is a valuable asset to assess safety and health hand protection hazards, technologies and solutions.

Dave Johnson - *ISHN* Editor

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Four *essential features*

Select gloves that protect & offer comfort, usability & improved productivity

By VICKY ADAMS

In 2011, a study was conducted to find out why workers in a variety of industries did not wear personal protective equipment (PPE) such as aprons, goggles, headgear, and gloves. What the study found was that nearly 70 percent of these workers did not know they were required to wear protective clothing.* Not wearing protective gear is likely a key factor in the high number of work-related injuries in the United States. It also has a negative impact on worker productivity and overall production goals. *(See Sidebar: US Worker Injury Statistics.)*

However, another reason for work-related injuries is that, even if workers do wear protective gear, they often do not

U.S. WORKER INJURY STATISTICS

In 2014, nearly three million *nonfatal* workplace injuries and illnesses were reported by private industry employers.

A total of 4,679 *fatal* work injuries were recorded in the United States in 2014, an increase of two percent over the previous year.

Source: US Bureau of Labor Statistics

Four essential features continued

ENCOURAGING PPE COMPLIANCE

To encourage PPE compliance, whether it applies to gloves or any other type of PPE, employ these top strategies:

- *Create and improve upon existing PPE education and training programs.*
- *Increase monitoring of workers' compliance with PPE directives.*
- *Put more emphasis on comfort and the look of PPE products; workers are more likely to wear more stylish and comfortable PPE products.*
- *Make PPE compliance a part of worker performance evaluations.*

wear the *correct* protective gear for the task at hand. For instance, the type of eye gear worn to protect cleaning workers from such things as chemical splashes would not be the correct eye gear for workers to wear in an industrial setting where dust may be an ongoing problem or there is the possibility of airborne debris flying into someone's eyes. Not aware of the correct type of protection equipment necessary for their job, workers may select just any type of eye gear, believing they are safe. Worse, because they believe they are safe, they may be emboldened to take more risks on the job. This can result in not just an injury but a very serious injury.

Next to protective eye gear, one of the most important types of protective equipment to consider is gloves. We use our hands for nearly everything in a work setting. When hands are protected, worker productivity improves. This makes proper selection of gloves all the more important and explains why administrators should always encourage PPE compliance. *(See Sidebar: Encouraging PPE Compliance.)*

Which gloves for what purpose

Different types of gloves and different types of glove materials are designed for different work situations. Because of this, when selecting work gloves, workers in all settings must remember two things:

1. Not all work gloves offer the same protection.
2. You need to know what types of gloves are designed to work in which settings and why.

To help us better understand why these two points are so critical, let's explore some of the most common types of material used in the manufacture of gloves, their strengths, and their weaknesses:

Latex (natural rubber): These gloves are considered a "general use" glove because they can be used in a variety of work-related situations when gloves are needed. These gloves perform well when working with acetone or thinners. They are also best when working in a medical setting or when handling potentially infectious materials. However, they offer limited

Four essential features continued

protection when working with chemicals and organic solvents, and it can be hard to detect puncture holes in the glove. *(See Sidebar: A Closer Look at Latex and Nitrile Gloves.)*

Neoprene: Gloves made with neoprene may prove most effective when working with acids, alcohols, fuels, peroxides, phenols, or hazardous materials. They are considered poor when working with some types of hydrocarbons.

Nitrile: Also considered a "general use" glove, it is easier to detect punctures or tears on these gloves. They perform well when working with gasoline, turpentine, oils, greases, and some acids and bases; they should not be used when working with acetone.

Butyl rubber: Gloves made of butyl rubber will help protect hands when working with ketones and esters, but they are a poor choice when handling gasoline or aliphatic, aromatic, and halogenated hydrocarbons.

Norfoil: These gloves are best used when working with hazardous chemicals. Their downside is their lack of dexterity, so it is very important to select the best-fitting norfoil glove.

PVC (polyvinyl chloride): These types of gloves are best when working with acids, bases, oils, fats, peroxides, and amines; they are not recommended when working with organic solvents. They also offer good resistance to abrasions.

We should also note that the protection these glove materials provide can vary depending on conditions in the workplace, especially based on cold and heat. For instance, neoprene may harden under very cold working conditions.

A CLOSER LOOK AT LATEX AND NITRILE GLOVES

Because they are two of the most common types of gloves, we should look more closely at the differences between gloves made of latex and those made of nitrile.

Latex is a natural rubber material, not synthetic. Along with being more protective for those workers using acetone and thinners, latex gloves are very thin, feeling almost like a second skin. Further, they have a high level of touch sensitivity and are very protective when dealing with infectious materials, making them the glove of choice in medical settings.

Nitrile is a synthetic material designed to mimic a latex glove, but, because it is made with synthetic rubber, it helps remedy latex allergy concerns. This is essentially why they were developed. Further, nitrile gloves are generally stronger and more puncture resistant than latex gloves. Along with being resistant to gasoline or turpentine, they also better protect workers' hands when working with chemicals, acids, oils, and solvents.

* Study, "Alarming Number of Workers Fail to Wear Required Protective Equipment," conducted by Kimberly-Clark Professional; published on October 9, 2012.

Four *essential features* *continued*

While neoprene gloves are generally protective when working with most acids, in high temperatures they can prove very ineffective, even dangerous. Caution should be taken with all gloves when working in extreme conditions.

Also, in many work situations, selecting gloves with extra length—for instance, a 12-inch length covering the hand and wrist—may offer considerably more protection.

Further, different types of chemicals and chemical combinations are continually being introduced for use in industrial settings. Because of this, administrators and workers must stay updated on these new chemicals because they may require the use of different or very specific types of gloves.

Similarly, administrators and workers must continually evaluate and reevaluate the materials and types of gloves used in the workplace. If you are unsure about which type of gloves to wear, ask the manufacturer or a glove expert. When protecting workers' hands, there is no room to make the wrong selection.

Vicky Adams, Senior Category Manager, Safety and Gloves, at Impact Products. Impact-Products makes a wide-range of work gloves and related PPE gear for all types of work settings. Adams can be reached through her company website at www.impact-products.com

MCR - Hand Protection

MCR Safety is a unique glove supplier. We differentiate ourselves by being a glove manufacturer with engaging services in how we go to market. We have over 3,000 styles of cut, abrasion, chemical and liquid protection, puncture and thermal glove offerings. We are a licensed supplier of DuPont® Kevlar®, DSM Diamond Technology®, and Alycore® cut-resistant fabrics. We engage with our consumers to enhance worker safety, improve productivity, and generate business for our distributors.

We are a glove manufacturer. Our manufacturing includes a state-of-the-art coated seamless knit production facility, a cut protection facility with yarn spinning and knitting operations, as well as a tannery to support our leather glove and garment production. Our original manufacturing began with cut and sewn leather gloves. Today we manage our leather tannery to support manufacturing of cut and sewn leather gloves. We manufacture the largest assortment of leather gloves and garments. While our industry continues to evolve and shift more toward coated seamless knit styles, we have also evolved more into manufacturing of these styles. In regards to cut protection and seamless knit gloves, we manage our own yarn spinning operation to support the manufacturing of assorted string knit glove styles. We have a unique relationship to directly source Kevlar® fiber from DuPont® and spin into yarn for many of our cut protection offerings. Our most recent progression is to align ourselves with an established, state-of-the-art string knit manufacturer with a diverse assortment of coating capabilities.

We take a very integrated approach in providing products and unique services to our distributors and consumers. We differentiate ourselves as a glove supplier with services that include MCR Safety's Innovation Technology Center, MCR Safety's 360° Protection Program, Field Protection Specialists, Buy & Try sampling program as well as traditional web-based resources.

Our ITC lab is accredited to the ISO/IEC 17025:2005 standard, the single most important standard for testing laboratories around the world. Laboratories that are accredited to this international standard have demonstrated they are technically competent and able to produce precise and accurate test data. Our accredited scope includes ANSI/ISEA 105-2016 coated/uncoated abrasion testing, puncture testing and cut testing. MCR Safety is unique as one of the only in a handful of testing laboratories in the world with this accreditation.

