A TECHNICAL PUBLICATION OF ASSE'S
MANUFACTURING PRACTICE SPECIALTY

Safely MADE

VOLUME 4 • NUMBER 1

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OSHA Training Myths Busted

Powered Industrial Truck Operator Training & Evaluations

BY CURTIS CHAMBERS, CSP

Over the years, I have conducted numerous mock OSHA compliance audits of safety training records and have picked up on some common mistakes that many businesses and organizations repeatedly make. When I discuss these deficiencies with clients, I tend to hear the same misunderstandings or "myths" about OSHA regulations that lead to their mistakes. Because these same myths come up repeatedly, I have decided to write this to help raise awareness of these erroneous beliefs and to clarify what is actually required so others can avoid making the same mistakes (and avoid OSHA citations too).

I tend to hear the same misunderstandings or "myths" about OSHA regulations that lead to their mistakes.

I will focus on three common "myths" related to the OSHA training standards for powered industrial truck (PIT) operators.

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SafelyMADE

MANUFACTURING PRACTICE SPECIALTY

LEADING THE WAY INTO 2013

The Manufacturing Practice Specialty (MPS) has a few irons in the fire if you would like to participate. First, let me introduce the Advisory Committee for 2012-13:

DAVID F. COBLE

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- White Papers – Open
- Special Projects – Tom Culross and Todd Mills
- Twitter – Daniel Hammond

Our Whitepapers Chair position is open, and if you would like to join a committee, let me know. Please also contact me if you would like to become part of MPS's leadership for 2013-14.

Tom Culross, Todd Mills and Carl Huckaby are leading a project to prepare a whitepaper on best practices in manufacturing safety and health management. Those practices can be as broad as management should be active in the safety and health effort and as specific as recommending that an experienced mentor be assigned to each new employee to teach the right way to perform the job. If you have suggestions, let us know. We also are planning a webinar on this subject once our research is well underway and the draft paper is available.

We welcome Westex as our new sponsor. Plan now to attend our annual face-to-face meeting at ASSE's annual Professional Development Conference in Las Vegas at the end of June 2013. We also hold quarterly teleconference calls on the second Monday of the quarter at 1:00 pm (Central). If you would like to join us, please contact me for the call-in number information.

Materials for the next issue of *Safely Made* are due October 29, 2012. If you are interested in publishing an article, an op-ed piece, a question-and-answer item or a safety success story, contact David Evans, our new Publication Coordinator.

The U.S. Bureau of Labor Statistics' revised Census of Fatal Occupational Injuries indicates that 1, 896 workers lost their lives on the job in 2010 in the goods-producing sector in the U.S. This is unacceptable. As SH&E professionals, we do not really know what we have prevented. But, please continue your contribution to make this number zero. ✪

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OSHA Training Myths Busted
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Myth 1: OSHA Requires Employers to Conduct Refresher Training for Their PIT Operators Every 3 Years

False! OSHA standards require initial training (formal classroom training and practical hands-on training) and an evaluation (actual observation of performance) of all PIT operators [see **1910.178(l)(2)(ii)**]. The OSHA standard also requires that additional refresher training and evaluations on pertinent topics be performed in special instances, such as when the operator is involved in an accident or near miss, observed operating unsafely or equipment or workplace conditions change [see **1910.178(l)(4)(ii)**]. However, many employers also believe OSHA standards require them to conduct refresher training for operators every 3 years. And that is where they can get themselves into trouble.

When you look closely at the OSHA standard at issue here [see **1910.178(l)(4)(iii)**], you will see it does not require refresher training every 3 years; it requires that an evaluation of each PIT operator's performance be conducted at least once every 3 years. The evaluation is where the employer actually observes the operator's performance in the workplace to ensure s/he is operating their PIT properly.

Avoid problems with OSHA by setting up a specific program for training and by evaluating your PIT operators.

Now I do not have a problem if you want to provide refresher training every 3 years; knock yourself out. But be aware that if you only have a record of operator training conducted every 3 years to show an OSHA inspector instead of the mandatory operator evaluation that is required every 3 years, you are not in compliance with the OSHA standard referenced here. So always remember to conduct (and document) your PIT operator evaluations every 3 years.

Myth 2: OSHA's PIT Operator Training Requirements Do Not Apply to Floor-Operated Battery-Powered Hand-Lifts

False! The operator training standard applies to all classifications of PITs, which include not just sit-down rider forklifts, but also order-pickers, stand-up lifts, rough-terrain forklifts, tuggers and the electric-powered mobile hand-lifts controlled by an operator who walks along with the lift (also known as a Class III PIT, see **OSHA e-tool** for pictures).

I have audited many sites where the employer had meticulously trained and evaluated their operators of the traditional sit-down forklifts, but they were not aware the same rules also applied to the many employees who were operating hand-operated battery-powered pallet lifts. And I guarantee you that most (I hesitate to say all) OSHA inspectors are aware that the training and evaluation requirements apply to operators of these walk-behind battery powered lifts. So avoid problems with OSHA by setting up a specific program for training and by evaluating your PIT operators who run floor-operated battery-powered hand-lifts.

Myth 3: OSHA Standards Require Powered Industrial Lift Operators to Carry a Driver's License to Prove They are Authorized to Operate Their Lift

False! The OSHA PIT operator training standard requires the employer to "certify" that each operator has been trained and evaluated [see **1910.178(l)(6)**]. The rule states that the certification must include the name of the operator, the date of the training, the date of the evaluation and the identity of the person(s) performing the training and/or evaluation. However, no requirement exists that requires the certification be carried by the operator.

Now I am not discouraging you from issuing a wallet-sized license to your PIT operators; in fact, it can be a useful tool to spot-check for compliance on the floor. Pay close attention to the requirements listed in the standard because you must document all of the required details about the training and evaluation process. This can include in some instances three different names (the PIT operator name, the trainer name and the evaluator name), as well as the date (or dates) the training and the evaluation were both conducted. That is a lot of information to cram onto a little wallet-sized card, especially if the training and the evaluation were performed by two different people on two different dates.

Seldom have I seen wallet-sized cards that had all of the required information, which sets the employer up for an OSHA citation if the wallet cards are the only documentation serving as operator certification. Furthermore, the cards tend to get lost or deteriorated over time, leaving you in a lurch during an OSHA inspection. So always use a full-fledged form to capture all required information for each PIT operator (see **free sample certification form**) and keep it on file in the office or someplace where it will not get lost or damaged, even if you issue forklift drivers licenses for your operators to carry.

In conclusion, that is my input on the most common problems I see arising from misunderstandings related to the OSHA PIT operator training standards. I hope this helps clarify for some of you what is actually required, as opposed to some myth that you heard that could get you into trouble with OSHA. ✪

Curtis Chambers, CSP, *served as a safety officer in OSHA's consultation program and as corporate safety director for a Fortune 500 multinational company. For 12 years, he owned and operated OSHA Pros Inc. then sold that business in 2011. He now runs OSHA Training Services Inc. and is developing* www.oshatraining.com.

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As a Manufacturing Practice Specialty member, please be sure to take full advantage of your membership. The same benefits are also available to the other 28 Industry and interest groups.

Strains, Sprains & Materials Handling Safety Tips

Strains and sprains—although perceived as menial injuries—not only cause painful and sometimes permanent injuries for those involved, but also result in lost workdays. To keep these incidents form happening, OSHA suggests materials handling safety tips for both employers and workers.

For Employers

Improper manual handling of material may cause common injuries, such as strains and sprains, that result in lost workdays. Here are some tips for the reduction of sprains and strains.

1) Preplan the job with the human interface in mind to minimize manual material handling hazards, such as heavy and repetitive lifting, repetitive reaching and carrying of material. The human interface is when a person lifts, lowers, carries, pushes, or pulls, material, tools or equipment. A pallet jack, forklift or other mechanical means should be considered as the first alternative during the preplanning.

2) Develop protocols for handling material on the jobsite. Try to eliminate heavy lifting, bending and reaching.

•Stage materials close to where they will be used.

•Stage materials off the ground preferably at waist height, especially items that are heavy or frequently used, to prevent stress. Determine if the material can be raised from ground level even if it only a small percentage of the time. Simple solutions, such as strapping three to four pallets together or using saw horses with plywood to raise materials off the ground, can have a great effect.

•When possible, use platform ladders or scaffolds where the workers can turn their feet and the body to eliminate twisting and reaching.

•Position scissor lifts at the proper working height when possible. Many workers get in the habit of working overhead more than they have too.

•Have material delivered in small quantities that weighs less and is easier to use.

•Arrange for tools, such as forklifts, pallet jacks or carryalls, to reach material positioned out of the power zone and also to move heavy material.

•Use low-vibration tools. Compare vibration levels from different vendors before purchase.

•Plan to minimize high force, awkward postures and vibration by providing assists, such as hand carts, motorized carts, dollies, powered hand tools, antivibration gloves and floating seats.

