Industrial Safety & Hygiene News

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ISHN

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Safety & health best practices

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- Injury/illness statistics & research
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- Personal protective equipment

All NEW content

OIL & GAS INDUSTRY SAFETY

VOLUME 3*

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introduction

Welcome to *ISHN's* third volume of feature articles and sponsored content pertaining to oil and gas industry safety. We believe that safety and health professionals in all industries can benefit and improve their safety and health programs, processes, and cultures by absorbing the best practices used in the highly hazardous oil and gas business, and the lessons learned through errors and accidents.

The oil and gas sector presents safety and health issues that thousands of EHS pros who have never set foot on an oil rig face on a regular basis. These include: 1) falls and the need for fall protection; 2) electrical safety risks such as arc flashes and blasts and the need for flame-resistant clothing; 3) ensuring that workers wear other personal protective equipment (PPE) such as respirators, steel-toe footwear, eye protection, hearing protection, and hardhats; 4) monitoring regularly for chemical exposures; 5) ensuring vehicle safety; 6) protecting lone workers and small crews in remote locations; 7) handling the stress of working long hours, continuous shifts, and the dangers of fatigue and sleeplessness; 8) handling worker substance abuse and the potential for violent on-the-job behavior – verbal assaults, bullying, intimidation, harassment, and physical assaults; and 9) welding safety.

Safety and health professionals in the oil and gas sector deploy various tactics and strategies to protect workers that again, pros everywhere can learn from. Solutions to safety and health problems include:

- Training
- Toolbox talks
- Behavior-based observation and feedback
- Making "safety contacts" in the field with workers to prevent risk tolerance, complacency, and shortcuts
- Near-miss reporting
- Work stoppage until risks are mitigated
- Risk assessment
- Safety and health management systems with plan-do-act-review components
- Senior management's active participation in safety and health practices
- Senior management investment in safety and health
- Constant communication and safety messaging
- Active worker input on safety goals, plans, and practices
- Effective safety oversight of contractors, short-term employees, and new hires
- Making use of the increasing array of OSHA, NIOSH, and trade association safety resources

ISHN thanks all the subject-matter experts who contributed articles; the *ISHN* staff editors who researched, analyzed, organized, and wrote concise, relevant articles; and the contributions of *ISHN's* Construction eBook Volume Three sponsors. Particular thanks for volume-three content provided by the Texas Mutual Insurance Company.

I'm sure you'll find this eBook to be valuable in assessing safety and health practices and technologies in the oil and gas industry, and determining ways these safety and health solutions are transferrable to your workplace.

Dave Johnson
ISHN Editor

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Oil and gas industry **safety and health trends**

Based on exclusive ISHN *reader research*

By DAVE JOHNSON, *ISHN* Editor

Executive summary

ISHN surveyed safety and health professionals in the oil and gas industry, petroleum refining, coal, ethanol/biodiesel fuels and allied products in December 2015, to learn about their job challenges, PPE usage, and 2016 purchasing plans, and priorities for 2016.

Controlling slips, trips, and falls; hand and arm injuries; hazardous energy control; and confined spaces are the hazards of most concern to pros in the oil and gas sector.

Regarding current PPE use, 83-86 percent of respondents' companies use fall protection, head protection, hearing protection, foot protection, and hand protection. Fire-resistant clothing is used by 79 percent.

In 2016, 82 percent plan to buy eye and face protection; 71 percent plan to purchase hand protection, hearing protection, and or fire-resistant clothing. Sixty-eight percent plan to purchase foot protection and head protection.

Regarding safety and health funding, half of respondents indicated budget allocations remained unchanged in 2015. About 25 percent expect slightly higher budgets in 2016. And 25 percent expect to expand their safety and health staff levels.

Training is a high priority for respondents, and training resources (electronic or off-line) are expected to be in high demand.

