Volume 04 | March 2015 | A Westex by Milliken Publication

FLAME RESISTANT INSIGHTS℠

The source for arc flash and flash fire news

ANATOMY OF A BURN

PLUS:

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Director of Safety, NECA

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Letter from Westex by Milliken

Happy New Year!

We are looking forward to an exciting year. As you know, in 2014 Westex was acquired by Milliken & Company. Everyone was very excited about the acquisition because it brought together Milliken's vast resources and innovative R&D capabilities with Westex's long-standing deep knowledge of the FR marketplace. As Westex by Milliken, we have the ability to innovate faster and deploy even better products with added comfort, durability and protection. In just four short months, Westex by Milliken delivered on this concept by launching four new products at the National Safety Congress in San Diego.

In addition to this exciting change, Westex by Milliken signed an exclusive partnership with Cone Denim in January 2015 to provide innovative flame resistant denim apparel fabrics. As a global leader, Cone Denim has over 100 years of experience in denim manufacturing along with a strong reputation of quality and innovation. Our partnership with Cone will allow us to create a superior line of Westex Indigo™ brand flame resistant denim fabrics and we look forward to launching new products this year.

This fourth edition of *Flame Resistant Insights* eZine continues our commitment to safety education and training. Westex by Milliken was honored to receive the NECA Industry Partner of the Year award in October 2014 which recognizes a company for their educational efforts in the electrical industry. Educating the FR marketplace is a top priority at Westex by Milliken, and we hope that you find valuable information in our eZine.

Thank you for subscribing to *Flame Resistant Insights* and please feel free to contact any of us here at Westex by Milliken if you have any questions.

Sincerely,

Mike Enright
Vice President, Westex by Milliken

The Challenge of Keeping Pace with Keeping Safe

OSHA and industry changes that will impact your FR clothing program.

By Marcia L. Eblen, PE and Randy Wade Sr., ASP

Today's world is changing so rapidly, in so many different areas. Daily news programs are interrupted by live time breaking news while more news updates scroll by at the bottom of the screen. This is often referred to as "information overload," which makes it difficult for us to focus on the issues that should be the most important to us.

If you are part of the electric or utility industries, two of the breaking news items you want to know about are the OSHA changes for FR clothing and the proposed changes to ASTM F 1506 (Standard Performance Specification for Flame Resistant and Arc Rated Textile Materials for Wearing Apparel for Use by Electrical Workers Exposed to Momentary Electric Arc and Related Thermal Hazards).

The recently released revision of OSHA (CFR 1910.269) has been in the making for nine years, and was effective as of March 2014. Employers need to provide employees with FR garments rated equal to or higher than the potential work zone arc flash incident energy by April 2015. This means employers must make reasonable estimates (calculations) of the arc flash incident energy of their facilities and transmission and distribution systems in order to determine the required garment protection level. This analysis is likely to lead to at least some changes in FR clothing programs.

ASTM 1506 has also been in a revision cycle for quite some time, but a new task group has shown progress by making changes that are intended to create a more transparent process for identifying fabrics and verifying specifications. This is vitally important because often the fabric brand helps determine the vast majority of the protection in an arc rated garment, along with most other important

properties such as FR durability, comfort, shrinkage, etc. Most knowledgeable safety directors therefore specify FR fabric by brand name and weight because they've come to trust specific names.

Many proactive companies have long required employees to wear FR garments. Under the new rules the garments must provide the appropriate thermal protection for the arc hazard energy an employee may be exposed to, and company procedures and hazard analysis must be adequate to cover all equipment calculated energy hazards. While previous OSHA direction had simply been "clothing cannot ignite and cause additional harm," the new revision now considers FR clothing Personal Protective Equipment. It must have the appropriate thermal protection and must also be provided by the employer at no cost to the employee.

Appropriate thermal protection means the FR clothing must have an arc rating that meets or exceeds the incident energy of an arc to which someone could be exposed in any given task. This is an important upgrade, because FR clothing has two primary jobs: to not ignite and continue to burn (which the old standard covered), and to insulate the wearer so that no second or third degree burn occurs through the clothing. FR clothing must be clean, free of flammable contaminants, and in good repair — a responsibility that now falls squarely on the shoulders of the employer.

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Arc Hazard Analysis

Arc Flash Incident Energy Analysis is the first step before embarking on major clothing purchases or signing a long-term rental service contract. While the arc flash incident energy calculation methods are more mature then they were 15 years ago, there is still considerable arc flash behavior knowledge required to make the required “reasonable estimates” mandated by OSHA. Now, OSHA has provided specific guidelines for making “reasonable assumptions” during the calculation process, and companies need to make sure their estimates meet these guidelines and stay current with ongoing research that updates estimation methods.

Once the incident energies have been determined, the appropriate minimum protection levels for FR daily wear can be selected and procedures for additional protection must be implemented for the equipment and situations that exceed that level.

Understanding Your Fabrics

The core of FR clothing protection is fabric. Not all fabrics are created equal — each category has its own pros and cons. Understanding the qualities of the fabrics (and the fabric manufacturers) is key to maintaining an effective clothing program with a consistent product.

Fabric types are often categorized by suppliers as treated or inherent, even though these terms are outdated. These terms refer to how the flame resistant properties are engineered into the product, but what is most important to people who specify, purchase and wear these garments is the durability of those FR properties — not how they are achieved. The simple fact is that all commonly available FR arc-rated fabrics are engineered by people, using chemistry. If that FR durability is guaranteed and market-proven for the life of the garment (and not to a de minimis standard or set number of launderings), how fire resistance is accomplished ceases to be relevant.

Treated products

Treated products begin with a flammable fiber or fabric and use flame retardants to impart the FR qualities to the fabric. This engineering can be done at either the fiber level or at the fabric level. More often than not, they are comfortable and absorbent to the wearer, and the top quality brands can look and feel just like non-FR clothing. The top brands in this category offer a true guarantee of FR durability, backed up by decades of market-proven performance.