MCR Safety's 360° Protection Program is designed to perform assessments and review workplace hazards. This service provides emphasis on cost savings, enhanced productivity, and risk reductions. Results are achieved by the execution of our five-step process that evaluates, measures, analyzes, executes, and enhances worker protection.

We have dedicated safety professionals committed to

Hand *Protection continued*

engaging at industrial workplaces to demonstrate our products, provide training, and extend our 360° protection program. They operate from service vans equipped with our gloves, glasses, and garments.

Our Buy & Try sampling program engages consumers at industrial expos as well as leisure activities such as motorcycle events, air shows, and many sporting events. We present and demonstrate our gloves to thousands of people to generate new distributor business.

Our most popular web-based resources include our cross reference guide, on-line product training, and permeation guide. Additionally, our Press Room is a popular source to keep everyone aware of our industry trade show and end user events.

How we go to market is uniquely different. We promote our brand identity with MCR Safety and Max, our mascot. Max is an ever-vigilant protector with 360° of vision and always on guard for your safety. Our consumers recognize Max as an endorsement of hard working gear. Max represents the toughest, most reliable safety gear. Workers who wear our gloves refuse to be out-performed and so do we. People who work hard know that MCR Safety gear delivers.

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American National Standard for Hand Protection Classification

By ISHN STAFF

Why this standard is important

The document classifies a whole glove or material used in the construction of an occupational glove to help people understand glove performance data if they are not familiar with the details of the test methods and the results to be expected when testing. This document provides or refers to appropriate test methods for specified criteria and provides pass/fail criteria to allow users to interpret test results and determine if certain hand protection products meet their needs.

One of the major changes in this fourth edition of ANSI/ISEA 105 surrounds the determination of classification for cut-resistance. For purposes of classifying a glove to this standard, a single test method has been selected in an effort to provide consistent meaning of the ratings from the end-user perspective. In addition, the number of classification levels has been expanded to address the disparate gap among certain levels seen in earlier versions and to model the approach used in similar international standards.

Hazard protection

Cut resistance, puncture resistance (other than hypodermic needle), hypodermic needle puncture resistance, abrasion resistance, chemical permeation resistance, chemical degradation resistance, heat and flame protection, ignition resistance and burning resistance, heat degradation resistance, conducive heat resistance, vibration reduction, dexterity.

The standard does not address protection from electric shock, ionizing or non-ionizing radiation, every type of thermal exposure and harmful temperature extreme, and

American National Standard
for Hand Protection Classification continued

every type of exposure to chemicals, biological agents, or other hazardous substances. This standard does not address protection for welding, emergency response applications or fire fighter applications.

Test methods used in this standard

Cut resistance: ASTM F2992-15. Cut resistance testing measures how the glove material will resist cutting by a sharp edge. Larger weights reported by this test method indicate a glove material with greater cut resistance.

Puncture resistance (other than hypodermic needle): EN 388:2003. Puncture resistance testing measures how the glove material will resist puncture by a pointed object. Higher puncture forces reported by this test method indicate a glove with greater puncture resistance.

Hypodermic needle puncture resistance: ASTM F2878-10. Puncture resistance testing measures how the glove material will resist puncture by a sharp-edged needle. Higher puncture forces reported by this test method indicate a glove with greater puncture resistance.

Abrasion resistance: ASTM D3389-10 and ASTM D3884-09. Abrasion resistance testing measures how the well the glove material resists loss of material from rubbing on rough surfaces. Larger numbers of abrasion cycles until failure reported by this method indicate a glove with greater abrasion resistance.

Chemical permeation resistance: ASTM F739-12. Permeation resistance testing measures the rate at which chemicals (contacting the glove) pass through glove materials on a molecular level. Longer breakthrough times indicate materials with better chemical permeation resistance. Permeation rates may be used to determine how much chemical passes through the material in a given period

Chemical degradation resistance: Appendix B in standard. Degradation resistance testing measures the effects of a chemical on a glove material. In this test, the measured effect is loss of puncture resistance. Lower percentage changes in puncture resistance indicate gloves with greater chemical degradation resistance.

Ignition resistance and burning behavior (or after-flame time): ASTM F1358-08. Ignition resistance and burning behavior testing measures how easily a glove material will ignite and if ignited how readily the material will continue to burn once the flame is removed. Materials that show no ignition or longer ignition times and short after-burn times (time for the burning material to extinguish following removal of the flame) using this method are considered to perform better when exposed to a flame for a short time.

Heat degradation resistance: ISO 17493:2000. Heat degradation testing determines the exposure temperature

American National Standard
for Hand Protection Classification continued

at which gloves will be thermally stable (i.e., show no significant heat degradation). Higher temperatures reported by this method indicate gloves having greater heat degradation resistance.

Conductive heat resistance: ASTM F1060-08. Conductive heat resistance testing measures the insulation provided by the glove when in contact with a hot surface. Higher temperatures reported by this method indicate gloves with greater insulation for contact with hot surfaces.

Vibration resistance: ANSI S2.73-2002 (R2007). This measures the vibration transmissibility of the glove by comparing the difference between the two sites across a spectrum of frequencies.

Dexterity: EN 430:2009. Dexterity is the ability of the wearer to manipulate objects and control his hands in the desired manner. It, in this case, is assessed by determining the wearer's ability to pick up between his thumb and forefinger small diameter pins lying on a flat surface. The dexterity of the glove is highest when the wearer can pick up the smallest diameter pin provided.

Other factors for consideration

Natural Rubber Latex: Workers exposed to natural rubber latex as a component of gloves may develop allergic reactions. Latex gloves have proved effective in preventing transmission of many infectious diseases to healthcare workers. Some people exposed to latex develop allergic reactions in the form of rash, hives, itching and other symptoms. The medical community has not established safe levels of proteins to evaluate latex-containing products.

Viral Penetration Resistance: The penetration of viruses or other biological agents may be a concern for hand protection products that do not use continuous barriers or products using microporous films. Viral penetration resistance testing measures the effectiveness of whole gloves or glove materials in preventing the transmission of a bacteriophage, or viral simulant for Hepatitis and Human Immunodeficiency Viruses.

Chemical Penetration: In some work environment, chemical permeation resistance may represent a severe exposure to gloves not mimicked by all types of chemical exposures. For some exposures involving low hazard liquids, acceptable performance can be demonstrated by resistance to penetration.

Human Factors: Human factors relate to the fit, function, and comfort provided by gloves. The protection provided by gloves against specific hazards typically involves some tradeoff with hand comfort and functionality. These properties are generally subjective and will depend on the perception of the wearer, the type of work being performed,

American National Standard
for Hand Protection Classification continued

the environmental conditions, and the length of the wearing period.

Fit: Gloves should fit properly. The relative fit of the gloves may be a function of the particular glove design, available sizes for a particular glove style, and the personal preferences of the wearer for fit. Manufacturers provide numerical sizes (e.g., size 9) for some styles and size descriptions (e.g., small) for other styles. Some manufacturers provide sizing charts or indicate how to measure hands to select the appropriate sized glove based on their sizing system.

Function: Glove function is most often characterized in terms of dexterity, tactility, and grip. Criteria for dexterity are incorporated in ANSI/ISEA 105-2016. There are no standard tests for tactility. Often tactility is measured by how well a person can identify objects by touch without looking at the objects. Grip is affected by the type of treatment on the glove surface, the type of object being grasped and the presence of any wetness or other substances. Good grip in gloves allows the wear to hold heavy objects in different orientations.

A new approach
to selecting cut-resistant gloves

Over the years, the industry has struggled to equate cut resistance with actual risk. The recent updates to the ANSI 105 and EN 388 standards will provide a more uniformed approach to assessing the cut-resistant performance of gloves across the globe. While this will make the cut scores more comparable, it will not help safety managers determine which cut score is best suited for the job. The ultimate objective of choosing the right glove for the right job requires equating a glove specification to something more realistic, like risk of injury. It is the intent of this article to outline a new and unique approach to assessing cut risk, which takes a comprehensive look at all factors involved.