Organizational safety and health challenges

Here are the top ten challenges facing pros in all sectors surveyed:

1 – Training workers on the proper use of equipment (72 percent)

2 – Increasing job stress (69 percent)

3 – Safety and health policies, codes, and goals used throughout the supply chain (66 percent)

4 – PPE compliance (55 percent)

5 – Putting safety on equal footing with environmental protection, quality, production, etc. (52 percent)

6 – Employee safety-related discipline (48 percent)

7 - EPA compliance (48 percent)

Oil and gas industry **safety and health trends** *continued*

8 – Shortage of skilled labor (48 percent)
9 - OSHA compliance (45 percent)
10 – Making new technology work for safety and health applications (41 percent)

The top challenges specific to oil and gas production:

1 – Slips, trips, and falls/Maintaining good housekeeping (83 percent)
2 – Hand and arm injuries (69 percent)
3 – Hazardous energy control/lockout/tagout (69 percent)
4 – Confined spaces (66 percent)
5 – Work at heights (59 percent)
6 – Working in temperature extremes (52 percent)
7 – Explosions and fires (48 percent)
8 – Motor vehicle accidents (48 percent)
9 – Respiratory hazards due to chemical exposures (48 percent)
10 – Noise (45 percent)

Plans to address safety and health challenges

- Expanding workload
- Increase training
- Additional planning and risk assessments for turnarounds coming up next year
- Allow workers a flexible schedule
- Better manage the 'do more with less' processes
- Consideration of personnel limits
- Fatigue policy
- Identify ways to more efficiently use existing employees and decrease travel times
- Shifting of employees from slower areas to growth areas, more use of contract employees

Increasing job stress

- Stress management program/Training:
  - Stress management, training classes on dealing with stress
  - Consult workers
  - Encourage work-life balance
  - Fatigue policy
  - Spread workload
  - Use scheduled time-outs
- Health and wellness initiatives
- Continue to find efficiencies in job processes and training, and support human resource processes
- Hiring new employees
- Increased manpower and job shifting
- Provide a 3rd party support network
- Pauses for safety, safety stand-downs etc. until the point is made that we will operate safely and efficiently

PPE compliance

- Training:
  - Computer-Based Training (CBT)
  - Coaching and training
  - Improved education and behavior-based safety programs
- Conduct management and corporate HSE audits

Oil and gas industry **safety and health trends** *continued*

- Continue to engage supervisors to ensure compliance
- Inspectors spot-checking workers
- Behavior-Based Safety (BBS)
- Get the most appropriate PPE for our industry
- More awareness and promote ease of use PPE; reward good behaviors
- More signage

OSHA compliance

- Additional audits and inspections with cross-functional groups)
- Close monitoring of existing and new regulations/Monitor for new OSHA regulations as they are published
- More dependence on outside resources/Working with outside consultants
- Training
- Hiring or training existing employees to assist with compliance efforts
- Improving competence in OSHA regulations, peer reviews
- Improving PSM program
- VPP

Employee safety-related discipline

- Training
- Behavior-based safety programs. Continue with safety-culture improvement process including accountability for management and front-line workers
- Establish clear guidelines and expectations; hold employees and leaders accountable
- Have monthly meetings with supervisors
- More awareness and promote ease of use PPE; reward good behaviors; consequences for non-compliance and repeat offenders
- Plant-wide communication
- Try for consistency

Gaining equal footing with production, quality, customer service, etc.

- Needs leadership support/acceptance of responsibilities/actions
- Alignment of policies in all locations of the business
- Building scorecards
- Constant reiteration of the importance of safety
- Corporate safety training
- Developing safety leadership programs
- Discussion with group
- Follow procedure manuals in a common sensible way
- Getting our message out
- Increased visibility of stop-work authority and message that production will not come at the expense of safety
- Management ranking on safety
- More monitoring
- Set safety as number one priority

Recordkeeping

- Better utilization of electronic systems (SAP, Meridium, etc.)