Inherent fibers

Inherent fibers are manmade from chemicals that will not support combustion in normal atmospheric conditions. Because they are often uncomfortable and/or expensive, inherent fibers are blended with other fibers, including flammable fibers such as cotton, nylon and polyester. This makes them more comfortable and breathable in a way that does not diminish the flame resistance. The quality process controls during the fiber production and weaving or spinning into fabric are the keys to flame resistance and arc rating, just as they are with treated fabrics.

Thermal insulation, another critical fabric characteristic, is measured by arc rating. Some types of fabric do a good job of resisting combustion, but not of insulating the wearer from the thermal hazard. These products are often very lightweight and either do not meet the arc rating needs, or should be layered to provide your arc energy exposure needs.

Arc ratings are achieved in one of two ways, Arc Thermal Performance Value (ATPV) or Energy to breakopen threshold (Ebt). ATPV-rated fabrics block heat transfer to the body that would cause second-degree burns; the rating is the amount of arc flash energy, in calories, above which a second-degree burn is likely. ATPV fabrics remain intact above their rating. Ebt-rated fabrics also block second-degree heat transfer up to their rating. However, at or just above their rating the fabric breaks open, potentially exposing skin and flammable under layers to the arc.

There's no such thing as a perfect FR fabric — each fabric type has pros and cons, and there are often huge differences among fabric brands even within a category (such as FR cotton, "88/12" or triblends). Users should do their homework and be aware of all of the issues with each one, such as off-gassing, buildup of static electricity and excessive shrinkage, before they make their final choice of fabrics for inclusion in their program. Those preferred fabrics should then be specified in writing, with no substitution, and monitored to ensure that what's specified is what's delivered.

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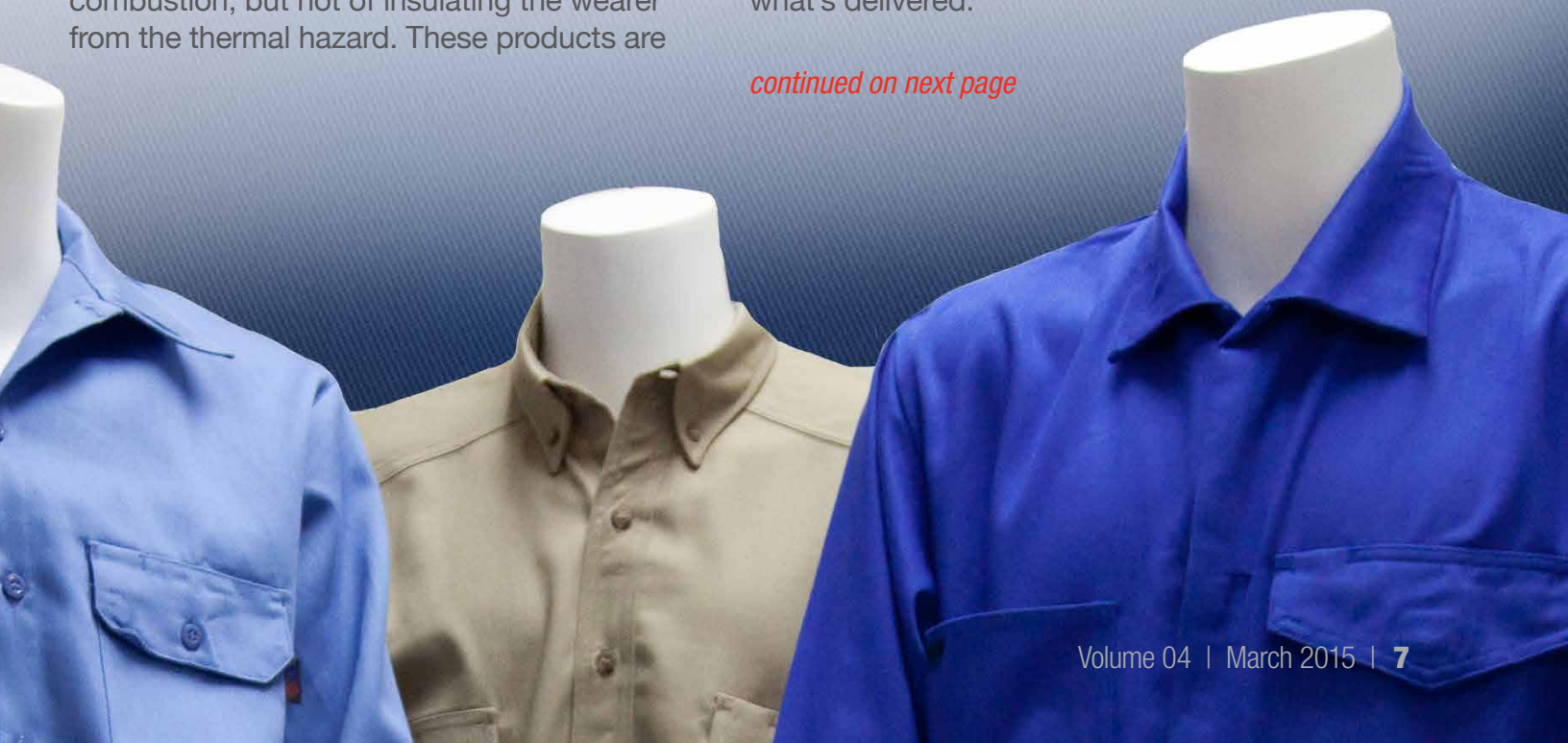

Buyer Beware

No matter how a fabric is described, a key element of a desirable product is one that is guaranteed FR for the life of the garment. Specifiers should ask who is offering the guarantee, will it be provided in writing, is it linked to a standard with a set number of launderings under perfect conditions or is it truly life of the garment and has it been proven over time in the real world. The market is becoming saturated with many "new and improved" fabrics but it is important that you verify a fabric's FR durability and consistency of production. Can the fabric be guaranteed to be replicated garment after garment from one year to the next, and how do you know? There are good reasons that less than 20 percent of the FR fabric brands share over 80 percent of the U.S. market — they work consistently, while others fall short (shrinkage, comfort, FR durability, appearance issues, etc).