Material basics and performance

Before going further, it is important that we take some time to review the basic fundamentals related to cut-resistant fibers and types of grip coatings.

Steel and glass were among the first technologies used in cut-resistant apparel. While initially very strong, they were found to weaken and break after repeated flexing and gave way to the development of more advanced materials such as HPPE (High Performance Polyethylene, such as DSM Dyneema®) and Aramids (such as DuPont® Kevlar®) with much high durability. Glass and steel continue to be used today, but for the most part are now engineered with advanced materials to produce highly cut-resistant gloves and sleeves that are more comfortable, durable and flexible. Still, depending on whether blended or engineered, we can easily go from a very inexpensive, predominantly glass blend with very high initial cut scores, to more expensive engineered yarns that make use of fully encapsulated glass, steel or mineralized materials for ultra-high cut resistance and all-round performance. It is important to point out that, when tested, gloves made with blends of predominantly glass fibers score very high due to the dulling of the test blade. However, the inherent stiffness and brittle nature of glass fibers cause it to split, resulting in possible protection failure, skin irritation, fatigue and premature wear.

The issues described above have led to the proliferation of HPPE and Aramids to become the fibers of choice in providing superior cut protection in gloves and sleeves. Both materials are inherently strong with HPPE offering coolness and comfort, while aramids provide (depending on thickness) light to medium heat protection. Until most recently, this superior comfort and performance could only be gained by using higher quality HPPE and aramid-based fibers blended with spandex or nylon for extra flexibility and performance levels.

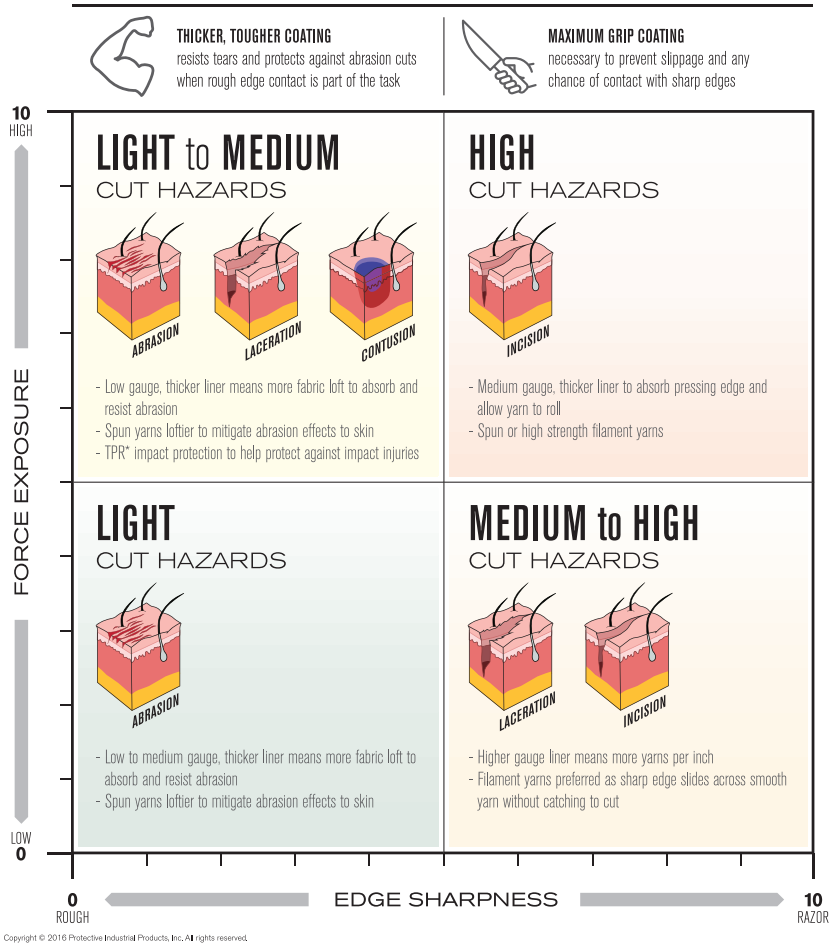
A new approach
to selecting cut-resistant gloves continued

Today, the approach by leading glove producers is to develop proprietary engineered yarns, using HPPE or aramids, along with novel technology that embeds, encapsulates or blends multiple strong fibers such as glass, steel or mineral-based materials that, until recently, could not even be imagined – let alone mass produced. Advancement in nanotechnology is allowing them to work with incredibly strong materials, previously thought to be too thick or too stiff. These natural materials can now be formed into nano-thin, highly flexible fibers that when blended to produce a whole new generation of gloves and sleeves, offer sustainable performance and dexterity. The overall benefit to the user is lower cost, higher cut resistance, improved flexibility and outstanding wear performance.

Protection from injuries

With the advancement in materials as described above, we can feel confident that gloves and sleeves produced today are among the best we've ever seen. However, making the right selection only gets harder with more choices. Cut scores cannot be relied upon as the sole indicator of performance and we must consider factors in real work applications like the threats of applied force and edge sharpness and equate them to the risk of injury.

With the exception of contusions, most skin injuries are a result of contact with a sharp edge or even a burred, rough edge on fragile skin. Using a glove or sleeve layer helps reduce the



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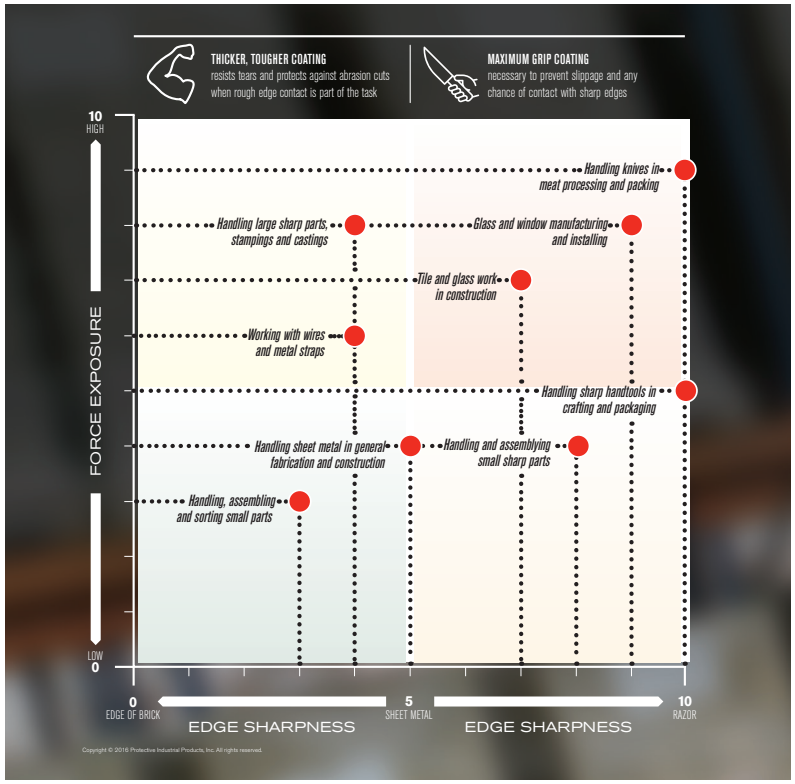
A new approach
to selecting cut-resistant gloves continued

likelihood of damage to the skin. The extra layer offered by a technical glove today consists of a knitted or fabric liner, coated with a natural or synthetic rubber polymer. While leather may offer some abrasion protection, it slices effortlessly when in contact with a sharp edge, making it no match for gloves using the latest technology consisting of cut-resistant fibers and yarns.

In the case of coatings, thicker, tougher varieties will offer extra protection especially when contact with burred, rough edges is a necessary part of the task. An example of this would be handling heavy sheet metal or working with castings. The coating grip also plays an important part in preventing a sharp part or knife from slipping and allowing its blade or cutting edge from making direct contact with the gloved hand or arm.

It can be argued that a cut-resistant liner should act as the last line of defense for protecting skin and that avoiding any direct contact with sharp edges is obviously crucial. Edge sharpness and force of contact are critical factors in determining whether the glove or sleeve material type will be able to defend against contact with the underlying skin. Proper selection is multi-factorial and for this reason we deemed it necessary to develop an alternative approach to help determine the risk and possible severity of an injury.