3) Conduct regular material handling and lifting inspections. Look for places where the principles discussed here are violated, such as:

•Materials (conduit, connectors, elbows, etc.) placed on the floor or ground.

•Tools or equipment on the ground or floor.

•Work methods that encourage repetition or awkward postures. For example, how many times does a worker unnecessarily pick up material off the ground and then place it back on the ground before making final installation?

•Trailers or conex boxes improperly laid out and labeled, with heavy items or repeatedly used items stored on the top and bottom shelves.

4) Where possible, incorporate variety into the job so workers can perform less stressful tasks, which use different muscle groups following heavy lifting, bending and carrying. It is desirable to alternate between higher periods of stress and less stressful periods to allow the body to recover and thus to reduce cumulative trauma to the body.

5) Encourage workers to warm up by performing the motions they will use on the job for a few minutes before full exertion. Consider bringing in a professional (e.g., ergonomist, exercise therapist or physical therapist) to help start and monitor any warm-up and range of motion program.

6) Provide workers with appropriate PPE, such as vibration damping gloves and gel kneepads.

7) Train workers on the proper techniques for lifting, bending and carrying. For example:

•Do not twist when lifting;

•Keep the load close to the body. If possible, arrange for work to be done in the power zone. (The power zone for lifting is close to the body, between mid-thigh and mid-chest height.)

•Grip the load firmly with your whole hand, not just with your fingers.

•Lift in a smooth motion, do not jerk.

•Use two people to handle loads heavier than about 40 to 50 lbs. If the load looks like more than you can handle, get help either from another person or by using a mechanical lifting/moving aid. If the load can be divided into smaller units that can be safely handled, do so.

For Workers

Strains and sprains are painful injuries that result from improper material handling techniques. These injuries could eventually end your career. Here are some tips to help you avoid unnecessary strains and sprains.

1) Read and understand your company's procedure for handling material. Ask about any policy you do not understand.

2) Speak up about ways work could be modified to make it safer.

3) Plan the job to minimize manual handling.

4) Use mechanical equipment to lift and carry material when possible.

5) Pushing or pulling using a cart or hand truck is preferable to carrying; pushing is preferable to pulling.

6) Participate in your employer's education and training on proper techniques for lifting, bending, and carrying.

7) Minimize repetition, force, exertion, awkward positions and vibration where possible. For example, use assists, such as hand carts, motorized carts, dollies, powered hand tools, antivibration gloves and floating seats.

8) Try to work at waist height as much as possible. Use a ladder or work platform to prevent stretching and bending. Using a platform or platform ladder allows you to turn your feet and body, which changes your reaching position and angle.

9) Use proper techniques for lifting, bending and carrying.

10) Grip the load firmly with your whole hand, not just with your fingers.

11) Participate in warm-up activities before heavy lifting.

12) Wear appropriate PPE when completing the job task. Back belts are not considered to be effective in preventing injuries.

13) Report all injuries immediately, even if they may not at first appear to be serious. ✪

Information obtained from www.osha.gov through the OSHA Alliance Program.

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EXCELLENCE IN HEARING LOSS PREVENTION AWARD

NIOSH in partnership with the National Hearing Conservation Association is encouraging applications for the next round of Safe-in-Sound Awards to be presented in 2014. The Safe-in-Sound Excellence and Innovation in Hearing Loss Prevention Awards honor excellent hearing loss prevention practices in each of three work sector environments: **construction**, **manufacturing** and **services**.

In addition, a fourth award for Innovation in Hearing Loss Prevention recognizes individuals and/or business entities, regardless of sector/NAICS code affiliation. The awards recognize those who demonstrate, by example, the benefits of developing or following good hearing loss prevention practices. Click **here** for details regarding application requirements and information about previous award winners. Submit self-nominations by Sept. 3, 2013. Contact **info@safeinsound.us** for additional information. ✪

The **Construction Practice Specialty (CPS)** focuses on all aspects of construction safety and is intended to provide industry-specific information and focused networking opportunities to ASSE members. Some popular topics include jobsite safety, LEED, crane safety, communicating to a diverse workforce and contractor relations.

Today, CPS is the largest of ASSE's practice specialties. It continues to publish its newsletter, ***Blueprints***, triannually and assists with the publication of ***Construction Safety Management & Engineering***, which is edited by Darryl C. Hill, Ph.D.,CSP, a past CPS Administrator and the 2010-11 Society President. CPS sponsors construction-related concurrent sessions as well as a Construction Safety Forum at ASSE's annual Professional Development Conference. CPS also sponsors the **Utilities Branch**, which is free to all its members.

To join this popular practice specialty, contact customer service at (847) 699-2929 or visit **www.asse.org/JoinGroups**. If you are an existing member of CPS and would like to join the Utilities Branch for free, send an e-mail to **customerservice@asse.org** indicating your interest and member ID.

Follow CPS at **www.asse.org/construction** and on **LinkedIn**. ✪

Fatal Welding Explosion at DuPont Buffalo Facility

In a **draft report** released in April at a news conference in Buffalo, NY, the U.S. Chemical Safety Board (CSB) determined that an explosion that killed one and injured another contract welder on November 9, 2010 was caused by the ignition of flammable vinyl fluoride inside a large process tank, a hazard that DuPont engineers had overlooked.

CSB found that that sparks or heat from the welding, which took place on top of the tank, most likely ignited the vapor. CSB said a primary cause of the blast was the company's failure to require that the interior of storage tanks on which hot work is to be performed be monitored for flammable vapor. A proposed recommendation urges DuPont to require monitoring the inside of storage before performing any hot work, which is defined as welding, cutting, grinding or other spark-producing activities.

"I find it tragic that we continue to see lives lost from hot work accidents, which occur all too frequently despite long-known procedures that can prevent them. Facility managers have an obligation to assure the absence of a flammable atmosphere in areas where hot work is to take place. Explosion hazards can be eliminated by testing inside tanks as well as in the areas around them."

Noting CSB issued a safety bulletin on the dangers of hot work in March 2010, CSB Chair Rafael Moure-Eraso said, "I find it tragic that we continue to see lives lost from hot work accidents, which occur all too frequently despite long-known procedures that can prevent them. Facility managers have an obligation to assure the absence of a flammable atmosphere in areas where hot work is to take place. Explosion hazards can be eliminated by testing inside tanks as well as in the areas around them."

The accident occurred at the DuPont chemical plant in Tonawanda, a suburb of Buffalo, which employs approximately 600 workers. The facility produces polymers and surface materials for countertops, sold under the trade names Tedlar® and Corian®. The process for making Tedlar involves transferring polyvinyl fluoride slurry from a reactor through a flash tank and then into storage tanks. The tanks were also interconnected by an overflow line. CSB found the company erroneously had determined that any vinyl fluoride vapor that might enter the tanks would remain below flammable limits.

Days before the incident, the process had been shut down for tank maintenance due to corrosion on tank agitator supports. The fill lines were locked out for safety. Tanks 2 and 3 were repaired and the process restarted, but work on Tank 1 was delayed because the necessary parts were not available. Finally, a contract welder and foreman were engaged to repair the agitator support atop Tank 1. Although Tank 1 remained locked out from the main process, the overflow line remained open, which connected Tank 1 to Tanks 2 and 3. CSB determined that flammable vinyl fluoride flowed through the overflow line into Tank 1 and accumulated to explosive concentrations. Investigators found that while a facility hot work permit was issued for the task, the DuPont personnel who signed it were not sufficiently knowledgeable about the Tedlar chemical process.

Although DuPont personnel monitored the atmosphere above the tank prior to authorizing hot work, no monitoring was done inside the tank to see if any flammable vapor existed there. CSB's investigation found the hot work ignited the vapor as a result of the increased temperature of the metal tank, sparks falling into the tank or vapor wafting from the tank into the hot work area.

The explosion blew most of the top off the tank, leaving it and the agitator assembly hanging over the edge. The welder died instantly from blunt force trauma, and the foreman received first-degree burns and minor injuries.

CSB Team Lead Johnnie Banks said, "Our investigation found that DuPont's process hazard analysis incorrectly assumed that vinyl fluoride in the Tedlar process could not reach flammable levels in the slurry tanks. And, critically, DuPont personnel did not properly isolate and lock out Tank 1 from Tanks 2 and 3 prior to authorizing the hot work. The flammable vapor was able to pass through the overflow line into the tank on which the welder was working, unknown to him or to the operators who signed off on the hot work permit."

Dupont Facility

CSB also determined that DuPont should have included the three storage tanks as part of the Tedlar process covered by OSHA process safety management rules. Yet on the day of the accident, a compressor failure led to higher concentrations of vinyl fluoride vapor in the polyvinyl fluoride slurry. Furthermore, a U-shaped seal loop on the flash tank overflow line had a "fishmouth" split in the pipe that could emit vinyl fluoride vapor. Engineers concluded further operation with the broken seal loop presented no hazards, but CSB determined the pipe split provided a potential pathway for flammable vinyl fluoride gas to enter the tanks.