The increased need for FR clothing creates a challenge for both the end user and the suppliers — in particular, a barrage of information from suppliers. It is easy to understand that suppliers will suggest that their products are the best solution for a program. But because there are distinct differences among FR fabrics, even within a given category, all of the garment components from the fabric production to the construction techniques must be understood.

Some garment suppliers keep their fabric suppliers confidential. However, the fabric and fiber production is what imparts the FR and other vital qualities, so it is wise to demand and scrutinize the information.

As with any Personal Protective Equipment, these key production qualities need a proven, auditable quality control system. Companies should use due diligence to make sure the garment supply chain has sufficient controls in place to ensure the performance of the finished product. Contracts should be founded on acceptable fabrics first and then specific garment styles and construction techniques.

Analyze Proposed Substitutions

As your program progresses, there may be fabric substitutions proposed which are presented as equal to the fabrics you have specified in your contract. If the evidence supporting the new products is simply compliance with ASTM and NFPA Standards, you need to do more investigation to verify the product's equality. The standards normally represent minimum performance levels when new and tell us little or nothing about other vital properties or performance over time. You may see two different seven-ounce fabrics labeled ASTM 1506 compliant. But not every seven-ounce fabric has the same Arc Thermal Protection Value. And even if they do, they are only tested for three launderings. The weave and fiber content may be different and not appropriate for your specific environmental hazards. It is well known that some fabrics perform far better in molten metal exposures then others; this should matter to anyone who has ever seen HD slow motion video of arcs, because it is quite clear they produce large volumes of molten metal.

The test data and research sources for these fabrics, both old and new, can be found fairly easily. There are dozens of websites with information about new or established products, but be very careful to separate the marketing

spin from the facts. Additionally, if your program requires additional layers to achieve the required level of protection, i.e., adding a coverall on top of a shirt and pant, control of the fabrics in the layers is essential. It is well known that the arc rating of two different fabrics layered on top of each other can only be determined by specific test (ASTM F1959). Any substitution of key layers would require new testing of the layered fabrics.

Improving Standards

ASTM F18.65 is the subcommittee that is responsible for test standards for FR arc-rated clothing. Under their jurisdiction is ASTM F 1506 (Standard Performance Specification for Flame Resistant and Arc Rated Textile Materials for Wearing Apparel for Use by Electrical Workers Exposed to Momentary Electric Arc and Related Thermal Hazards). This standard covers most of the clothing worn by electric workers. The current standard contains key information that must be on the label of all garments. Proposed changes being considered to labeling requirements may add more transparency for the end user about the fabrics used in any particular garment. This is because some garment manufacturers are guarded about disclosing the source of the fabric, while others have always included the brand and style of the fabric — including the fabric's name. The suggested revision also allows manufactures to use a "unique fabric identifier," which will help the end user to verify the garment is being made with the fabric your contract specifies. This fabric identification requirement would add a direct link between the label and the fabric test report — which is the core of the safety requirement for the fabrics and ultimately the garments.

Use and Care

While manufacturing materials and controls are extremely important for the arc flash performance of the garment when new, how it is laundered and maintained is equally important. Garments must be kept clean and intact, with no tears, rips or evidence or evidence of wearing out (threadbare). Sleeves should not be rolled up and buttons (or closures) should be secure. After all, the fabric can only protect what the fabric is covering. Always follow manufacturer's instructions when laundering. Make sure to include proper laundering instructions in employee training. If you are in a uniform laundering program, investigate their laundering to make sure it is compliant with the manufacturer's requirements.

Now is not the time to think about your FR

As the old safety adage goes, "Personal Protective Equipment is your last line of defense." You need to be sure that your last line of FR clothing defense is a quality product that has been proven. Quality products are readily available, but recently there have been too many poor, questionable or inconsistent fabrics on the market. So, it requires more research and scrutiny to find the quality products. You won't be fooled by an imitation product if you know how to select and specify top quality products and identify the product you specify by clear labeling.

Hopefully you will never need to test the effectiveness of your FR clothing. But if your program employs the use of a proven product that your research has verified, you can have confidence that it will be there to perform as it was designed. And history has recorded many occasions when FR clothing was all that stood between the worker and death — or a long stay in the burn ward. Demand to know what you are wearing and commit to taking care of it and using it. Do it for yourself, and for your family.

FR Clothing FAQs

Multiple layers, cleaning and NFPA 70E

Has anything been published on the arc rating of multiple layers of arc rated clothing?

Absolutely. Most major fabric manufacturers have done extensive research on layering; in the significant majority of cases, the arc rating of a two-layer system is greater than the arc ratings of the two fabrics individually. This is the result of the air space between the layers. Arc ratings are based on the fabric brand, type and weight, and it is the fabric manufacturers who do almost all of the arc rating work. So, while this data is generally readily available from a brand, it is much harder to find layering information involving two different brands.

Can FR clothing be dry cleaned? Is it bad for the treatment?

Always refer to the laundering guide for the specific fabric type and brand you own before laundering. However, as a general observation, most of the quality name brand fabrics can be dry cleaned, home washed or industrially laundered. All commonly available flame resistant arc rated fabrics in the U.S. today are engineered by people, using chemistry. We encourage you to specify brands that are guaranteed flame resistant for the life of the garment, and not tied to some minimum standard or set number of launderings. If you stick with one of the top brand, market-proven fabrics, your decisions about dry cleaning or other methods will be based on what can best remove soil and stains, and not what might degrade the FR properties. Liquid chlorine bleach and fabric softener are prohibited for all FR and AR fabrics.

Does NFPA 70E apply if dead front covers are removed for visual inspection on electrical equipment only?