The matrix below demonstrates the multiple factors involved in determining applications for cut-resistant gloves or sleeves.

To explain further, the Force on the vertical axis tries to relatively quantify the amount of force that may be applied if there is edge contact with the glove or sleeve, with 10 representing a severe force such as that of a knife carving meat on a processing chain. The Edge Sharpness axis on the bottom correlates the sharpness of the cut threat with 10 being a razor-sharp blade and 0 representing a rough edge, such as that of a brick or

*The Cut Risk Hazard Factor™ or CRH: Factor™ are trademarks of Protective Industrial Products,Inc.

A new approach
to selecting cut-resistant gloves continued

masonry block. By plotting work tasks on the matrix, we can relatively quantify a "cut-risk hazard factor" * as outlined on the right side. This comparative indicator helps safety managers determine the level of potential hazard related to the task or application.

Conclusion

Selecting Cut-resistant gloves or sleeves is not a linear science and choosing the highest cut level is not necessarily the best protection or best product for dexterity and productivity. We can see that proper glove selection is based on understanding the fundamentals of glove materials and technology, as well as that of task related risks. We all seek a "one product - one level solution," but that is just not possible – even with today's advanced fiber materials and engineered yarns. By offering a more relatable method of assessing risk, we can help safety managers more confidently assess their requirements and better correlate them to EN and ANSI cut scores.

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Safety *at hand*

Hand injuries can restrict movement, cause serious damage

By BENITA MEHTA, ISHN Managing Editor

Hands are one of the most complex parts of your body. Tendon, bones, tissues and nerves work together to allow various movements. The hand consists of 27 bones (including eight bones in the wrist). When the other associated parts (nerves, arteries, veins, muscles, tendons, ligaments, joint cartilage, and fingernails) are considered, there is potential for a variety of injuries.

Hand injuries that cause damage to one or all of those inter-meshing parts can make it difficult to do even the most simple tasks. Hand injuries are often caused by misuse of tools, improper glove use, carelessness, lack of awareness or distraction.

Hand safety study

A workplace hand safety study conducted in late 2015 in partnership with the American Society of Safety Engineers covered hand safety topics ranging from how often injuries occur in the workplace to what's causing those injuries.

More than a quarter of the 400 safety professionals who participated in the study, 27 percent, reported having more than 30 work-related injuries occur in their company in the past 12 months. Twenty-eight percent reported having between 10 and 30 injuries in that same time period.

Most common injuries

According to the U.S. Bureau of Labor Statistics, more than 1.1 million hand injuries in 2014 resulted in visits to the ER and lost time from work. In the workplace, 20 percent of injuries involve the hands and fingers, ranging from minor cuts and irritations to more permanent injuries, like fractures and amputations.

Safety *at hand continued*

The five most common hand injuries in the workplace are lacerations, crushes, avulsions or detachments, punctures and fractures. Additional hand hazards employees may encounter include electrical burns, exposure to chemicals, frostbite, penetration, contusions, sprains and strains.

OSHA recommends that employers should protect their workers against hand injuries that can include burns, bruises, abrasions, cuts, punctures, fractures, amputations and chemical exposures.

When an injury to the hand occurs, an initial evaluation and treatment should be done as soon as possible so the short- and long-term effects on the hand can be minimized.

Overuse injuries

In addition to more well-known injuries, overuse also can result in serious debilitation. Overuse injuries occur when too much stress is placed on a joint or other tissue, often by "overdoing" an activity or repeating the same activity.

Overuse injuries include the following:

- Carpal tunnel syndrome is caused by pressure on a nerve (median nerve) in the wrist. Symptoms include tingling, numbness, weakness, or pain of the fingers and hand.
- Tendon pain is actually a symptom of tendinosis, a series of very small tears (microtears) in the tissue in or around the tendon. In addition to pain and tenderness, common symptoms of tendon injury include decreased strength and movement in the affected area.
- De Quervain's disease can occur in the hand and wrist when tendons and the tendon covering (sheath) on the thumb side of the wrist swell and become inflamed.

Treatment

Treatment for a finger, hand, or wrist injury may include first aid measures; medicine; taping for support; application of a brace, splint, or cast; physical therapy; and in some cases, surgery. Treatment depends on:

- The location, type, and severity of the injury.
- How long ago the injury occurred.
- Your age, health condition, and activities (such as work, sports, or hobbies).

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Selecting the Best *Hand Protection for the Task*

By KEVIN WEATHERFORD

People who play sports that require a swing of perfect alignment like golf, enjoy the outcome when the sweet spot is felt. The question is, *how* did they find the 'sweet spot'? Did they get lucky with one swing and struggle locating it the next time or do they regularly hit the 'sweet spot', due to their dedication towards persistence?

Today, more than ever, we at Ringers Gloves are seeing customers select their hand safety protection based off of one of two things. There is either a lower price point than what they currently have or they felt a sense of connection with a sales representative who promised some type of magic in their glove. We feel the lack of persistence and dedication towards identifying the hand hazards and exposure levels before selecting the proper hand safety protection, keeps these customers from ever seeing the cost savings in locating the 'sweet spot'.

Ringers Gloves uses a **7 step process** (https://ringersgloves.box.com/v/7-step-process) that helps to identify the correct method towards locating the 'sweet spot'. This method helps to guide the user to make the best decisions on all levels of hand protection needs within a facility.

This past summer, Ringers Gloves had the opportunity to assess a manufacturing facility that was having difficulty meeting their annual PPE budget. Below are the steps we followed to locate their 'sweet spot'.

Ever wonder why a forklift operator is wearing the same cut level of hand protection as the sheet metal operator? And even worse, their monthly usage is the same?

Let's take a look at this even closer, to uncover how the 'sweet spot' was found.

Let's begin by looking at the sheet metal operator's glove use. Through the proper hand hazard assessment, we identified that the sheet metal operator needs a level of cut 4 protection. The glove selected costs $10 each. Through understanding the exposure level, it was determined that 2 pairs of the selected glove would be used each month by this one operator.

Price Per Glove	$10.00
Gloves Per Month	2
Cost Per Month (1 employee)	$20.00
# of Employees	150
Total Monthly Glove Spend	$3,000
Total Annual Glove Spend	$36,000

Now let's look back at the forklift operator's hand protection. Remember, he is using the same glove and has the same monthly usage.

Through the proper hand hazard assessment, we have identified that the forklift operator has no exposure to cut

Selecting the Best *Hand Protection for the Task*

continued

Price Per Glove	$10.00
Gloves Per Month	2
Cost Per Month (1 employee)	$20.00
# of Employees	50
Total Monthly Glove Spend	$1,000
Total Annual Glove Spend	$12,000

hazards. Truly, what is needed, is superior grip with true feel. Through conversing with this operator, it was discovered that the he liked the sheet metal operator's safety gloves because of their gripping capabilities. After reviewing a few options, the correct Ringers Glove was selected. The new selected glove costs $5.00. With the proper training and communication of expectations it had also been determined that the operator only needs 1 pair per month.

The correct level of protection:

Price Per Glove	$5.00
Gloves Per Month	1
Cost Per Month (1 employee)	$5.00
# of Employees	50
Total Monthly Glove Spend	$250
Total Annual Glove Spend	$3,000
Annual Savings	($9,000) = "The Sweet Spot!"

When the correct level of persistence is applied towards identifying the hazard exposures, true cost savings will be seen every time. Staying out of the 'sweet spot', is when the magic glove is introduced and only the savings of a $1.50 a pair is viewed as a win. By the sales representative never walking onto the plant floor to evaluate the hazards, you could still be overprotecting the operator causing a higher priced level of hand protection to be used.

These behaviors are seen every day in multiple industries which cause companies to struggle meeting their PPE budgets. Many times procurement members are being measured on an overall immediate cost reduction, while safety members are being measured by an overall annual reduction in injuries. When both sides come together and understand that greater savings can be had by taking a deeper look upfront into all department hazards, both parties will be successful.