CSB will consider and vote on several proposed **recommendations** to DuPont. These include enforcing safety procedures for hot work permits and ensuring explosion hazards associated with hot work activity are recognized and mitigated, revising corporate procedures to require that all process piping and vent piping be positively isolated before authorizing any hot work and requiring air monitoring for flammable vapor inside tanks and other containers where hot work is to be performed. ✪

Investigation Details: E.I. DuPont De Nemours Co. Fatal Hot Work Explosion

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Scholarships & Grants

ASSE's Foundation (ASSEF) has released its **2013 Scholarship Program** information. tember, 2012. In preparation, the Ergonomics Practice Specialty would like to provide members with information on the application process and where to find more information to properly position yourself for a scholarship or grant.

Below are some tips. Click **here** for full details.

•Review the list of "Frequently Asked Questions" before you complete the application.

•When applying for more than one scholarship, only complete one application.

•The same application should be used for both undergraduate and graduate programs. Please complete the information that is relevant to your status.

•Incomplete or late applications will be disqualified.

•Applicants must graduate in May 2013 or later to be eligible for any of the awards.

•Previous recipients of ASSEF scholarship awards are eligible to receive subsequent awards.

•ASSE student membership is preferred and costs $15 per year. To obtain an application for student membership, contact ASSE's Customer Service department at (847) 699-2929 or download the **application**.

•ASSE general or professional membership is preferred if you are a part-time student applying for a scholarship.

Mail your completed applications postmarked by Dec. 1, 2012 to:

ASSE Foundation
Attn: Adele Gabanski
1800 E. Oakton St.
Des Plaines, IL 60018

Transcripts may be mailed separately. It is the student's responsibility to make sure it is received on time.

The ASSEF Scholarship Award and Selection Committee will review all applications. Award recipients' names will be posted on ASSEF's website on or around April 1, 2013. If you have any questions, please send an e-mail to Adele Gabanski at **agabanski@asse.org**. ✪

By Howard W. Spencer, CSP

Protect Operators From High Voltage

For the operator's protection, where parts of more than 50 volts to ground are not guarded or isolated by elevation, insulating mats providing good footing shall be placed so that the operator cannot readily touch live parts unless standing on the mat. These mats may also provide antifatigue for persons who must stand for long periods of time reading gauges, taking readings or operating controls. Insulating matting should not be confused with rubber or carpet runners used to help prevent slips and falls. They should not be relied upon as the sole or primary source of electrical insulation.

Dielectric matting, most commonly called switchboard matting, is placed on the floor to insulate personnel from electrical shock. The New Jersey Public Employees Occupational Safety and Health Act states that "dielectric matting must be used when appropriate to protect all personnel from electrical hazards [29 CFR 1910.335 (a)(2)(ii)]." MSHA also recommends that "insulated mats or platforms, insulated for the phase-to-phase voltage of the system, shall be kept in place at all switchboards and power control switches where shock hazards exist."

Matting used for electrical insulation should meet either of the two common standards.

•ASTM D-178, Class 2, Type II

Type II includes:

A - Ozone Resistance

B - Flame Resistance

C - Oil Resistance

•Military Specification 15562-F Amendment 3, Type II

Mats meeting the standards are made from rubber 1/4" thick and selected according to the voltage.

Table 1 Classes of Mats & Their Maximum Use Voltage

Class	Maximum Use Voltage
0	1,000
1	7,500
2	17,000
3	26,500
4	36,000

The various surface textures available act as a safety tread while reducing the possibility of metal particles becoming embedded. All mat classes are available in various widths and up to 60' continuous lengths. Switchboard matting must be stamped on the reverse every 40" with identification coding, (manufacture's name, type, class and ASTM D-178).

Nonconductive floor mats come in three variants: nonconductive corrugated, nonconductive smooth and nonconductive diamond-plate matting. The choice is based on the application. When personnel are working with exposed energized parts, the dielectric matting must be:

•placed around test benches and equipment, such as switchgear and elevator control rooms, and during maintenance such that personnel are standing only on the matting while working;

•used in addition to all other OSHA-required PPE;

•inspected regularly to ensure that it is not damaged;

•vacuumed or swept frequently to remove debris that may embed in the mat.

Mats should be carefully inspected before work is done, which may require their protection. ✪

Howard W. Spencer, CSP, *works for J.A. Montgomery Risk Control and is a member of ASSE's Penn-Jersey Chapter.*

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Technical Questions

Q: What is the frequency that emergency stop devices should be checked?

A: Most say they check theirs at the beginning of each shift and after any repair on the equipment.

Q: Does ASSE have a standard on emergency stop buttons that clearly say "unguarded"?

A: OSHA gives the color and shape and says it must be "easily accessible." Interpretation letters define that in distance only.

The most applicable standard carried by ASSE is the standard, "Control of Hazardous Energy—Lockout/Tagout and Alternative Methods" **(ANSI/ASSE Z244.1-2003 (R2008)**, but that does not get into the specific design of the button. NFPA 79 provides additional detail on this topic and can be viewed (but not printed, saved or copied) free of charge on **NFPA's website**. Non-ASSE members must register to read the document **here**.

Also note: "IEC 60204-1(3) states that emergency stop devices must be easily accessed and operated and therefore should not be guarded. While this is generally accepted, certain industries/applications do not follow this standard. An example of such an industry is the semiconductor industry in the U.S. The SEMI standards actually allow a guard to prevent accidental operation. It is up to the user to determine if a guard is acceptable, but for most users, it is not." ✪

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By Howard W. Spencer, CSP

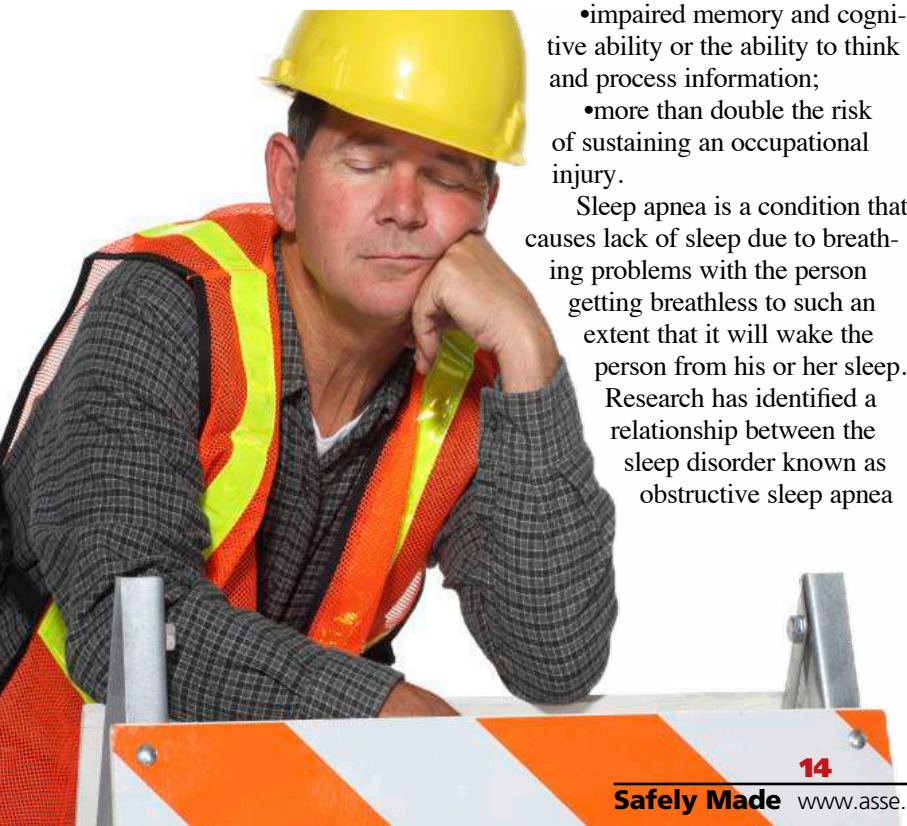
Impact of Sleep on Safety Performance

Sleep deprivation is reported to be the most common clinical problem faced today. Surveys have shown that approximately one third of the world's population has at some time in their lives suffered from lack of sleep. At least 84 disorders of sleeping and waking lead to a lowered quality of life and reduced personal health. They endanger public safety by contributing to traffic and industrial accidents. These disorders can lead to problems falling asleep and staying asleep, difficulties staying awake or staying with a regular sleep/wake cycle, sleepwalking and other problems that interfere with sleep.

Recent scientific research reveals that sleep loss, and even poor-quality sleep, can lead to an increase in errors at the workplace, decreased productivity and accidents that cost both lives and resources.