NFPA 70E applies to all industrial electrical work that is not specifically excluded in the scope. It seems the real question is, does this

scenario require arc rated clothing and other Personal Protective Equipment (PPE)? If so, that is a matter of interpretation. The 2015 revision has a new chart which you can use to determine whether an arc flash hazard exists for a particular operation. If the answer is yes (and most work with a cover removed would be yes), arc rated flame resistant clothing is required. HRC 0, which was the hazard risk category that allowed 100% cotton non-FR clothing, has been eliminated. Additionally, the letters HRC have been changed to PPE. The math and logic behind them is the same, but HRC 2 has been replaced by PPE C2 (or Personal Protective Equipment Category 2).

Can OSHA enforce NFPA 70E at an audit? If so, what may be the penalty?

OSHA does not enforce NFPA 70E, or any other consensus standard. OSHA tells us what we should do, but not how to do it — which is where 70E and other standards come into play. In other words, OSHA tells us that we must protect workers from the arc flash hazard, but not how to best accomplish that. NFPA 70E goes into great detail on how to do that, and OSHA can (and does) rely on 70E. There is an OSHA letter of interpretation which says that while OSHA doesn't enforce 70E, if you are compliant with 70E, you are compliant with OSHA.

Penalties depend on the specific citations, the number and egregiousness of them, the company history, etc. If you have an arc flash that injures a worker in flammable clothing, the OSHA fine will be the least of your worries. Burn treatment is extremely expensive and long term, with even average incidents running into millions of dollars for medical treatment alone. The change in mod rate from a single arc flash burn has been enough to push some companies to the edge, or even out of business.

70E: MORE THAN JUST A BUZZWORD

By Wesley Wheeler
Director of Safety,
NECA

When you hear the terms “70E,” “NFPA 70E” or “70E Certified,” what comes to mind? What does it mean when employers say, “In order to work here, you must be 70E trained”?

NFPA 70E: The Standard for Electrical Safety in the Workplace®, is a consensus document that explains how to comply with OSHA regulations. Not every customer, contractor and vendor understands which elements of the standard are relevant to their businesses — yet they leverage “70E” as a promotional selling point. But there are real, substantive benefits to understanding and adhering to NFPA 70E that extend far beyond marketing copy.

Insurance companies are one of the driving forces behind the implementation of NFPA 70E. They know that a well-managed safety program balances preparation, training and accountability. Planning the work is an essential principal found in the 70E standard. Ensuring qualified people are performing the work with proper protective equipment and familiarity with installation conditions are essential to proper planning.

Training is another important factor in determining the qualifications of an individual who may perform work on electrical systems. Knowing the proper techniques to recognize and test circuits safely is critical. Distinguishing between a live circuit and a circuit that has been placed in an “electrically safe working condition” can be the difference between life and death. The training referenced in 70E also considers practical training; that is, actually performing the tasks that are governed by this document. Sitting in a classroom does not make a person qualified. Training and experience are as much a part of being qualified as being able to pass a written test. Being able to physically perform all of the essential functions of tasks associated with energized work is an essential part of this qualification.

Accountability may turn out to be the most overlooked aspect of work being performed under 70E requirements. All too often, mid-level managers and production supervisors insist work be performed energized without considering the ramifications. It’s easy for them to instruct a maintenance or contractor worker to work around energized circuits in order to keep plant production lines running, but they fail to realize the liability they have, morally and legally. They’re also not considering the consequences in the event something goes wrong. Consequences can include extended downtime, personnel injuries and repair costs.

So the next time you hear “we are 70E compliant,” stop and ask yourself, “Is this just someone using the term or do they practice what they say?” NFPA 70E is not a buzz word that alone will keep you safe. Understanding all the requirements found in this document is essential in keeping all personnel safe.

WESTEX® by Milliken

9 Immutable Keys to Safety

By Craig Long
Vice President and Executive Director,
Performance Solutions by Milliken

Not many leaders today are talking about safety as a strategic lever. And the government does not trust organizations to embrace safety, so they legislate things we should do and audit us for compliance.

I propose that safety should be any CEO's first concern. Not only is safety the right thing to do, it makes good business sense.

CONSIDER THIS:

- U.S. employers pay ***over*** $50 billion per year in direct workers' compensation costs.
- ***Each*** prevented lost-time injury or illness ***saves*** $37,500.
- Investors increasingly use workplace safety and health measures to screen underperforming stocks.
- In a recent survey of several hundred top CFOs, 60% reported that each $1 invested in injury prevention returned $2 or more, and over 40% said productivity was the greatest benefit of an effective workplace safety program.

Paul O'Neill knew safety's importance. Shortly after being appointed Alcoa's CEO in 1987, he addressed a group of Wall Street analysts in New York. His very first sentence to the street: "I want to talk to you about worker safety." While the analysts focused on standard questions about inventories and capital ratios, Mr. O'Neill replied, "I'm not certain you heard me. If you want to understand how Alcoa is doing, you need to look at our workplace safety figures."

Within a year, Alcoa's profits hit a record high. Upon Mr. O'Neill's retirement in 2000 to become the treasury secretary, his leadership helped the company's annual net income surge more than five-fold. Market capitalization was at $27 billion, and Alcoa had become one of the world's safest companies.

So what does it mean to shareholders, employees and extended stakeholders to be one of the safest companies?

I've worked for 39 years with Milliken & Company, and not long ago, we faced a burning platform. Low-cost, off-shore competition posed a growing threat. All our domestic competitors decided to either go overseas or go out of business. While Milliken dedicated more to R&D than any company in the textile industry, we had to address fundamental costs and quality structures to survive.

We were working hard on safety, but in a silo. We saw no connection between safety and operations. We were in survival mode.

I led several study missions to Japan to learn about world-class manufacturing, visiting over 40 operations. And in every case, they started with a safety briefing. At one plant, we said, "We are not here to learn about safety, we are here to learn about world-class manufacturing."

The reply changed Milliken forever.