By incorporating the Ringers Gloves 7 step approach, you will benefit greatly, which will keep you in *The Sweet Spot!*

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ANSI / ISEA 105-2016 A3 CUT

EN 388 3542

- TPR impact protection on top of hand and fingers
- Quality grain goatskin leather with extreme dexterity
- Cut resistant palm rated for EN388 and ANSI
- Secure cuff closure

PART# 664

R-HIDE CLASSIC

ANSI / ISEA 105-2016 A3 CUT

EN 388 3542

- Quality grain goatskin leather with extreme dexterity
- Cut resistant palm rated for EN388 and ANSI
- Secure cuff closure

Shedding fibers *a cause for concern*

Cut-resistant sleeves evaluated for respiratory hazards

By MAUREEN PARAVENTI, ISHN Web Editor

Can hand protection cause a respiratory hazard? That's the question scientists from the National Institute of Occupational Safety and Health (NIOSH) set out to answer when they conducted a Health Hazard Evaluation at a steel mill in Pennsylvania. The process yielded results that went beyond the efficacy of personal protective equipment to uncover an adverse safety culture that had a chilling effect on employees' willingness to report real or perceived safety problems.

Sleeves were shedding fiberglass fibers

The evaluation was done in response to a request from employee and union representatives at the plant who were concerned about the potential for respiratory illness from fiberglass fibers being shed from cut-resistant sleeves. They also cited skin irritation, safety and hygiene problems from the required use of these sleeves.

The evaluation began with a visit to the steel mill in November, 2011 that included a tour of the plant to see how cut-resistant sleeves are used. While there, researchers collected tape and vacuum samples from work surfaces, cut-resistant sleeves and employee clothing and skin (fiberglass fibers were found on surface, clothing, and skin samples). Bulk samples of new and washed cut-resistant sleeves were also gathered for examination.

Additionally, NIOSH investigators talked to employees about their respiratory and other health concerns related to the sleeves. Workers reported numbness and/or pain in the hands or wrists from wearing the sleeves with thick gloves, probably due to awkward hand and wrist positions and the extra force needed to grip tools. Some had steam burns

Shedding fibers *a cause for concern continued*

and itchy, irritated skin. There were also discussions about heat stress, poor hygiene practices, and safety hazards associated with the sleeves.

Fear of disciplinary action

NIOSH also found that most employees they spoke with were uncomfortable reporting work-related injuries and illnesses or telling their supervisor about their safety and health concerns. They felt that reporting would lead to disciplinary action. (NIOSH's subsequent review of the OSHA injury and illness logs and employee medical records found that the company reported one-tenth the number of entries of the U.S. steel industry average).

Off-site, the NIOSH investigators identified the type, shape, and size of fibers collected from all of the samples and reviewed the OSHA injury and illness logs and employee medical records.

NIOSH's conclusions: The size and shape of the fibers shedding from the sleeves make them difficult to inhale into the lungs. The composition and size of these fibers make them unlikely to cause any long-term health problems. However, the fiberglass fibers could cause temporary upper respiratory irritation.

Based on the evaluation results, NIOSH recommended that the company provide a different type of cut-resistant sleeve from the ones they had been wearing for employees who have skin irritation, hand or wrist pain, and provide new and washed cut-resistant sleeves in more locations that are easy to get to throughout the steel mill, including employee locker rooms. Employees should be trained on how to care for, maintain and dispose of the sleeves. When returned by the laundry service, sleeves should be checked to make sure they are adequately cleaned.

The cutting edge of **hand protection**

Form-fitting gloves and cut-resistant materials

Ansell

If you want to understand the evolution of hand protection in the workplace, look no further than the Electrolux plant in Memphis, Tennessee. Nearly half of the plant's 500 employees are women – well ahead of national numbers showing women making up about 27 percent of the manufacturing workforce. What's different in Memphis? It's a newer facility, and everything from automated operations to a brighter, more worker-friendly environment seems to be making the factory more appealing to women. We're seeing similar trends in factories around the world, even if growth in the U.S. is more measured.[1]

What does this have to do with hand protection? Practically speaking, it's creating a significant new demand for industrial gloves in smaller sizes. That may sound simple, but it's not. Few manufacturers are mass-producing gloves in sizes suitable for women, and the adjustments go beyond size and must account for variances in muscle fatigue and dexterity. Additionally, the changing nature of manufacturing jobs – including an increasing emphasis on final assembly as heavy assembly becomes increasingly automated – shifts the focus for gloves toward dexterity, tactility and comfort. And understand: Every innovation in hand protection is driven by a desire to improve the comfort, performance and protection of today's workers.

Enter ergonomics

Manufacturers are driven to design and engineer gloves that provide the protection necessary for the job, and that are compliant with current regulations. Minimizing hand fatigue and discomfort are important considerations, and new trends

The cutting edge of hand protection continued

around form-fitting gloves in lightweight materials with second skin-like feel are driving innovation in the market. Studies consistently show comfort is the No. 1 universal user need. This requires R&D teams to think differently about muscle performance, hand fatigue and the materials used in today's gloves.

Some categories of hand protection are obvious – such as cut-prevention or protection from fire or chemicals, for example – but there are other pieces to the hand protection puzzle that aren't as obvious. Nearly two-thirds of reported occupational injuries can be classified as repetitive stress reactions, and these can be debilitating and incredibly costly to both worker and employer. Consider this: Workers who suffer repetitive stress injuries, on average, require 23 days to fully recover—14 more than the average for all other injuries. And these injuries cost employers some $80 billion per year.[2]

Repetitive stress injuries are tied to certain tasks and the impact of those tasks on the muscles and surrounding joints. These injuries and conditions, such as carpal tunnel syndrome (the most common repetitive stress injury, affecting more than eight million people in the U.S. alone),[3] are real and can be chronic. Gloves play a factor. The question becomes: Are they helping to prevent these issues, or are they contributing to them?

Having the right glove for the job is critical. For workers handling oily parts, this means improving grip so less muscle effort is required to hold or use a tool or machine part. Alternatively, the wrong glove can exacerbate a problem by inhibiting motion. A certain design or material (such as leather, which is bulky) may make the movement required to complete a task more difficult. However, the same glove that works against certain movements may be perfectly suited for others. With that in mind, it is essential for R&D teams to understand the various tasks and movements of workers. From there, it's possible to design and engineer gloves that at least minimize any resistance from the glove and, at best, actually support and encourage the movements necessary for the job. That is the science of ergonomics, and it's a new frontier in innovation within glove design.

Cut protection

Improving the comfort and performance of gloves through the use of new materials and innovative, ergonomic design is critical for any number of reasons – not the least of which is simply improving the rate of compliance for workers needing hand protection. The evolution in comfort, however, cannot come with any sort of compromise in protection. Hand injuries in the workplace account for 13 percent of all industrial injuries, and cuts can be especially costly with an average price tag of almost $22,000 per incident.[4]

Employers are aware of the risks and increasingly are requiring their workers to wear gloves with cut protection. Unfortunately, many businesses are overprotective, insisting upon gloves with ANSI cut levels beyond the needs of the job. This can be counterproductive, because those gloves may be heavier, less comfortable and may not perform as well

The cutting edge of hand protection continued

as gloves better matched to the job. Asking workers to wear gloves ill-suited for the job can push them to remove the gloves altogether, putting their hands at greater risk and the plant in non-compliance.

It doesn't have to be this way. New in-house yarns specifically provide cut protection while reducing the cost of materials. Historically, many of the most effective cut protection gloves have carried premium price tags, mostly due to the cost of materials. With cost no longer a deterrent, these proprietary yarns and other advanced materials and designs make it possible to deliver lightweight, breathable gloves with multiple levels of ANSI cut level protection. These gloves also provide additional advanced features, such as silicon-free coating, dirt-masking colors, and improved grip and abrasion resistance.

Ultimately, the benefit of all this innovation is simple: There are more choices available to today's workers than ever before. The tasks men – and women – around the world are performing and the risks associated with them differ across industries. Today's fabrics are better, lighter and more breathable, allowing improved dexterity and tactility. New coating formulations last longer and improve grip and abrasion resistance. Today's multipurpose gloves are lighter, and deliver a more comfortable all-day experience, while disposable, single-use gloves are getting lighter and thinner while maintaining their protective qualities.