Some sleep disorders can be life-threatening. A recent U.S. Army study concluded sleep deprivation reduces emotional intelligence and constructive thinking skills. Other short-term consequences include:

- decreased daytime alertness. Loss of just 1.5 hours sleep results in a 32% reduction in daytime alertness;
- impaired memory and cognitive ability or the ability to think and process information;
- more than double the risk of sustaining an occupational injury.



Sleep apnea is a condition that causes lack of sleep due to breathing problems with the person getting breathless to such an extent that it will wake the person from his or her sleep. Research has identified a relationship between the sleep disorder known as obstructive sleep apnea (OSA) and workplace accidents. Men with OSA have a 50% higher chance of being involved in industrial accidents, and the chances of male and female heavy snorers having occupational accidents is significantly higher than average. The American Lung Association reports that 1 out of 25 middle-aged men suffer from OSA. The website Medscape reports that an estimated 80% of Americans with OSA are not diagnosed.

Narcolepsy is another sleep disorder where a person experiences extreme sleepiness and may fall asleep almost instantly, wherever s/he may be. People with narcolepsy may suffer from intermittent episodes of falling asleep. Treatment requires a combination of interventions, such as using medications and behavioral counseling.

Two different factors influence one's need for sleep: a person's basal sleep need (the amount of sleep the body needs on a regular basis for optimal performance) and sleep debt (the accumulated sleep that is lost to poor sleep habits, sickness, awakenings due to environmental factors or other causes). Studies suggest that healthy adults have a basal sleep need of 7 to 8 hours every night.

Recent scientific research reveals that sleep loss, and even poor-quality sleep, can lead to an increase in errors at the workplace, decreased productivity and accidents that cost both lives and resources. Awareness can help improve sleep habits and in turn safety.

As the prevalence of inadequate sleep grows and the demands of the workplace change, it becomes increasingly critical that both management and safety practitioners recognize and take action to mitigate the impact that insufficient sleep has on safety and well-being. Some sleep experts advocate that sleep deprivation be recognized with the same seriousness associated with the impact of alcohol on society. The Australian Transport Safety Bureau reports, "After 17 to 19 hours without sleep, performance on some tests was equivalent or worse than that at 0.05% blood alcohol content."

Howard W. Spencer, CSP, *works for J.A. Montgomery Risk Control and is a member of ASSE's Penn-Jersey Chapter.*

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By David F. Coble, M.S., CSP

The Layered Approach to Hazard Recognition

Even within organizations with the best safety and health management systems, both the line organization and SH&E professionals can overlook hazards. Therefore, effective techniques must be used to recognize potential hazards so that controls can be implemented to prevent unwanted events, such as injury, illness and property damage. Many hazard recognition techniques exist, and almost all organizations need to use a variety of techniques to be more assured that hazards are recognized.

Every organization needs techniques that are effective for different personnel in the organization. There should be techniques for SH&E professionals (such as risk mapping), supervisors and managers (such as walk-through audits) and the individual employee performing the task (such as the final safety checks). Many techniques can be used by all members of an organization (such as job safety analysis and behavioral observations), but others will require a higher level of trained and equipped personnel to use (such as process hazard analysis and testing circuits with electrical test equipment). Your challenge is to identify every task that occurs in your workplace and to ensure that there is a layer of hazard recognition techniques to identify the hazards.

Identify every task that occurs in your workplace and ensure that there is a layer of hazard recognition techniques to identify the hazards.

When Can Hazards Be Recognized?

Three opportunities exist to recognize hazards.

1) Before Exposure: Some hazards can be recognized in the planning, design and preparation phase of a task or project. This is the best time to recognize potential hazards because at this point, no one has been exposed to any hazards. Adequate time should be allowed to review the upcoming job and to determine what hazards may be present. Examples commonly used during this phase would include blueprint reviews, job hazard analysis, turnaround and outage planning, prevention through design and the final safety checks.

2) During Exposure: After the job, task or operation has started, hazards can still be found, preferably before an unwanted event occurs. Examples commonly used during this phase include process hazard analysis after a process is already in operation, walk-through audits and review of job procedures.

3) After Exposure: After exposure has occurred, recognition may be the result of an incident, such as an injury or illness, or could be the result of a critique or review of the task or job just performed. This phase also includes review of work permits, policies and procedures and debriefing of the individuals who took part in the job. Examples commonly used during this phase include root cause analysis, demolition audits and job cessation reviews.

To be effective, multiple techniques may be required to be used simultaneously or back-to-back to find hazards. Many hazard recognition techniques are useful when applied in all three of these opportunities. The key objective for every organization is to implement enough techniques at all phases of the operation to find and control hazards.

The Layered Approach to Hazard Recognition

Hazard recognition is a multilayered approach. Figure 1 indicates the three layers useful to identify hazards before exposure. More layers in the pyramid can be added to find hazards after the task has started, and should an unwanted event occur, another layer can be added.

The first layer of hazard recognition before someone is exposed, at the bottom of the pyramid, is the initial planning for the project, job or task. The normal technique is a meeting of interested parties to discuss the task and what is needed to complete it. This meeting typically occurs in an office, conference room, control room or perhaps a morning meeting at the jobsite. These planning sessions can be as simple as a toolbox meeting or more complex, such as a group of engineers, SH&E professionals, maintenance and operations managers, and other advisors. This layer may also involve sending a planner to the jobsite to assess the procedures, tools, equipment and personnel that will be needed.

For example, ZZZ Construction is planning to replace a 5-ton air conditioning unit on the roof of a building with a larger air conditioner. The customer and contractor meet in the office to discuss how the job will proceed. They examine blueprints to understand roof load capacities, discuss expected weather conditions, evaluate the skill of the personnel needed and plan on the types of cranes, aerial lifts, helicopters, tools and other equipment needed. A planner will most likely be sent to the jobsite to note visually what tools, equipment, personnel and documents will be needed.

During this layer, general hazards, such as roof capacities, land topography, overhead power lines and building height will be noted and evaluated.

Table 1 The Most Common Hazard Recognition Techniques

Action Critiques
Activity Safety Analysis
Behavioral Observations
Blueprint Reviews
Demolition Audits
Documentation Reviews
Employee Suggestion Systems
Final Safety Checks: Last-Minute Safety Check, The 10-Second Drill, Out-of-View Observations, Looking for Differences & Preuse Equipment Inspections
Hazard Operability Studies
Incident Investigation/Analysis
Inspections & Audits
Job Safety Analysis, Job Hazard Analysis, Job Safety & Health Analysis
Job Cessation Reviews
Management of Change
New Equipment Reviews
New Chemical Purchases
New Chemical Equipment Reviews
Operational Readiness Reviews
OSHA-Required PPE Hazard Assessment [1910.132(d)(1)]
OSHA-Required Demolition Plan [1926.850(a)]
Perception Surveys
Permitting (Confined Space Entry, Hot Work, Lift Plans, Hot Taps, Barricading, Scaffold Tagging, Working Alone, Excavations & Working Overhead Are Examples)
Prejob Safety Analysis & Prejob Task Analysis
Risk Mapping
SH&E Project Reviews
Safety by Design
Safety Policy Reviews
Start-of-Shift Hazard Assessment
Training & Education
Turnaround, Overhaul & Outage Planning
What If?
Work Orders

Therefore, the hazard recognition techniques that might be used in this phase include blueprint review, risk mapping, management of change and new equipment reviews. Ideally, SH&E professionals will be included during this phase, but they often are not. It is also common for generic checklists and standard operating procedures to be used during this phase to help identify hazards.

The second layer of hazard recognition includes the formal written techniques commonly used to identify, evaluate and control hazards. The broad plans, equipment, personnel and environment have been considered and evaluated in the first phase. The second layer is the opportunity to prepare formal SH&E plans.

Various options are available. For example, ZZZ Construction can prepare a series of job safety analyses for the various job steps. ZZZ may prepare a lift plan for using the crane or helicopter. With the assistance of SH&E professionals, the company may prepare a complete SH&E review. Permits for overhead work, hot work and barricading may be used. These methods are useful for the planners of the task to review written documents that guide them and to remind them of issues that must be considered.

The third layer of hazard recognition is useful for the field employee who performs the job or task. After the first two layers are concluded, the field employee may find that conditions have changed: the weather has changed, the planners overlooked hazards or did not estimate correctly how the job could be performed, new people have been introduced to the job or hazards were overlooked during the first two phases.