WE MUST START WITH SAFETY

The Japanese manager said, "We have to start with safety. It's how we earn the trust of our people. It allows us to ask them to participate in other improvement activities."

In recent years, Milliken has more than doubled the S&P 500's rate of earnings growth, despite lagging behind the index in topline growth. We have proven ideas for achieving this operational excellence that are relevant for any company. But the success stems largely from the strong foundation in safety that has driven Milliken the last two decades.

HERE ARE SOME EXAMPLES:

- Milliken has run at world-class safety rates for over 25 years.
- In 2010, Milliken became the first company to be recognized twice as one of the safest companies in the U.S.
- Milliken runs its operations with zero safety managers on site. Safety is an associate-driven process.
- All eligible Milliken sites are VPP Star-certified, including its corporate headquarters.

WE ANALYZED NUMBERS TO VALIDATE PAUL O'NEILL'S CLAIM, AND HERE'S WHAT WE FOUND:

- If the typical Fortune 500 company improved its safety rate from the national average to the world-class level Milliken obtained, it could avoid workers' compensation costs of over $50 million per year per company.
- To generate this type of return at current profit levels, the average Fortune 500 Company would require additional sales of over $800 million per year.

What we learned in Japan really connected the dots. Milliken reached the conclusion that world-class safety was not obtainable unless everyone in the organization was engaged. Easy to say, but hard to do. This level of change required significant training and restructuring of roles and responsibilities.

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9 Immutable Keys to Safety

This is a proven methodology necessary for any organization to achieve world-class safety performance.

1 FOLLOW THE LEADER

We believe that the tone is set from the top. Every organization has a “chief safety officer.” At Alcoa, Paul O’Neill took on that role, as did our former CEO, Roger Milliken. This moves safety from just another program to an uncompromised value within the organization. While this is a critical component to safety excellence, we often don’t see this level of commitment in the c-suite in other organizations. The “buck” has to stop somewhere, and with safety, the higher it stops, the better.

2 MEASURE, REVIEW, REPEAT

We believe the right metrics have to exist at each level in the organization. Most organizations tend to look only at output metrics, but input metrics are more important the deeper you go in the organization. They must be understood and actionable to create the desired behavior. Reviewing these metrics is just as important.

3 WHO’S IN CHARGE HERE?

We believe the roles and responsibilities of everyone in the organization must change, creating the proper structure to support the process. Leadership must take an active role in establishing safety as a value. Management is still accountable but now provides resources and acts as a coach. Hourly associates are now leaders. A central steering committee with supporting sub-committees based on risks are populated with everyone at the location. This is about management moving from the front of the room to the back of the room — not leaving the room.

4 HEAR YE, HEAR YE

We believe safety reporting is critical from two perspectives: 1) how safety is reported from the top of the organization and, 2) how safety is reported up the organization. Today, safety is first on the agenda of every Milliken gathering — even board meetings. It's symbolic, but it also sets the tone that safety is a non-compromised value for the organization. As for reporting up the organization, every associate must feel that reporting injuries is non-negotiable. For many organizations, the pressure to be "good" can drive zero reporting of injuries. "No news" isn't always good news.

5 A LA CARTE

We believe what to standardize and what to customize is a fine cultural line. If everything is prescribed to a corporate standard, it is more challenging for people to buy in. If the committees and sub-committees have the authority to customize safety processes to fit their environment, the ownership changes. While total authority cannot be abdicated by leadership, it is necessary to allow room for new ideas for a robust safety process.

6 PAY NOW, SAFE LATER

Most leaders will invest in preventive measures for machinery, security and much more. We estimate most companies spend only 17.5% of their total safety budget on preventative safety. At Milliken, the preventive safety spend is 80% of the total, but we spend less per incident overall. How? By investing in prevention. Bottom line, the Milliken spend in total is half of the industry average, and the incident rate is one-seventh.

7 ABCs AND 123s

We believe one of the major preventive spends is education. Most organizations tend to put their education dollars on "hard skills": technical skills around code and compliance. At Milliken, we invest in our associates' "soft skills," including "how to run a meeting," "how to resolve conflict," and "giving and receiving feedback." This was not management's idea. Our associates asked for this type of training.

8 YOU'VE GOT A FRIEND

We believe in handling case management as part of the safety process. How well do organizations handle situations where someone is hurt and out of work? The industry average is 13 months. At Milliken, it's six weeks. The more the company can interact to understand the nature of the associate's injury, the more support it can give in terms of recovery to assist the associate in returning to the job. The organization must earn the trust of associates and communicate genuine concern in their well-being for case management to be effective.