Bottom line: It is critical for safety managers to maintain their focus on compliance while providing their workers with the most optimal hand protection experience.

Written by Steve Genzer. Mr. Genzer is President and General Manager for the Industrial Solutions Business at Ansell, with responsibility for the worldwide business for Ansell Global Core Industrial Brands (HyFlex®, AlphaTec®, ActivArmr®) and the mechanical protection and chemical product portfolios at Ansell.

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Making the **cut**

What you should know about new ANSI/ISEA glove standards

By MARK NICHOLLS

A lot can change in five years. Consider this: in 2011, NASA's Juno Spacecraft was just starting its trip to Jupiter, only six U.S. states allowed same-sex marriage and LeBron James was storming the playoff court in a Miami Heat jersey.

Time marches on, and with it progress. That's why ANSI has decided to update its national hand protection standards. ANSI/ISEA 105-2016 is the latest revision of a voluntary industry consensus standard first published in 1999, then revised in 2005 and 2011. Such standards and classifications are critical for the industry, as they help safety managers, employers and product users appropriately select gloves for whatever workplace exposures exist in their specific line of work.

Why update the standards?

As industries and workplaces change and evolve, so does personal protective equipment. From new yarns to thinner materials to moisture management technologies, safety managers have more product selection now than ever before. While product evolution is necessary and beneficial for workers, it makes the job of the safety manager exponentially more difficult, as managers today are faced with an array of quality gloves to potentially select.

That's where standards help. The 105 standard addresses the classification and testing of hand protection for specific performance properties related to chemical and industrial applications. In layman's terms, the standards provide

Making the **cut** *continued*

manufacturers with a mechanism to classify their products for specified areas of performance – and safety managers with clear guidelines on how to choose products that will best protect workers.

So how can safety managers easily decipher the new standards? Let's look at the classification changes individually and examine what's changing, what's not and what that means for glove manufacturers and their customers.

Cut performance

The most significant change in the ANSI/ISEA 105-2016 update centers on the cut performance portion of the standard. The 2011 version allowed the choice of two different test methods with two different test machines. To reduce the variation in glove classification caused by multiple testing methods, the revised standard establishes a single test method (ASTM F2992-15 for TDM) to provide consistent ratings from the end-user perspective.

Additionally, while the old standards had five cut performance ratings, the new standards have nearly doubled the rating levels, with a new scale of A1-A9. The biggest effect of the new rating system will be more segmentation in the old ANSI cut 4 range. Gloves rated 4 in the old range can be rated A4, A5 or A6 in the new range. The new high-end levels – A7, A8 and A9 – were created to differentiate high-end cut-resistant gloves (as the availability and styles of these gloves continues to increase).

Impact resistance

Another significant change to the standards includes introducing an impact resistance test method. While no standard in North America currently exists to address glove impact, a new regulation is under development to implement a back of the hand impact standard for gloves. The new system will allow different levels to differentiate impact protection – critical for industries such as oil and gas, mining, automotive and construction.

Vibration reduction

Currently, when tested in accordance with ANSI S2.73-2002 (R2007), a glove's vibration reduction is classified as pass/fail. A new ISEA working group is continuing to re-evaluate and refine this standard for more precise measurement.

Puncture protection

Standard changes to the puncture test are most applicable for those in the sanitation, recycling or medical industries. While the standard puncture test remains the same, the revised standard adds a needlestick puncture test.

What about chemical and heat protection?

A few performance properties weren't impacted by the standard changes – most notably chemical protection. Permeation testing will still be done in accordance with ASTM Method F739 standards. However, that doesn't mean safety

Making the **cut** *continued*

managers can't be more proactive in analyzing more data for glove selections – in fact we encourage it to ensure you're selecting the best gloves possible. We recommend going beyond ASTM Method F739 chemical permeation testing by also looking to glove manufacturers to rate glove's chemical degradation.

So now what?

One of the most important things to be aware of in regard to the ANSI/ISEA 105 standard updates is the lack of mandatory implementation. While most safety managers use the standard as a guide to select the right protection equipment for their employees, the use of the selection standards is not mandatory in the U.S. Similarly, glove manufacturers are not required to update products to the new standards within a certain timeframe – meaning that until a timeline is enforced, we can anticipate variance in PPE identification to continue. It's up to responsible manufacturers to adhere to the standards – and for safety managers to demand the best from their suppliers.

Mark Nicholls is Senior Vice President & Chief Commercial Officer-Americas at Ansell. For more information, visit Ansell's Regulatory and Compliance Resource center at www.ansellpro.com/regulatory-compliance.

A cut *above*

Clearing up misconceptions about cut-resistant gloves

By MATT BURTNEY

The U.S. Bureau of Labor Statistics reported that 70 percent of workers who experienced hand injuries in 2015 were not wearing gloves. The remaining 30 percent of injured workers wore gloves but the gloves were inadequate, damaged or the wrong type of the hazards that were present.

When it comes to selecting proper hand protection, cut-resistant gloves seem to be one of the most confusing topics. The goal of this article is to highlight misconceptions that we have about cut resistance and to clear up any uncertainty. So the next time you're selecting cut-resistant gloves, you'll choose the right pair the first time.

Full Kevlar® Lining

Cut-proof vs. cut-resistant

Cut-proof gloves are the unicorns of the safety world — no, not magical and wonderful. I mean entirely mythical. There is no such thing as a cut-proof glove. If there was, we would only manufacture and sell one glove and it would be called the "Perfect Glove 3000" and working for a glove manufacturer would be pretty boring.

What we in the glove industry manufacture is a cut-resistant glove and there are different levels of cut resistance based on the hazards the worker is facing.

Even though cut-proof gloves don't exist, gloves designed to be cut-resistant are sometimes misinterpreted as being cut proof. As workers, this gives us a false sense of security. We become overly confident and can endanger ourselves by performing tasks we would not normally perform.

They're called cut-resistant gloves because realistically, cuts can still occur. But by wearing a cut-resistant glove, a cut that required stitches becomes a cut that needs a band-aid.

So we know cut-proof gloves don't exist, but what about performing a field test to see how cut-resistant a glove really is?

Makeshift cut test methods

These field tests could be taking a pair of scissors, a table saw or a machete — I've heard it all — and being dissatisfied that the glove didn't hold up.

A cut *above* *continued*

But it's not surprising. Cut-resistant gloves are not designed to stop a pair of scissors (or those other test tools). In North America, gloves should be tested and rated based on standards outlined by American National Standards Institute's (ANSI) ASTM F2992 cut test.

The science behind the ANSI's test method is to measure the cut resistance of a material against a razor blade under a specified load on a TDM-100 machine.

The test accounts for measuring errors by using a new blade each time the test is run since a dull blade would need more force to cut through the material.

The problem we find with performing a cut-resistance test in the field is that they are not realistic.

A pair of scissors will most certainly cut through a glove, even the "Perfect Glove 3000" cut-proof gloves. But how often does the cut hazard a worker is facing come from a pair of scissors cutting through their pinky finger?

Carefully consider cut-resistance

The main reason we need cut-resistant gloves is that our skin cuts very easily. Since leather is just the skin of an animal, it cuts just as easily. Some leather gloves are cut-resistant, but that is thanks to a Kevlar® lining.

This misconception is a little different because there are some gloves where only the palm of the glove is cut-resistant.

But as a general rule, cut-resistant gloves give 360 degree protection by using high performance yarns like Kevlar® or HPPE (High Performance Polyethylene). These yarns give five to ten times the cut protection of leather and are considerably stronger than steel on an equal-weight basis. A coating will increase the glove's cut resistance slightly but only in the area where the coating is applied (usually the palm, unless the glove is fully coated). We use engineered composite yarns to increase the cut protection and make sure it is still 360 degree protection.