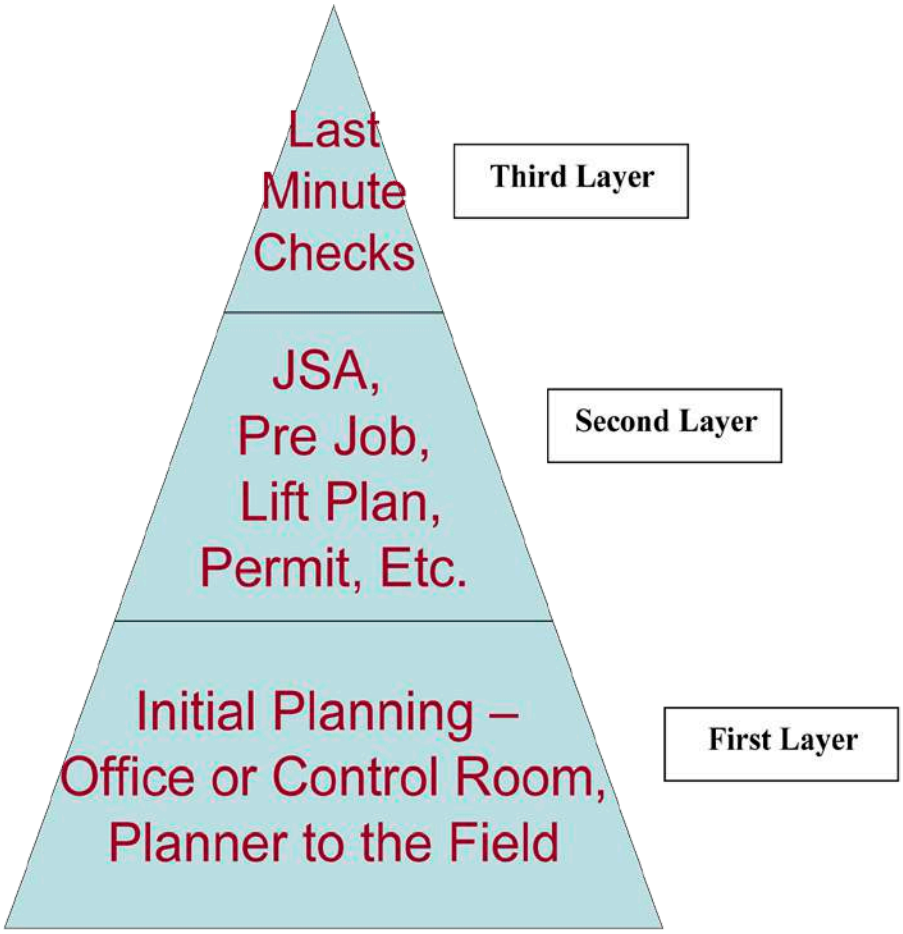
Additional layers of hazard recognition may also be necessary to protect individuals who are exposed to the job during and after completion. These techniques might include safety audits during the job, start-of-shift hazard assessments, behavioral observations and updating permits. Once the job is completed, a job review should be conducted to ensure that hazards were not left behind (for example, impaling hazards, floor holes and electrical hazards). Studs that held the original air conditioner in place or an aesthetics barrier that was removed may leave impaling or tripping hazards for those who will service the air conditioner in the future.

Effective Hazard Recognition Techniques During the Second Layer

During the past 36 years as a safety professional, I have used a variety of techniques in many different locations and many different types of entities, including manufacturing, service organizations, construction sites, migrant labor camps, shipyards, public sector agencies, aviation and maritime. The following lists some of the most common hazard recognition techniques that are useful during the second layer and examples of how the technique can be used. This list is not in any particular order.

1) Preuse Analyses: This technique is also called new equipment reviews and new chemical reviews. Preuse analyses can be applied to new PPE, a new industrial hygiene sampling device, a new tool or piece of equipment. For example, a preuse analysis has helped an organization discover that new plano safety glasses for visitors did not have an ANSI Z87 approval. In another case, a company learned that a new environmental sampling device was not intrinsically safe. In a third example, a manufacturing plant learned during the preuse analysis that the purchasing people had bought rolling ladder stands that did not have adequate guardrails.

Figure 1 The Layered Approach to Hazard Recognition



Before any new equipment, device, protective equipment, etc., is put into use, someone or a qualified team should conduct a preuse analysis.

2) Blueprint Reviews: This technique is intended to be used before construction starts and during construction as well. How many times have you seen retrofits or remodeling needed on structures and buildings because they were designed wrong? Examples include inadequate numbers of exits or the exits are not placed remotely from one another, the location where the maintenance people must be located to work on equipment puts them at the edge of the roof and no guardrails are installed, and the eyewash is installed several hundred feet from where hazardous chemicals are used. With virtual computer design plans, this process has become even more effective. Safety and health staff should review the drawings before construction starts.

3) Work Permitting: Issuing a written permit or approval document to perform all but the most routine tasks will require workers to go through a checklist to ensure that hazards have not been overlooked. Some organizations have multiple work permits for different activities, but it is also effective to have a single work permit that will cover hot work, vessel entry, excavations, overhead work, working alone, lockout/tagout, etc. A technique for finding hazards after the exposure occurs is for permits to be reviewed periodically to look for additional missed hazards, oversights and procedural errors.

4) Equipment Inspections: This technique is effective before equipment is used on a particular work shift. OSHA has nearly 400 inspection requirements for items, such as slings, cranes, respirators, forklifts, machines, grinding stones, etc. Many more equipment inspections that OSHA does not specifically address should also be performed, such as for eyewashes, machine emergency stops, hand tools, etc. To do these inspections, the inspections must be planned and organized, and those who do the inspections must be adequately trained. These inspections and training increase hazard awareness as well as find potential hazards before the equipment is used.

5) Risk Mapping: This technique can be used anytime, but it should be used before a task or operation begins. Risk mapping involves drawing out a map of the entire worksite, including surrounding areas if necessary, the operations that are occurring and the hazards that each generate. Then, synergistic or causal effects of one operation impacting another operation are considered. For example, arc welding in an area where flammable vapors can be carried by prevailing winds into the welding area can produce deadly fires and explosions. The placement of administrative staff adjacent to areas that have vibration and excessive noise is another example. Unless the impact of one operation on an adjacent operation is studied, these hazards can be overlooked.

Perception surveys will tell you what employees really think about safety, work practices, risk acceptance, management leadership and more. You learn about hazards that are occurring through ignorance, shortcuts, miscommunication and nonchalance.

6) Hazard Operability Studies: Sometimes, these studies or reviews are called HAZOPs, what-if reviews, process hazard analyses and other names. OSHA and EPA require these studies for some chemical processes, but every chemical process would benefit from this type of review. The purpose of this review is to prevent or minimize the consequences of catastrophic releases of toxic, reactive, flammable and explosive chemicals by identifying improper procedures, equipment, employee training, management systems and maintenance. For example, during the study, one may find that galvanized piping has been used for a chemical that is highly reactive to galvanized piping.

7) Perception Surveys: Every organization has three safety and health management systems. The first management system is the one you have written in your safety manual. Many of you have detailed policies and procedures for safety and health. The second management system is the one you think you have in the field. You know that not every single item in the safety and health policies manual is being done or followed to the letter, but you have a good idea of how well the activities follow the prescribed systems. The third management system is the one you really have in the field—what is really going on. Perception surveys will tell you what employees really think about safety, work practices, risk acceptance, management leadership and more. You learn about hazards that are occurring through ignorance, shortcuts, miscommunication and nonchalance. Conduct a survey every 2 years for a while and see if there is improvement. The goal is to get all three safety and health systems the same.

8) Management of Change: This technique is most useful after a process, piece of equipment or machine has been placed in service and changes need to be made. Whenever any changes are made, with the usual exception of "changes in kind," a new hazard can be introduced: the wrong valve, the wrong type of metal in the piping, the wrong circuit breaker, the wrong training, the wrong gloves or the wrong ladder. Analyze each change for what could happen.

9) Job Hazard Analysis: This technique is also called job safety analysis, job safety and health analysis, and other names. The most common approach is a three-column spreadsheet. The auditor lists each major step required to perform a particular task. Beside each step, the auditor lists the hazards that are present when performing that step in the task. Then, in the third column, the auditor lists the potential control measures for each hazard noted. You will find thorough guidance for using this technique in the National Safety Council's Accident Prevention Manual, Administration and Programs (12th ed.), pages 173 through 179, and OSHA Publication 3071-2002, Job Hazard Analysis.

Effective Hazard Recognition Techniques During the Third Layer

The best laid plans can go awry. For this reason, the third layer is needed at the jobsite to find and control hazards that may have been overlooked or that developed after the initial planning. New personnel, changes in the weather or working conditions, unfamiliar equipment and tools and mistakes during the planning process can cause hazards.

The following five techniques have a long history of being used effectively by the field employee just before the start of the job. Collectively, they are known as final safety checks, but each has a distinct value and purpose.

1) Last-Minute Safety Check or Simple Multistep Planning Process: Every task, every job and every activity needs to be rechecked after the planning and organizing phases. To do the job, task or activity safely, a simple, short multistep question process will cause the employee to stop and consider the hazards and controls. Some employers even put these processes on a wallet card, the back of the employee's ID or on a sticker for the toolbox or hardhat (If you want to put a sticker on a hardhat, follow the hardhat manufacturer's requirements for applying adhesives to a hardhat.). Many variations of the last-minute safety check exist, but most are based on four simple questions. The questions should be similar to:

- What am I about to do?
- What do I need to do this job and how will I do it?
- How could I or someone else get hurt?
- What will I do to prevent injury?