Oil and gas industry **safety and health trends** *continued*

to track and record critical equipment inspection and testing

- Continue to use maintenance management work-order system to ensure inspections and logs are completed
- Improving communication
- Increasing knowledge in our maintenance systems, better reporting systems
- Maintain daily operations logs/Keep log book inside each vehicle
- New data collection techniques
- New hire
- Recordkeeping is documented on a rig maintenance program; injuries are recorded in a patient contact log by the medic and an incident report completed by the safety training coordinator
- Training
- We use web-based tracking software to report injuries; equipment inspections are uploaded onto a company intranet page

Safety goals for 2016

- Safety training (for new hires, refresher training, for example) 79 percent
- Develop and/or improve your safety culture 69 percent
- Improve oversight of contractors and contracting services 45 percent
- Improve process safety management 45 percent
- Improve maintenance safety 41 percent
- Reduce slips, trips, and falls by workers 38 percent
- Protect lone workers 31 percent
- Reduce motor vehicle accidents 31 percent
- Reduce ergonomic injuries (lifting, strains and sprains, etc.) 21 percent
- Reduce fatigue due to longer work hours 17 percent
- Reduce serious injuries and fatalities 17 percent
- Protect workers against weather extremes 14 percent
- Test for and control substance abuse 3 percent

Expected PPE purchases in 2016

- Eye and face protection (safety glasses, face shields, eye and face protectors etc.) 82 percent
- Fire-resistant clothing (for arc flash explosions etc.) 71 percent
- Hand protection (impact-resistant gloves) 71 percent
- Hearing protection (earplugs/earmuffs etc.) 71 percent
- Fall protection (harnesses, lanyards, lifelines etc.) 68 percent
- Foot protection (safety-toed footwear, slip-resistant boots etc.) 68 percent
- Head protection (hardhats, etc.) 68 percent

Resource allocation plans for 2016

Twenty-eight percent of respondents expect more safety and health resources in 2016; 24 percent expected fewer resources; and 48 percent anticipate the same amount of resources as in 2015.

Regarding safety and health staff levels, 28 percent expect staffing to increase slightly; 14 percent foresee slight decreases in staffing; 3 percent predict significant staff cuts; and 55 percent expect staff levels to remain the same as in 2015.

Oil and gas drivers "too comfortable"

When it comes to neglecting seat belts

By TEXAS MUTUAL INSURANCE

The oil and gas extraction industry has one of the highest fatality rates in the United States:

27 fatalities per 100,000 workers versus a general industry average of 4 fatalities per 100,000 workers, according to the Centers for Disease Control and Prevention.

We don't want you to become a statistic. That's why we're going to spend a little time talking about the importance of wearing your seatbelt when you get behind the wheel.

Motor vehicle accidents account for about 31 percent of those fatalities.

Many of these tragedies could have been prevented if drivers and passengers had simply worn their seatbelts.

In Texas for calendar year 2013, of all persons killed in motor vehicle accidents where restraint usage was applicable and usage was known, 44.7 percent were reported as not restrained when the fatal crash occurred. (Source: Texas Department of Transportation Texas Motor Vehicle Crash Highlights Calendar Year 2013)

The real tragedy of any workplace accident is the human cost. That is the bottom line we should all be focusing on.

A 25-year-old oil and gas extraction worker was driving the company pickup. It drifted off the road and rolled multiple times. Unfortunately, he did not survive.

The worker had made $87,000 a year.

At 25 years old, he might have worked another 42 years.

If you adjust for inflation and salary increases, the deceased worker's family could be out nearly $5 million.

And do you want to know the saddest part of this story? It could have been avoided if the driver had simply buckled his seatbelt.

Unfortunately, this young man is not the exception. Our industry has gotten way too comfortable with driving. We're ignoring simple rules that could save our lives and spare our families a ton of heartache.

Oil and gas drivers "too comfortable" *continued*

To understand the importance of wearing your seatbelt, it helps to see what happens during a crash.

The vehicle slows or stops, but unbelted occupants keep moving at pre-crash speed due to inertia. Inertia is every object's tendency to keep moving until something else works against the motion.

While your vehicle may have slowed or stopped after colliding with another vehicle or object, unbelted occupants keep moving at the same speed until they catch up and crash into what's in front of them.

At 30 mph, unbelted occupants will hit something four times as hard as they would hit it at 15 mph. That's the same impact as if they had fallen three stories.

Too often, unbelted passengers don't just hurt themselves.

Passengers who don't wear their seatbelts become flying objects that put everyone else in the vehicle at risk.

Exposure to unbelted occupants increases the risk of injury or death to others in a vehicle by 40 percent.

In frontal crashes with an unbelted passenger sitting behind the driver, the rear-seat passenger increases the risk of fatality among belted drivers by 137 percent compared with belted rear-seat passengers.