9 FUN AND GAMES

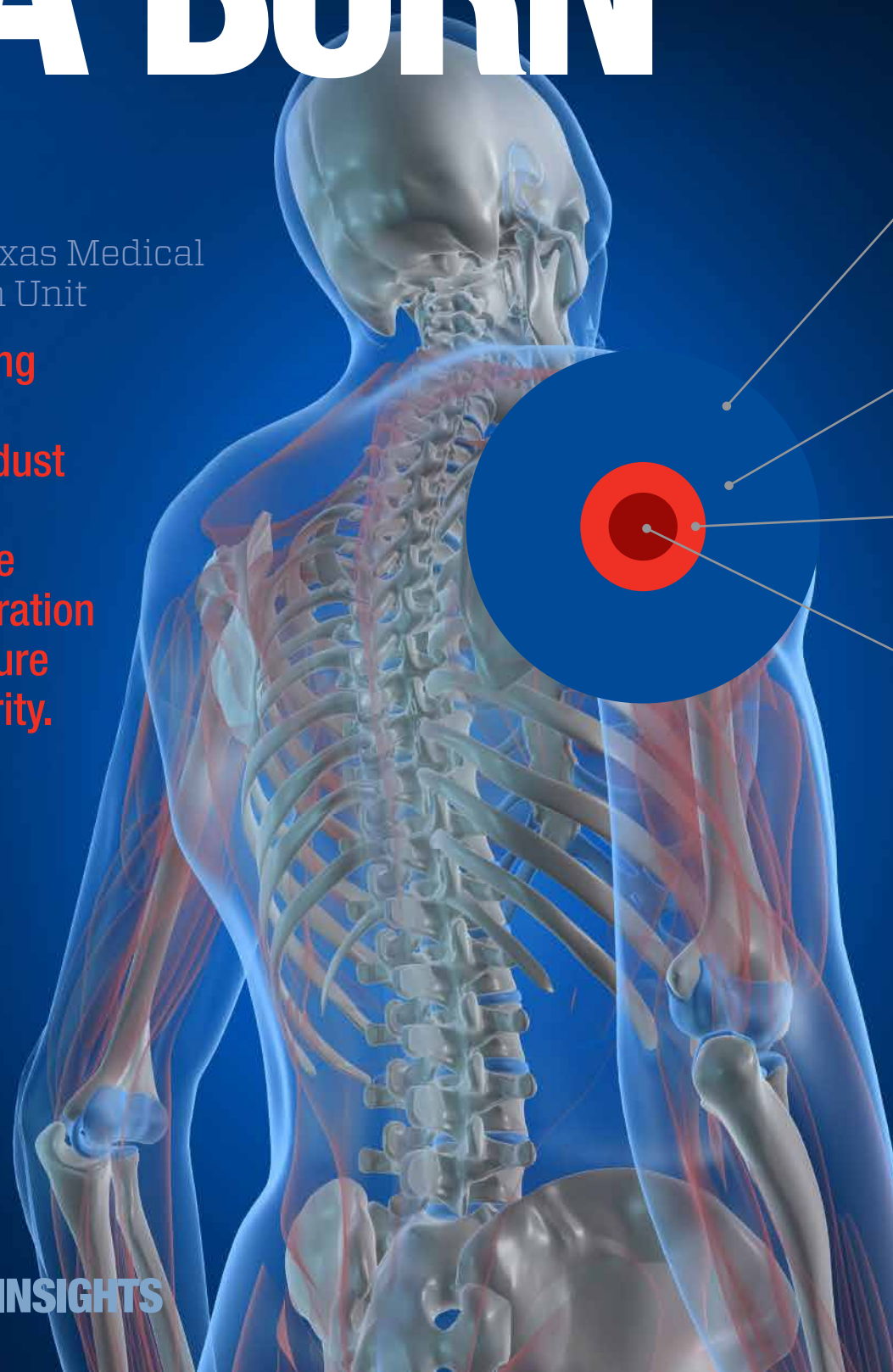
We believe safety awareness activities make safety visual and fun! The best activities are ideas of the hourly associates. We have Personal Protective Equipment fashion shows, safety recognition events and seat belt audits in the parking lot where every driver is given a "Lifesaver" candy if they're buckled up. One technician created a cantilever designed to crush a raw carrot to simulate a human finger in a piece of machinery. It was so impactful, the machine is rotated to each plant. We have identified over 200 awareness activities that have been created and practiced by our hourly associates, and we're not done.

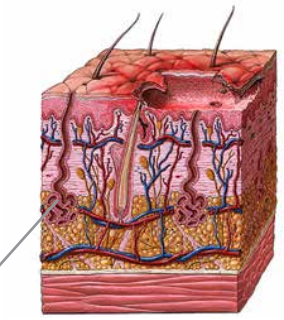
In short, we believe Paul O'Neill and Roger Milliken had it right — if you want to know how an organization is doing, start by looking at its safety process. Zero incidents is the only acceptable goal. The only successful approach is to set safety as an uncompromised value, engage the entire workforce and change roles and responsibilities. Only then can you create the desired outcome of a world-class safety organization. Once the safety foundation is set, you can start building your organization's operational improvements.

ANATOMY OF A BURN

By Jamie Heffernan
RN, BSN, CCRN,
The University of Texas Medical Branch Blocker Burn Unit

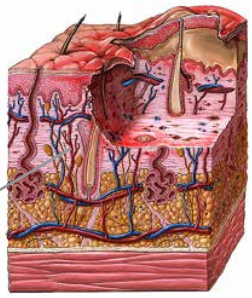
Burn injuries resulting from arc flash, flash fire or combustible dust incidents can be life threatening; both the temperature and duration of the hazard exposure impact wound severity.





FIRST-DEGREE BURNS

DEPTH:	Includes only outermost layer of skin, the epidermis
HOW IT LOOKS:	No blisters, very pink or red
HOW IT FEELS:	Very painful, tender and sore
TIME IT TAKES TO HEAL:	2–5 days with skin peeling
SCARRING:	No major scarring, may have discoloration

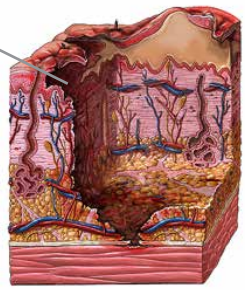


SECOND-DEGREE BURNS

DEPTH:	Includes entire epidermis, upper layers of the dermis
HOW IT LOOKS:	Pink or red in color; moist, oozing blisters
HOW IT FEELS:	Painful
TIME IT TAKES TO HEAL:	Less severe second-degree wound, 5–21 days; severe wound, 21–35 days
SCARRING:	Minimal scarring, may have discoloration

THIRD-DEGREE BURNS

DEPTH:	Includes entire epidermis, dermis and extends into subcutaneous tissues
HOW IT LOOKS:	Charred, leathery appearance
HOW IT FEELS:	Very little pain or no pain
TIME IT TAKES TO HEAL:	Small wounds, several months; large wounds may require skin grafting
SCARRING:	Scarring present



FOURTH-DEGREE BURNS

DEPTH:	Includes all skin layers and subcutaneous tissues, extends into muscle and bone
HOW IT LOOKS:	Black, charred, dry, crisp
HOW IT FEELS:	Painless (nerve endings are destroyed)
TIME IT TAKES TO HEAL:	Function in the affected area is lost or severely limited
SCARRING:	Excision or amputation is typically needed

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References

hospitals.unm.edu/burn/classification.shtml
healthresearchfunding.org/difference-between-3rd-and-4th-degree-burns/

Arc flashes and flash fires are frightening events. Survivors often report difficulties with acute stress disorder (ASD) and posttraumatic distress syndrome disorder (PTSD) after burn injuries, especially if a loved one or coworker perished in the event.