Examples of this process include SCAN, used by ExxonMobil. First, Survey your surroundings for potential hazards. Next, Consider how your actions could create an additional hazard. Third, Analyze what could go wrong and hurt someone. And, fourth, correct the situation, or if you are not able, Notify your supervisor to control the hazard.

Another example is SLAM, used by Marathon Petroleum. First, Stop, plant your feet and prepare to look around at your surroundings. Next, Look for potential hazards. Third, Analyze what could go wrong and hurt someone. And, fourth, Mitigate the hazards either yourself if trained and authorized, or report the hazard, if not.

A third example is called First Things First. The developers of this last-minute safety check require that their employees recheck four key issues before starting any job or task: 1) ensure that any hazardous energy is controlled, 2) ensure that housekeeping is in order, 3) ensure that the correct PPE is available, in good condition and is used and 4) ensure that all potentially needed emergency equipment and procedures are accessible, in good condition and understood how to use.

A fourth example is the 3C Personal Risk Manager developed and used by URS Washington Division. First, step back 2 yards for 2 minutes and ask: Are there any unsafe Conditions? Next, determine the Consequences of your actions. And third, Control the hazards.

Every organization needs a variety of techniques to be able to find the different hazards present to be able to evaluate the severity and probability of an unwanted event occurring.

The beauty of these techniques is that no paperwork is necessary, employees learn a simple and quick method to identify hazards that may have just developed or were overlooked, and employees take further responsibility for their own safety.

For example, ZZZ has removed the old air conditioner and the new air conditioner has been set in place. Now, the crew needs to anchor the new equipment and attach it to the utilities. This crew would use the last-minute safety check before starting the job to ensure that they are not too close to the edge of the roof without fall protection, that the weather has not changed, that they have an escape route and that their tools and PPE are in good shape.

2) The Ten-Second Drill: Other names for this technique include 360º, The Circle of Safety and The 10-Foot Circle. This technique encourages the employee to take 10 seconds before the start of the task to review surroundings. Why? Because the employee will concentrate on his or her task and not necessarily on nearby conditions. During movement around the task, or if there is a need to evacuate the area, potential hazards should be identified and controlled before starting. During this 10 seconds, the employee would ensure that a primary and secondary means of egress is known and is accessible, that there are no impaling hazards nearby, such as an outside screw and yoke valve stem or piece of rebar, that there are no holes or floor openings and no drain covers missing and that there are no hoses or electrical cords in the immediate vicinity that could create a tripping hazard.

For example, the ZZZ crew preparing to install the new air conditioning unit would take about 10 seconds and ensure that there are no impaling hazards, no tripping hazards, no stumbling hazards and no unauthorized personnel in the area.

3) Out-of-Plain-View Observations: It is fairly easy to walk through a work area and to take a quick look at the obvious, in-plain-view items and to find potential hazards. However, many hazards are behind closed closet or electrical panel doors, in drawers and toolboxes, behind and under desks and cabinets, above us and below us, inside of a pipe and otherwise just not in plain sight. Working surfaces may not be structurally sound, guardrails and walls (particularly glass walls) may not support the intended load, other people may walk under a grating or pipe chaise and be exposed to dropped objects, a weather pattern may be developing on the other side of the tanks or towers, and an exit door may hide a restricted means of egress on the other side of that door.

I asked a contractor foreman of a work crew installing new machinery at a plant several years ago how his crew would escape if an emergency occurred. I noticed before I asked him that there was a marked exit about 10 ft. away, but it had a piece of red barricade tape across the door with a cardboard sign that stated "Keep Door Shut." The foreman replied that his crew would go through that door—the red tape would not stop them. I asked the foreman if he had checked what was on the other side of that door before starting the installation of equipment. The foreman laughed and answered that he had not. I said, "Let's check it." We walked over, opened the door and found that the stair tower had been removed and there was a 15-ft. drop to the ground.

In our example of installing the new air conditioner, ZZZ workers should check roof openings, such as skylights and ventilators, for out-of-view hazards, for wasp nests and other hiding vermin in the new equipment, weak places in the roof and roof holes where sparks could enter the building.

In addition, some hazards that are not in plain view require testing devices to identify hazards. Ground fault detectors, current sensors, receptacle tension testers and air gauges may be necessary to identify hazards not in plain view. For example, an electrical receptacle looks innocent enough, but it may have no ground, reversed polarity, an open neutral or other hazard. Normally, employees in the field do not carry receptacle testers, electrical current testers and other testing equipment, but these employees can be advised to look for damage, missing parts and modified parts as clues that further tests may be needed to identify hidden hazards.

4) Looking for Differences: One need not be an SH&E professional to find hazards. One simple technique is to teach employees to look for differences. Look for differences based on their education, their life experiences and what they would normally expect to find in the workplace. When one sees something that is different or out of place, chances are good that a hazard exists. If someone sees something that is different and knows that a hazard exists, that person should correct the hazard if trained and authorized or should report the hazard if not. If someone sees something different and does not know if the difference is a hazard, then someone who would

know should be consulted before the start of the task. For example, the use of duct tape and cardboard is usually a difference and many times is a clue that a hazard exists. Machine parts leaning against the wall or on the floor should be a difference. Electrical covers lying about should be a difference. If one machine is covered and a similar machine is not, that is a difference.

For example, the ZZZ crew installing the air conditioner might notice that the concentric rings guarding the fans have different width openings. They may notice different gauges of sheet metal in the units themselves, or different sizes of electrical wiring. These are differences that may be just fine, or they may indicate a hazard.

5) Preuse Equipment Inspections: As I assist clients on jobsites, I find many examples of damaged and modified tools, ladders, slings, hoists, fork trucks, machine guards and a host of other pieces of equipment that present hazards. The reasons for these findings include a belief by the employee that it is okay to use damaged equipment, an understanding by the employee no hazard exists, failure on management's part to teach the employee how to safely use the equipment, poor leadership among management and the first line supervisor in allowing the damaged equipment to be used and an inadequate inspection of the tool or equipment before use. Before an employee can conduct an adequate inspection, the employee must understand what is unsafe equipment, what is an acceptable and unacceptable risk, how to inspect the equipment and must be given the time to inspect the piece of equipment.

OSHA has numerous requirements to inspect equipment before use, such as for hoists and cranes [1910.179(j)], slings [1910.184(d)], respirators [1926.103(h)(2)] and aerial lifts [1910.67(c)(2)(i) and 1926.453(b)(2)]. Many other pieces of equipment should be inspected before use, such as grinders, hand tools, ladders and PPE.

For example, the crew installing the air conditioning unit should inspect their tools, lifting devices, ladders, aerial lifts, PPE, electrical cord sets, etc. before starting the job. Any defective equipment would be discarded or repaired.

Summary

Numerous hazard recognition techniques are available. Every organization needs a variety of techniques to be able to find the different hazards present to be able to evaluate the severity and probability of an unwanted event occurring. The hazard recognition system must be properly managed through planning, organization, leadership and control. This system must be periodically audited to recognize deficiencies and needed improvements.

How bad can someone be injured at your worksite? They could die, could they not? Your employees deserve the best hazard recognition management system that you can provide. ✪

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By Robert Long

Objectivity, Audits & Attribution When Calculating Risk

I made the mistake recently of suggesting to a group of risk managers that a discussion about the myth of objectivity was overdue. I was blown out of the water with the response that such a discussion was irrelevant. They all knew what they were doing, were experienced and had extensive audit tools to ensure objectivity was their reply.

However, objectivity is a myth. The myth was dismantled by Michael Polyani in 1946 in *Science, Faith and Society* and by Thomas Kuhn in 1962 in T*he Structure of Scientific Revolutions*. It was shown by Polyani, Kuhn and now a host of postmodernist thinkers (Heidegger, Foucalt, Derrida and Baudrillard) that the positivist accounts of history and science could not be separated from the humans who participate in such accounts. It was the work of the Frankfurt School that showed that all communication is infused with politics, power and disposition. Indeed, the postmodernists argue that a lack of participation in the process of analysis robs any communication of commitment and intimacy with the subject. The reality is, all data are interpreted, and our interpretations rely on a host of cognitive, social and subconscious biases.

Humans are emotional creatures, and when fear and anxiety are intensified, people focus on the adverse outcomes more than the likelihood of that outcome occurring.

Any assessment of risk is an emotional, rational and subjective exercise. Risks are not objective but are attributed. One person is anxious about one activity when the person beside him or her is not. Some people are confident with some high-level risks, and others are much more cautious. In *Risk Makes Sense*, a table was presented and discussion (*Is Risk Neutral?*) showed how various human biases aggravate or mitigate risk attribution. The idea that humans assess risk objectively or just calculate risk based on the common criteria in any risk matrix (exposure, frequency, probability and consequence) is not supported by the evidence.