Engineered composite yarns

Engineered yarns are made using two or more components (ie. Kevlar® and steel). These gloves can offer 20 times the cut resistance of comparable-weight leather gloves. These gloves are needed in a variety of jobs in the pulp and paper, butchery and metal stamping industries. Adding steel to a high performance yarn is like reinforcing concrete with steel rebar.

Be careful with ratings

So cut-proof gloves don't exist but surely the glove that has the highest cut resistance must be the best glove, right?

WRONG!

This probably seems pretty basic but it's worth repeating: The best rated glove is the one that protects against the hazards you are facing. A worker who uses a box cutter once a day won't need the same protection as someone who works in metal stamping eight hours a day.

Using a glove designed for heavy-duty cut protection for a

A cut *above* *continued*

light-duty application has a snowballing effect: if a worker has less dexterity in the glove, they won't be able to do their job properly. If they can't do their job properly, they won't wear the glove. If they don't wear the glove, compliance takes a hit. Then the risk of hand injury skyrockets!

Bottom line

The fact that 70 percent of workers who experience had injuries weren't wearing hand protection is cause for concern. Consult your distributor and glove manufacturer about the proper level of cut resistance that they suggest and make sure that the chosen gloves are comfortable. It's the first step to bringing those numbers down.

Matt Burtney is the content marketer for Superior Glove: the four-time Canada's Best Managed company and a global leader in work glove manufacturing. He can be reached at matt.burtney@superiorglove.com. For more information about Superior Glove's hand protection products, call (888) 428-1210 or visit www.superiorglove.com.

Beyond glove *performance*

Instruction & training should be standard procedure

By GIL LeVERNE, JR

Today's protective gloves are made of materials, and by processes, which create gloves with superb levels of strength, versatility, functionality, comfort and protective resistance to cuts, chemicals and other hazards. But all those qualities can be wasted, or at least compromised, if people don't know how to properly and safely fit, wear and use the gloves for the task at hand.

Fortunately, while no regulations or laws require them to do so, top-tier protective glove manufacturers provide comprehensive instruction and training in those how-to disciplines as a matter of course.

Typical training

Industry leaders have a knowledge-giving regimen that is a multi-faceted approach:

- Distributors are trained at a state-of-the-art training center, where the whole spectrum of appropriate personnel – from areas such as product management, research and development, and sales – are brought in to cover all the technical wear and usage considerations for single-use, specialty and general purpose gloves.
- Company personnel conduct hands-on training at a major end-user site using hazard assessments. After doing a glove evaluation with the safety director of the plant in question, gloves can be replaced – if they are found wanting – by newer- technology products that provide what was missing – e.g., a higher coefficient of friction for a general purpose glove that will give a better grip.
- The manufacturer visits its distributors to conduct events such as lunch-and-learn sessions, where new product

Beyond glove *performance* continued

rollouts are coupled with training and practice exercises for proper use of the gloves.

Unfortunately there are less-conscientious industry operators – what Gil LeVerne, Jr., SHOWA's director of marketing, calls "imposters that simply import product and distribute based on price" – who don't offer this kind of instruction and training. And, while the end-users of the gloves in the U.S. are required OSHA to inform their workers on how to use these gloves safely and effectively, that's not the case for the glove makers and distributors.

The kind of standard training module that end-users, and some manufacturers, would provide cover how to properly don, doff, adjust and wear the gloves, as well as proper care, inspection and disposal of them.

Cut and chemical resistance

Safety Data Sheets may provide some information of this sort for chemical-resistant gloves, but for the most part it's up to the manufacturer to do this – in telling customers the acceptable duration time for using a particular polymer glove in an environment that contains hexane, for example.

Instructions on how to use gloves can include disclaimers on how not to use them, too. One such caveat from a manufacturer will be that no glove is cut proof. That's to guard against a situation where someone tries to demonstrate that a box-cutter can't cut through a glove. For practical purposes, cut-resistant really means that the glove can protect against a glancing blow off of a sharp object, but not against enormous amounts of pressure.

It would seem that putting on a glove, whether it's a fashion or work glove, would be simple enough. Some of it is common sense – knowing that a glove that's too baggy or loose-fitting could make it harder to do a job effectively or get caught on something that could injure the wearer. But where chemical exposure is concerned, it's really important to use simple language to tell someone how to put on and remove the glove. "You have to take special care on how you take that glove off," LeVerne cautions. "Obviously you don't want to take a bare hand and use it to take off a glove that's been submerged into some type of harsh chemical."

Need for standards & awareness

Just as instruction and training in wear and usage aren't covered by regulations, neither are they rated by any type of certification or vetted by any standardized tests. LeVerne sees that as something that's sorely needed "because a lot of companies couldn't meet a rigorous standard.

"If there was some kind of standardization among all glove companies, where we could come together and agree on the type of training needed, and the kind of standard you'd have to meet, I think that would be enormous," he says.

That dovetails into something else that's lacking in the industry as a whole, namely, sufficient attention being paid to training,

Beyond glove *performance* continued

and the corollary investment of resources in training.

Accordingly, an OSHA study has found that 30 percent of manufacturing workers who suffered hand injuries sustained them, in part, because hand protection had been misapplied – a finding that suggests that workers haven't been properly trained in how to wear and use their gloves. And yet, there is evidence that putting the necessary effort into instruction and training could be an important, value-add benefit that would influence end-users and distributors to purchase higher-performance, premium-quality gloves.

Gil LeVerne, Jr. is Director of Marketing for SHOWA, www.showagroup.com. SHOWA is a top-tier glove manufacturer with a multi-faceted Sentinel training program. When SHOWA conducts a successful Sentinel training program, it is 80 percent more likely to close the deal with a new customer, and 60-70 percent more likely to retain the business of an existing customer. Showa also conducts on-site hazard assessments. The plant gets a lengthy document that shows how it can use recommended gloves more safely and efficiently, and a wall-mounted glove board or poster that matches up the gloves with the right departments and applications and shows employees what gloves they should pick out to do their jobs effectively.

Evaluate your *hand protection needs*

Assess hazards, worker likes & dislikes & current usage

By MARY KOSZELAK (LAVIGNE)

Hand lacerations, abrasions, and chemical exposure are some of the most common injuries workers experience on the job. In fact, hand injuries were the fifth most oft-occurring, nonfatal occupational injury in 2015, according to the U.S. Bureau of Labor Statistics (BLS).

OSHA requires safety managers to identify work situations in which employees require hand protection but, just as important, specify the proper protection needed. In an industrial manufacturing setting where the tasks are often widely varied, the considerations involved are many.

According to the BLS, 70 percent of workers who suffered hand injuries were not wearing gloves. The other 30 percent? They were wearing hand protection that was inadequate, damaged or the wrong type of glove for the hazard present. Many veteran workers tend to prefer the gloves they've worn for years — usually leather, well worn, and more often than not outdated. New workers may eschew gloves altogether. OSHA, while requiring employers to provide appropriate hand protection for workers, does not dictate specifics.

Assessing your needs

As is the case with all personal protective equipment (PPE), there is no "one solution fits all" answer for hand protection. Like all PPE, the effectiveness of hand protection requires safety managers to team with employees to increase worker knowledge, acceptance, and usage of hand and arm protection solutions.

Determining the best hand protection for a job begins with dual evaluations: First, of the environment and hazards present (potential dangers can include chemicals, cuts, punctures, abrasions, and temperature) — and second, of the current hand/arm protection (including worker likes, dislikes, and actual usage).

Handling objects with sharp edges requires a cut-resistant glove — its level of performance commensurate with the severity of the hazard. ASTM F1790 and EN388 cut test performance data can provide a useful indication of possible glove performance but is no substitute for actual use.

Thermal issues must address not only the temperature (heat/cold) to which the worker's hands will be exposed, but the duration of exposure, and the weight and size of the object being handled.

Chemical hazards can be classified according to a variety of criteria, including the particular chemical involved, nature of threat (splash, immersion, etc.) and duration of exposure — of which the recommended hand/arm protection solution

Evaluate your *hand protection needs* continued

must address them all. Consult glove manufacturer's chemical permeation data and technical support to determine the specific appropriateness of the selected glove.