Almost a third of such burn victims are affected by PTSD symptoms impacting their ability to return to work. The goal of burn centers is to return the survivor to living and working by supporting all aspects of recovery and rehabilitation. Peer support programs have been shown to aid in survivor coping and are often affiliated with burn centers. The Phoenix Society's Survivors Offering Assistance in Recovery is a robust hospital-based peer support program that is quite helpful as burn survivors return to everyday living. Many U.S. burn centers have incorporated this program into the care plan for the burn survivor.

In 2014, the National Burn Repository (NBR) published nine years of data from all American Burn Association-verified burn centers. Statistics show that flame continues to be the most common mechanism of injury at over forty percent of all cases. Fifteen percent of these cases were reported as work related and nine percent of those described the accident location as industrial.

The best cure for a burn injury is prevention. National Fire Protective Association's standard 2112 and its sister 2113 were enacted to ensure flame resistant clothing was made available to workers and that it would be maintained appropriately. Unfortunately the acceptable burn at 3 seconds is 50% of the body. Quite frankly, in a flash fire that travels in only one direction, a worker with no clothing at all would theoretically sustain a 50% burn.

According to the United States Department of Labor the average age of industrial workers is 42.5 years. A 40- to 49-year-old who sustained second- or third-degree burns to fifty percent of their body has an almost forty percent risk of death. The risk increases with smoke inhalation.

For the survivor in this age group, the average hospital stay is three days per percent of body burned at an average cost of $7,791 per day, which means an average of $1,168,650. This does not include outpatient treatment, rehabilitation or reconstruction, which can be necessary years after the injury. For people over 50, the risk of morbidity (illness) and mortality (death) from their injury increases.

Burn injuries are aesthetically unpleasant, psychologically devastating, extremely expensive and cause physical disabilities restricting movement and function. Extended rehabilitation, psychological support and reconstructive surgeries may continue for many years after the accident, sapping both the survivor and the family's resources. Burn injuries are personal. They are life altering for the survivor and their loved ones. The injury may be recoverable, but the survivor and the family are forever changed. How can burns approaching 50% be considered acceptable protection if it is only as good as no protection? Even if a burn survivor can make their life have quality, enjoy the moment, and live with "a new normal," should they have to when interventions could decrease the risk? It's vitally important to take the time to select FR fabrics and garments that do more than "comply." Please demand to know the body burn data and choose fabrics that protect, not just comply.

ASK WESTEX by Milliken

"On layered clothing systems, can the individual component arc ratings simply be added to obtain the system rating?"

Jason, Bloomington, IN

Answer: Great question, Jason! You actually cannot add the arc ratings of two individual fabrics together to receive the layered rating. In order to obtain a layered system arc rating, the fabrics must be arc tested as such. For more information on layered system arc ratings, check with your garment or fabric supplier. See Westex multi-layered fabric ATPV data.

Scott Francis
Midwest Market Manager, Westex by Milliken

"My company has both arc flash and flash fire hazards. Can I buy one uniform that protects everyone?"

Dan, Vancouver, BC

Answer: While there are fabrics that protect against multiple hazards, it's important to remember that not every fabric does. As you're putting together your FR clothing program, make sure you know the FR fabric brand of your garments. The majority of the Westex brand fabrics offer multi-hazard protection against arc flash, flash fire, welding and other thermal hazards. Learn more about our line.

Greg Kelly
Western Canada Market Manager,
Westex by Milliken

HAVE A QUESTION OF YOUR OWN?

Submit it to FRinsights@milliken.com or contact your area's regional manager.

"Can I wash my FR clothing at home?"

Kevin, Erie, PA

Answer: Most FR garments can be home laundered, but like all flame resistant fabrics on the market today, it is important to note that bleach or fabric softeners cannot be used. For more information, download the complete laundering guide for Westex fabrics.

Bill Rieth
Northeast Market Manager, Westex by Milliken

THE POWER OF 2

One Company. One Priority. You.

Milliken & Westex are now one company with one singular focus: to provide innovative fabrics for the FR industry that deliver on our commitment to worker safety, comfort and long-term durability.

100 PhDs

5,000 GLOBAL PATENTS

50 YEARS OF FR FABRIC EXPERTISE

149 YEARS OF PURPOSEFUL INNOVATION

The two most trusted names in FR fabric are now one

WESTEX® by Milliken®

LEARN MORE ABOUT THE POWER OF 2:

westex.com/powerof2

WESTEX BY MILLIKEN EARNS NECA 2014 INDUSTRY PARTNER AWARD THROUGH SHARED DEDICATION TO SAFETY

The NECA Industry Partner Award recognizes organizations or individuals that, though not members of the National Electrical Contractors Association (NECA), contribute to the electrical contracting industry's success through their decisions, actions or cooperation with NECA. The 2014 award pays homage to NECA Premier Partner, Westex by Milliken, for its long-term and ongoing work with our organization in the pursuit of improved worker safety.

Westex by Milliken opened shop in Chicagoland just after World War I. The company's expertise was established during World War II when the United States military commissioned innovative FR technology from this source.

Another milestone was achieved when Westex by Milliken launched a major research and development program, employing custom engineered equipment with proprietary processing steps, in 1987. It led to the creation of the innovative Indura® line of fabrics — the first cotton fabric engineered to provide guaranteed flame resistance.

Today, Westex by Milliken's primary business centers on production of the industry's premier brands UltraSoft®, UltraSoft AC® and Indura®, which are specified by thousands of end-users with millions of garments in service worldwide for protection from electric arc flash, flash fire and ferrous metal exposures.