One fun exercise I like to do in any worksite induction is to draw a line on a whiteboard and to get everyone present to introduce themselves by placing their name beside the highest-risk activity they would be prepared to undertake (Figure 1). This is not only a fun way of getting to know people in the induction group but shows instantly how everyone in the room attributes risk differently. Then persons in the group explain where their risk threshold is and get a chance to explain their understanding of risk. In this way, in less than 20 minutes, everyone has shown everyone in the group how risk makes sense for them. This not only blows away the nonsense of common sense but raises the bar for the importance of safety conversations with others.

We know from socialpsychology that the way we attribute risk to various activities is in part affected by many cognitive biases. The availability heuristic and probability neglect are two mechanisms that powerfully affect the way we attribute risk. Depending on what is available to our memory or our senses, we magnify, distort or dismiss the value of certain risks. We neglect the probability of something happening depending on how distant our emotions are from the subject. This is also called the recency effect—people tend to overestimate risk if their experience of an event is more recent and personal.

Humans are emotional creatures, and when fear and anxiety are intensified, people focus on the adverse outcomes more than the likelihood of that outcome occurring. This intensifying of emotions is where much human risk aversion originates. If you put this emotionally charged perception in crowds or through the media, then mass hysteria and groupthink further distort the real assessment of risk. You then find the general population becomes fearful of prowlers, immigrants, Islam or community violence even though its incidence is decreasing. The problem is that availability and attribution factors make people fearful when they need not be fearful and fearless when perhaps more caution is required.

So where does the myth of objectivity leave us with auditing and assessment? The key is social awareness, communities-of-practice and self-awareness. Lone audits and assessments are okay, but do not think you are somehow superhuman and objective. There should not only be ownership in risk by workers, there should also be ownership in risk by auditors. The more we try to step away from something to try and be objective about it, the more we reduce our participation in ownership with the subject.

All checklists are developed within the biases of the checklist developers. Sometimes it is good to think beyond the checklist. The checklist is often the minimum in thinking, and checklists can be constraining to open and critical thinking. The last few incident investigations I was on indicated that the incident was caused as a result of people not perceiving factors that were not on the checklist. The solution by the crusaders for bureaucracy is to increase the size of checklists. Increasing

Figure 1 Snapshot of Induction Risk-Ranking Activity

checklists does not of itself increase the capability of people to think critically. Indeed, the flooding of people with checklists sometimes induces the opposite—learned helplessness.

It also might be good to bring outsiders and novices on audits and assessment walks just because they do not think like you. There is nothing more dangerous to an audit or assessment than the problem of confirmation bias. We all like to have the agreement of others and the back-slapping that ensues, but this also limits our capability to think outside the box. Maybe the apparently "dumb" questions of others unfamiliar with your auditing bias are just what you need, particularly if you have been doing the same auditing processes for some time.

Finally, we should be self-reflective about our assessments and be prepared to admit our bias, as we invite the view of others into our decision-making. Once you know that your auditing is biased, you are then enlivened to the fact that you could sometimes be wrong and that even the participation of those being audited in the process might be a valuable strategy. ✪

Robert Long, *founder of Human Dymensions, has experience, qualifications and expertise across a range of sectors, including government, education, corporate, industry and community sectors, spanning 30 years. Long has worked at all levels of the education and training sector, including serving on various post-graduate executive, post-graduate supervision, post-graduate course design and implementation programs.*

If you are interested in learning more about risk, visit www.asse.org/ps/rmi.

Best of the Best

ASSE and the Manufacturing Practice Specialty would like to congratulate Brian Edwards and P.H. Haroz for their notable article, "Keeping Hazards in the Box." This article was one of 17 articles selected for inclusion in the 2011-12 Best of the Best publication. Click **here** to view this compilation of technical material. Visit **www.asse.org/ps** for more information on the groups represented in this publication or **www.asse.org/JoinGroups** to add an additional practice specialty to your membership. ✪

By Shawn M. Galloway

Do You Have Safety "Volun-Tolds"?

It starts with a simple request: "We are looking for volunteers to help us improve safety. Those who are interested, please tell the safety manager." A few weeks pass, and the number of interested parties who stepped forward is a bit less than desirable. Do you start selecting people? Many safety improvement efforts begin with a request for willing and interested individuals. In the absence of a strong, excellent and participative safety culture, it is likely that few will volunteer. With pressure to continue moving forward, rather than understanding the reason for a lack of volunteerism, many progress through forced selection. Instead of volunteers, you end up with "volun-tolds."

Involvement De-Motivators

What influences someone to not want to be involved in something as important as safety? The answer is simple: de-motivators. Most people are, by nature, internally motivated. Little external motivation is necessary to encourage someone to have pride in their work, feel a sense of accomplishment and want to do their best. In an EHS Today article, ProAct Safety founder Terry Mathis wrote, "More recent research suggests that most workers are motivated to do a good job and that the design of many of those jobs actually dampen their intrinsic motivation. In other words, workers arrive motivated, and either their jobs or bosses beat (figuratively, of course) the motivation out of them."

Have you ever started your day in a good mood, only to have it changed for the worse throughout the day as a result of something that occurred at work? Becoming de-motivated or feeling contempt for your job is something that many people experience. When de-motivators impact people's opinions of safety, an unfortunate and disastrous perception is developed.

A Google search for "safety is a joke" resulted in 67,100 responses. When people feel that safety is a joke, it is difficult to motivate the discretional effort critical for obtaining and sustaining excellence. Consequently, the request for volunteers for a new safety project falls on deaf ears.

Perception Influences

Unlike other activities that occupy employees' time within their work setting, safety is something that provides both external and internal benefits. Understanding this, why would anyone hesitate to participate? The answer—de-motivators—is not inclusive enough to identify how to solve the problem. The complete, yet complicated, answer is that de-motivators create perceptions that influence both individual and group decisions and can become "the new way we do things around here."

People pay attention to what their boss talks about most.

When people feel that safety is a joke, it is difficult to motivate the discretional effort critical for obtaining and sustaining excellence.

Sometimes this perception results from a solitary bad experience for a single, influential individual. This person then shares his or her perspective with peers. What often follows is the creation of a group perception that culturally reinforces from within. When new employees are brought into the team, they are also influenced by these perspectives.

Cultural reinforcement is a strong and often ignored aspect of occupational safety. To change perceptions, one must first understand the influence on the perception. You can force short-term behavioral change, but is that really the goal? You cannot force a perceptual change because it is an internal response within individuals. The old saying is true, "You can lead a horse to water, but you cannot make it drink." Nor can you force an epiphany. To change perceptions, new experiences must be created that offer the opportunity to influence perceptual changes.

Common Perceptions That Impact Safety Volunteerism

While not complete, the following are common responses provided during employee interview sessions. As you read them, consider if they exist within your organization.

•Employee suggestions and safety work order systems result in no status response. If employees are putting forth suggestions or safety work order requests and do not receive status updates, what motivates them to continue? This can be classified as a negative consequence. The result of a negative consequence is to stop behavior. Guess what kind of behavior it stops?

•Existing volunteers are ineffective. If employees feel that previous involvement did not result in improvement, what will motivate them to participate again? Moreover, if the group feels that participants were themselves ineffective, the potential volunteer might not want to have that negative stigma attached to him or her.

•Safety efforts do not currently focus on the biggest risk. If employees feel safety is out of touch with their perception of reality, they might want to participate if other de-motivators are not present. However, if there have been previous attempts of worker involvement that did not result in improvement in their areas of concern, they might view this new opportunity as more of the same.

•Production is a more often-communicated priority. People pay attention to what their boss talks about most. If production is mentioned more often than safety, a perception will be created that says production is a more important value. If this is the case, then employees might not want to volunteer as they might feel it is in their best interest to work toward the business elements that are appreciated most.

•There is lack of visible support from an immediate supervisor. A supervisor may inherently care about safety. However, if the leader does not actively promote involvement in safety, an undesirable perception will be created. Moreover, if the supervisor actively discourages involvement then, absent a strong internal determination for safety, this will most likely stop an individual from participating.

•Fear of punishment for involvement. If employees feel they will be punished, formally or informally, for doing other activities than their job, this will certainly de-motivate involvement. One employee stated in an interview, "Every time I would get back from the safety task, my boss would give me the worst jobs." Another stated, "Whenever I would ask to break away to help safety, my supervisor would complain and moan about how short-staffed she was. So I stopped asking."

Takeaway Principle

If employees feel there is a stronger incentive to not be involved, or if they fear negative consequence for involvement, can we rightfully expect volunteers? The predominant school of thought on performance management is that the internal motivation for involvement is already there, so we should just remove the barriers. Certainly, it is easier to select "volun-tolds" or to offer participation incentives than to do the hard work of creating a desirable culture free of de-motivators.

Moreover, do we want people to be involved because they are chasing a carrot or avoiding a stick? Or, do we want people to be involved because they proactively care and feel recognized for helping create a great and safe place to work?