The suitability of the solution to the potential risk, however, is not always straightforward and should not be understated. For example, wearing the wrong glove in the instance of accidental flash flame or hydrocarbon flash fire can increase skin damage. Traditional fiber gloves can accelerate the flame and melt to the skin — increasing long-term damaging effects, prolonging recovery and or permanently damaging workers' hands. Instead, these work situations require safety gloves that are specifically recommended for use in industries such as oil and gas, petrochemical, maintenance, and manufacturing.

Additional hand protection needs to consider can include worker requirements regarding grip, dexterity, tactile sensitivity, and wrist protection.

For employees who may be exposed to several types of hazards in the course of their workday, the solution may not be a single best glove, but a combination of gloves, called double-gloving, to addresses the present risks. For example, a cut-esistant glove can be worn beneath a chemical resistant glove if both hazards are encountered.

Importance of comfort and fit

Unfortunately, no objective "fit test" for hand protection exists. Fit and comfort are intimately personal, dependent on a worker's likes and dislikes as well as the design, material, feel, and ergonomics of the offered gloves.

If a worker's protective gloves do not fit properly, then safety, comfort, dexterity and overall productivity can be affected. Workers can be distracted by uncomfortable gloves and may remove them altogether — resulting in zero protection for the employee.

But poorly fitting gloves may also prove dangerous. An ill-fitting glove can cause the loss of grip on a ladder or a tool, or adversely affect dexterity and the handling of parts or equipment. An oversized glove or cuff has a greater chance of getting caught in moving parts on machinery. A too-tight glove or cuff may not only cause discomfort or promote fatigue but restrict a worker's ability to pull their hand out of a glove that has become entrapped in a piece of equipment or an application. These are all serious potential safety hazards.

New options

Advanced materials and new ergonomic designs offer safety managers and workers new options for glove comfort, fit, maneuverability, and protection. Many users are shunning heavy "one size fits all" cut and sewn leather and cotton gloves for modern coated knitted designs. Ergonomically-placed molded polyvinyl chloride (PVC) patches can optimize protection to the metacarpal and finger areas. Spandex fabric stretches easily to reduce hand fatigue. Hook and loop tab closures allow workers to adjust the glove's cuff for a more comfortable and secure fit. Liners can offer relief in cold weather.

Evaluate your *hand protection needs* continued

For safety managers, the solution is offering workers a choice of appropriate hand protection solutions. A comprehensive selection of suitable, properly-fitting, and comfortable quality work gloves should be available to employees so jobs can be performed both safely and effectively. Quality industrial gloves with construction and design elements that provide support beyond protection will help workers get their jobs done by enhancing grip, dexterity, and tactile sensitivity — and most importantly — stay safe.

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When hands go cold *and clumsy*

How to identify a true winter work glove

By ANDY OLSON

Here's how to spot winter hand protection that works – and why it matters. First, let's address the dangers of cold stress:

Frostbite: The freezing of skin tissue can have painful consequences, and the effects can linger for life. It's not just sub-zero air temps and wind chills workers need to protect themselves against. Handling metal tools and machinery leaves hands more susceptible to frostbite.

Increased accidents: Frigid fingers start losing their grip on any number of tasks, from maintaining a grasp on a ladder to holding on to objects that can cause damage to people and property if dropped.

Reduced productivity: Time spent trying to keep hands warm is time spent not being productive. Same goes for time spent recovering dropped objects. Or stopping work to assess the damage done by or to those dropped objects.

Think thermal first

The best winter work gloves are built from the ground up for protection from the elements first, enhanced with specific features that consider the needs of the worker. Two of the biggest faults of gloves simply retrofitted for winter protection are found in the fit and materials. Cramming insulation into an existing design might have a negative effect on how a glove fits. And an improper fit reduces the level of protection.

And materials that might do the job wonderfully in July become part of the problem in January. Traditional spandex, for example, is used in work gloves because of its lightweight, flexible, resilient, and breathable properties. In the winter, that same material also happens to absorb water and let cold air in. Other work glove materials – PVC palm reinforcements for example – stiffen and freeze up when the temps dip, making it hard to maintain dexterity.

Anatomy of a true winter work glove

So what exactly should we be looking for in a "true" winter work glove?

Outer shell: Consider it your first line of defense. Ripstop nylon with a DWR (Durable Water Repellent) finish not only

When hands go cold *and clumsy continued*

fends of the wind and the wet stuff, it will stay pliable in plummeting temps.

Insulation: To maintain warmth and dexterity, look for gloves with dual-zone insulation that use a heavier, higher-loft insulation on the back of the hand, and thinner, lower-weight insulation on the palm.

Waterproofing: In addition to a water repellent finish on the outer shell, serious winter work gloves are built with a waterproof membrane to bolster protection. This additional layer shuts out moisture from the outside while allowing sweat to escape. The most effective design is the one that bonds the membrane to the outer shell. This eliminates the "gap" that is created between standard membrane inserts and a glove's outer shell, which can collect water and cold air.

Fit: Gloves that are too big will hinder dexterity; gloves sized too small will constrict movement and stifle air flow. Especially important for winter work gloves is a cuff and closure to keep in warmth and lock out cold, such as an extended neoprene cuff with hook-and-loop closure or a gauntlet cuff with an internal elastic cord.

Tech-Friendly: Look for thermal gloves that employ a touch screen option to allow for swiping and answering calls on mobile devices without the need to remove the glove.

Andy Olson is product director, Ergodyne,
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Gloves as a **"business enabler"**

Keep employees on the job, productive & motivated

By LUCIE PONTING

Personal protective equipment (PPE) such as work gloves doesn't immediately spring to mind as a "business enabler" – allowing workers to be more motivated and productive. PPE spend is only one element of investment in health and safety – but it's an important one. In the U.S., NIOSH estimates 20 million workers use PPE on a regular basis to protect themselves from workplace chemical, mechanical and physical hazards. At a minimum, PPE such as hand protection should provide fail-safe protection and meet the highest industry standards, where applicable.

If employers want to maximize these business benefits, as well as ensure workers actually wear PPE provided, they need to pay greater attention to factors such as glove ergonomic design, how gloves interact with job requirements, and glove comfort, fitness for use and aesthetic appeal.

Figures from OSHA show that in 2014, workers suffered 95,950 fractures that required days away from work to recuperate, while there were 97,080 cases of bruises and contusions. These are "business disenablers."

Injury statistics

Upper extremities (hands and arms) affected by an injury or illness accounted for 346,170 cases (or 32 cases per 10,000 full-time workers) and hands accounted for two in five of these. In the U.S. oil and gas industry, statistics from the International Association of Drilling Contractors members show that more than 40 percent of all recordable incidents in 2015 affected the hands, wrists, fingers or thumbs, with more than 38 percent leading to lost time.

In making hand protection purchasing decisions, many businesses overlook the true cost of injuries such as these. Direct costs include workers' compensation payments, medical expenses and costs for legal services; indirect costs include training replacement employees, accident investigation, implementation of corrective measures, lost productivity, repairs to damaged equipment, costs associated with lower morale and absenteeism, and perhaps even penalties for legislative breaches.

The National Safety Council estimates the total price tag of occupational deaths and injuries in the U.S. economy in 2013 breaks down to a cost per worker of $1,400 (including the value of goods or services each worker must produce to offset the cost of work injuries – it is not the average cost of a work-related injury) and cost per medically consulted injury of $42,000.

Gloves as a "business enabler" *continued*

Barriers to use

An ongoing problem across all industries is that too many injury victims were not wearing the PPE supplied by their employer. An analysis by the Health and Safety Executive, the British safety regulator, found that hand/arm and foot protection were the most common failure categories followed by eye and face protection.

Workers don't wear PPE that is uncomfortable, made from poor quality materials, prevents them from moving or seeing properly, is ugly or hinders performance requirements. Good product design, the right materials, matching PPE to technical job specifications and informed purchasing decisions will overcome these barriers to usage.

Lucie Ponting is a British journalist specializing in health, safety and environmental issues. This article is adapted from an article in Impact– a thought-leadership magazine published by experts in impact protection, UK-based D3O. www.D3O.com

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