Westex by Milliken was one of the first companies to sign on to the NECA Premier Partner program in 2008 and continues to support the association at this high level of sponsorship. It is a leading sponsor of the annual NECA Show and has presented safety forums in connection with NECA's convention. Beginning in 2012, the manufacturer stepped up involvement in NECA's annual safety conference, which is now known as the "NECA Safety Professional's Conference presented by Westex by Milliken."

Westex by Milliken has also been a Platinum Training Partner to the Electrical Training Alliance and a Partner in Safety to the IBEW for the past several years.

"By providing training and protective apparel to the industry, Westex by Milliken is responsible for preventing an untold number of devastating incidents that could have resulted from an unfortunate event in the workplace," said NECA Safety Director Wes Wheeler. "These incidents are seldomly reported or make the news, but the fact the worker is safe is due to the dedication to safety that is demonstrated constantly by Westex by Milliken."

Easier than ever to find garments made with the fabric you want

You know the importance of the right fabric in protecting your people from arc flash and flash fire hazards, so you start by specifying Westex. Now, our new “Where to Buy” page makes it easier than ever.

Discover which suppliers in your region use Westex brand FR fabrics, and see which garments they offer.

Press Release

WESTEX BY MILLIKEN AND CONE DENIM JOIN TO PROVIDE FLAME RESISTANT DENIM FABRICS TO THE WORKWEAR INDUSTRY

SPARTANBURG, S.C. – Westex by Milliken and Cone Denim announced an exclusive partnership to provide innovative flame resistant denim apparel fabrics. Both leaders within their respective industries, Cone Denim and Westex by Milliken will merge fashion with protective, reliable industrial workwear fabrics.

"Cone Denim has a strong reputation of quality and innovation as a long-standing denim brand," notes Mike Enright, Vice President, Westex by Milliken. "Similarly, Milliken and Westex by Milliken have a strong heritage of innovation providing industry-leading, customer-centric solutions. Our partnership with Cone Denim allows us to create a superior line of flame resistant denim fabric."

For workers in outside elements, denim is often the fabric of choice. Consumer insights revealed the unmet need for guaranteed flame resistant denim to provide the same comfort and style of everyday denim clothing, including reduced shrinkage and a very soft hand. Partnering with Cone Denim, the expanded fabric offering from Westex by Milliken will provide end users a selection of stylish denim apparel with a broad array of options for color and performance qualities, without sacrificing safety.

"Cone Denim has over 100 years of experience in denim innovation and manufacturing and we are excited to be partnering with Westex by Milliken with their expertise and long standing excellence in flame resistant fabrics," says Steve Maggard, Vice President Product Development at Cone 3D. "Cone Denim fabrics are known for both style and performance and a move into technical denims is the next logical step in our product evolution."

FLAME RESISTANT INSIGHTS

Westex by Milliken Events

IEEE IAS ESW Electrical Safety Workshop

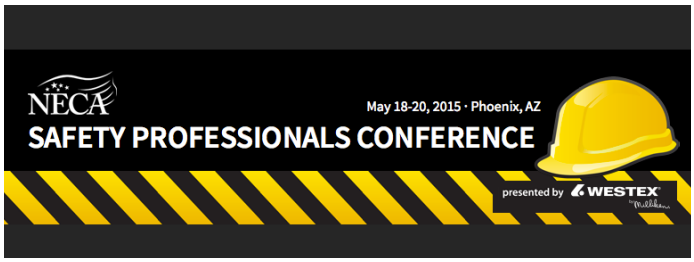
Jan 27–30 in Louisville, KY

Westex by Milliken had another great year exhibiting at the IEEE Electrical Safety Workshop. Thank you to everyone who visited our booth and attended the hospitality event at the Mohammad Ali Center. We look forward to the IEEE ESW 2016.

PSC Banff 2015

May 5–7 in Banff, Alberta

Visit Westex by Milliken at booth # 610 at the Enform Petroleum Safety Conference in Banff, Alberta. Banff is Canada's premier oil and gas safety conference and tradeshow. Don't miss all of our new Westex brand fabrics including the Westex UltraSoft® High-Vis for superior protection and comfort in low visibility environments. Register today.



NECA Safety Professionals Conference presented by Westex by Milliken

May 18–20 in Phoenix, AZ

Westex is proud to be a premier partner of NECA and sponsor the NECA Safety Professional Conference (NSPC) in Phoenix May 18–20th. The NSPC is the electrical industry's premier annual safety event. The NSPC educates on the latest safety and health information required to navigate the rapidly changing environment faced by today's electrical industry. Celebrate electrical safety month by registering today. Learn more.

ASSE

June 7–9 in Dallas, TX

Westex by Milliken is proud to be a Gold Sponsor of the American Society of Safety Engineers (ASSE). Come see us at booth #2235 at the ASSE Safety 2015 in Dallas, TX. Learn more about arc flash, flash fire and combustible dust hazards with our in-booth presentations by Scott Margolin, International Technical Director. Register today.

Volume 05 Preview:

Be on the lookout for more arc flash and flash fire tips, advice and insights in our next issue — coming in May 2015.

Connect With Westex by Milliken:

Have specific arc flash, flash fire or combustible dust concerns? Reach out to your regional manager for advice, or email FRinsights@milliken.com. We may feature your question in an upcoming edition of our *Flame Resistant Insights* eZine!

About Westex by Milliken:

Milliken and Westex, the two most trusted names in FR, are now one. Westex by Milliken continues to offer extremely comfortable, market-proven fabrics that are specified by name by thousands of companies globally. We are dedicated to providing advanced FR fabrics now and in the future. Milliken's extensive history of innovation and Westex's FR expertise strengthen our capabilities to deliver the most innovative FR fabrics for the millions of industrial workers who need protection from arc flash, flash fire and other thermal hazards.

WESTEX®
by Milliken