Continuing to select "volun-tolds" in safety, rather than creating an environment in which people want to participate, will generate or perpetuate a belief that safety is indeed a joke. Safety is no laughing matter. ✪

Shawn M. Galloway *is president of ProAct Safety, an international safety excellence consulting firm. As an author, speaker and business-safety strategist, he has helped organizations achieve and sustain excellence in safety, culture and operational performance. Galloway is the host of the COS video series, Culture Shock, and the weekly podcast series, Safety Culture Excellence. He can be reached at* info@ProActSafety.com.

Safety 2012 Recap

Manufacturing Practice Specialty Roundtable

Topic: America's Changing Manufacturing Workforce
Facilitator: David Evans, CSP
Recorder: Melanie Sanders

The facilitator began by explaining that the group would first brainstorm several issues related to the changing workforce in manufacturing and that those issues would be recorded and then prioritized for discussion of solutions.

Initial issues identified by the group were:

A. Talent
1) cannot find technically proficient employees;
2) lack of proficiency with new technologies.

B. Retired-in-Place
1) entitlement.

C. Training
1) value of conducting online vs. hands-on.

D. Aging Workforce
1) larger population aging out of job duties.

E. Obesity
1) need for redesigned equipment to accommodate;
2) more predisposed to injury;

F. Telecommuting
1) how to handle injuries that occur in the home.

The top three issues and their proposed solutions were:

A. Talent
1) use community college (associate and certificate) graduates with basics in mechanical engineering and other skills;
a) partner with community colleges to train employees in needed technological skills;
b) reverse mentoring—young graduates can train older unskilled population;
2) interns for technical projects (temporary assignment);
3) employee referrals;
a) use a "passport program" (SPO).

B. Good Matriculation Program for Temp Employees

C. Retired-in-Place
1) find new ways to use long-term employees (new tasks) or reassign;
2) leadership training reinvigorates enthusiasm;
3) engage them with new opportunities and challenges;
4) goal-setting, clear expectations and measured outcomes.

D. Telecommuting
1) ergonomics—provide office/other necessary equipment for employees;
2) mandate use of webcams to observe employee activity;
3) have policies in place and communicate them beforehand.

Manufacturing Practice Specialty Recognition

During Safety 2012, the Council on Practices & Standards (CoPS) recognized Vincent Scott, Publication Coordinator for the Manufacturing Practice Specialty (MPS). Vincent collects articles for *Safely Made* and also makes time to contribute his own articles to the publication. He is engaged, involved and is always willing to perform any required tasks as needed. He continually strives to meet MPS members' needs and to create a beneficial relationship between ASSE, MPS and safety professionals. To view the press release on Vincent, click **here**. To learn more about the CoPS awards program, visit **www.asse.org/ps/awards**.

In addition to the recognition MPS and its members received, MPS also held its annual face-to-face meeting and had its leaders attend the Council and House of Delegates meetings.

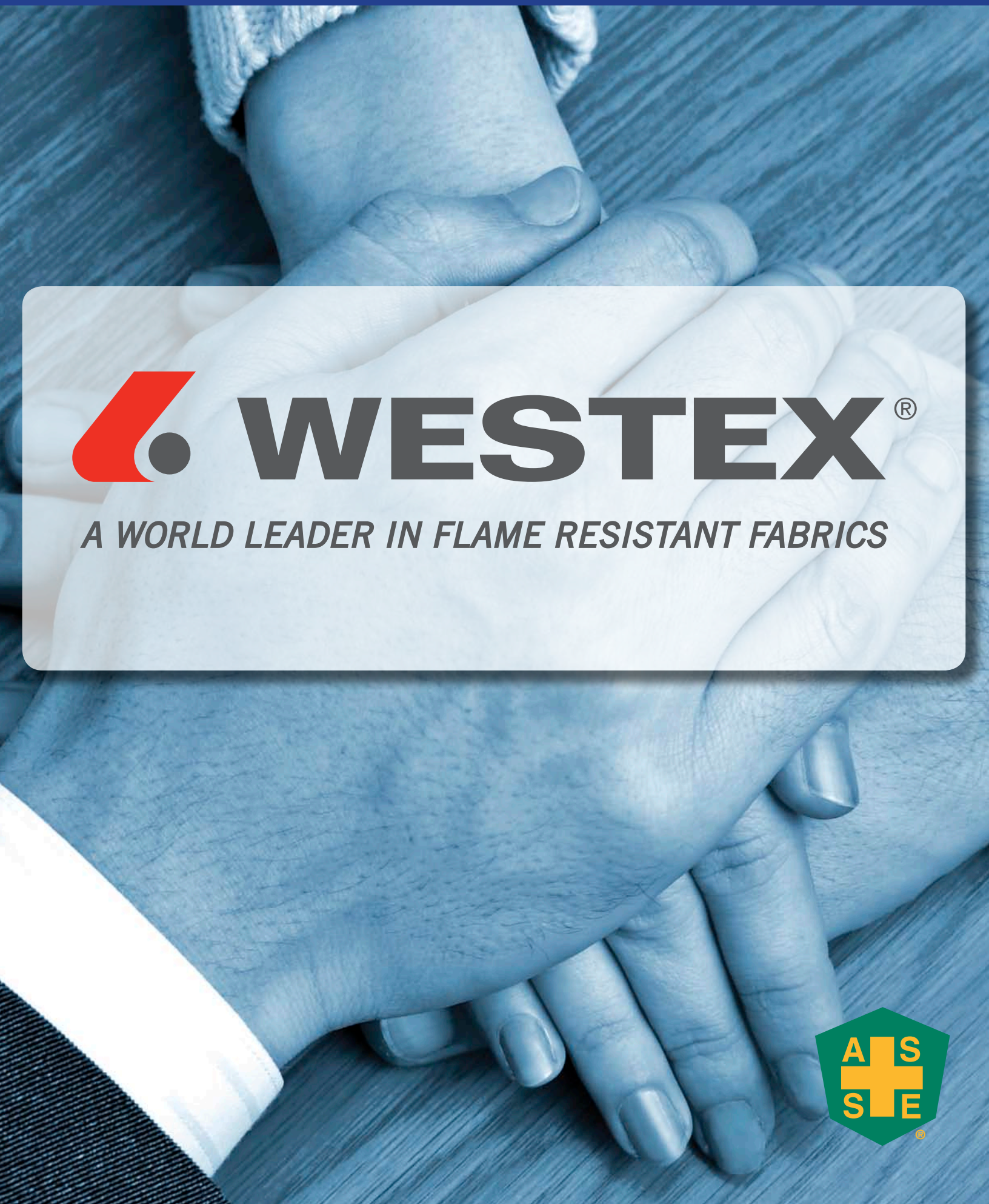
Safety 2012 Information

Several Safety 2012 presentations are available on SafetyNet, the social networking site accessible to all conference attendees. If you have not yet signed up for SafetyNet, you can still do so by visiting **http://safetynet2012.ning.com** and creating a profile.

If you could not make it to Safety 2012, speaker videos can be accessed **here**. Audio recordings of select Safety 2012 concurrent sessions are also now available for purchase and download. To view available sessions, click **here**. Proceedings will be available in **Members Only** soon, so keep an eye out.

Safety 2013 will be held in Las Vegas, NV, from June 24-27, 2013. MPS will sponsor several sessions and hold its annual face-to-face meeting so please plan to join us if you can. ✪

Thanks to our sponsor!



Welcome New Members!

We want to thank everyone who has remained a loyal member of the Manufacturing Practice Specialty (MPS) and welcome the following members who recently joined. We currently have more than 750 members, and we continue to grow. If you have any colleagues who might be interested in joining MPS, please contact **Krista Sonneson** to request an information packet. If you know anyone who might be interested in joining ASSE, please contact **customer service**.

Muzzamil Ahmed, Bitumat Co. Ltd.
Saad Alahmari, Rabigh Refining & Petrochemical Co.
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Gregory Bartlett, Behr Heat Transfer Systems Inc.
Jason Berger, Chubb Insurance Group
Tina Boreham, Flexfab Horizons International
Kevin Boteler, Marsh Inc.
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Justus Heuer, ESCO Corp.
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Andrew House, US Joiner LLC
Jessica Ierardi, Tecton Products
Tim Jamison, Invista
Thomas Klopp, Greene Tweed & Co.
Robert Kunkle, Access Business Group
Jan Kutzke, Ultrasonic Power Corp.
Christopher Lively, McCormick
Randi Martin, HEB Grocery
Nolan Masse, United Aluminum
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Robert Mauerman, Zurich Services Corp.
Rob Medlock, Safety Controls Technology
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Kathy Oo, L'Oreal
Ricky Owens, Central Washington University
Tricia Railton, OSHA
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Kathleen Ross, Flexhead Industries
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Kalvakolanu Sarma, Rabigh Refining & Petro Chemical Complex
Cliff Schindel, Oceaneering International
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