Simply put, seatbelts protect everyone in the vehicle.

Note Source for Stats — "Safety belts" June 2013, Highway Safety Research & Communications, Highway Loss Data Institute, Insurance Institute for Highway Safety

Effective protection

Using a seatbelt is an extremely effective measure for preventing motor vehicle crash fatalities and serious injuries. Lap/shoulder belts, when used correctly by light/pickup truck occupants, reduce the risk of fatal injury by 60 percent and reduce the risk of moderate to severe injury by 65 percent (National Highway Traffic Safety Administration).

Protect against second crash

Seatbelts help prevent or reduce injuries from the second crash or collision by securing people to their seats so they slow down with the vehicle as its crush zone absorbs most of the kinetic energy (energy in motion). A crush zone is a structural feature usually located in the front of a vehicle. The crush zone protects occupants by absorbing the impact.

Spread crash forces

Seatbelts spread crash forces over stronger, bony parts of the upper body. The longer people "ride down" a crash, the less likely they are to be injured. Ride down means the occupant is decelerated slower due to being restrained while a vehicle crash zone (and other devices) absorbs the initial impact of the crash.

Oil and gas drivers "too comfortable" *continued*

According to the Centers for Disease Control and Prevention:

- Adults age 18 – 34 are less likely to wear seatbelts than adults 35 or older.
- Men are 10 percent less likely to wear seatbelts than women.
- Adults who live in rural areas are 10 percent less likely to wear seatbelts (78 percent use) than adults who live in urban and suburban areas (87 percent use).

Per NIOSH Alaska Pacific Regional Office (with restricted access to Bureau of Labor Statistics Census of Fatal Occupational Injuries) data, pickup trucks were the most common type of vehicle to be involved in motor vehicle accidents for the oil and gas extraction industry. Furthermore, data shows pickup truck drivers are likely to not wear seatbelts.

Why pickup truck drivers?

- Pickups are common in the oil and gas industry.
- The Department of Transportation does not regulate pickups.
- Drivers and occupants often travel long distances to job sites and back home at the end of a long day.

Now that we know who's not buckling up, let's look at why.

Prevent ejection

A person ejected from a vehicle in a rollover crash is four times more likely to die than a person not ejected.

As you can see, it's pretty easy to make a case for seatbelts. So who's not wearing them?

Have you ever caught yourself saying things like this…

I'm a good driver: Your good driving record and training will certainly help you avoid accidents, but even if you're a great driver, you cannot control other factors, including other drivers' behavior.

I'll just brace myself: That won't work unless you can lift 3,900 pounds in 7/100 of a second (calculations are based on a 168-pound man involved in a collision at 62 miles per hour). The force of the impact would shatter the bones in the arm or leg you used to brace yourself. That's assuming you had the split-second timing to brace yourself before a crash.

I'd be trapped: More likely you would be knocked unconscious and thrown out of the protective area of the vehicle. If thrown from the vehicle, you are 25 times more likely to die in an accident.

They're uncomfortable: Today's seatbelts are designed for comfort as well as safety. Most will give when you move — a device, such as a weighted pendulum, locks them in place only when the vehicle stops suddenly.

All of this data is worthless if it doesn't get people to take action. Let's look at some basic solutions.

Written policy

While most states now have laws requiring the use of

Oil and gas drivers "too comfortable" *continued*

seatbelts, having a written seatbelt policy will confirm management's expectations regarding seatbelt use and leave little room for misunderstanding. Be sure that the seatbelt policy addresses not only their use in company vehicles, but also private vehicles when used for company purposes.

Training

Training helps ensure employees fully understand the importance of seatbelt use and the consequences of non-use.

Set the example

As a supervisor or manager, you influence your employees' behavior through your actions/behaviors. If you do not use your seatbelt every time you get behind the wheel or ride as a passenger, you are telling the employees it's okay to ignore the rule.

Observe

Random observations are a good way to measure seatbelt use and reinforce its importance. Watch employees as they leave or return to the yard, taking the opportunity to teach safe behaviors.

During your observations, make sure employees are wearing their seatbelts properly. You're probably thinking that's a waste of time. Everyone knows how to wear a seatbelt. And you're probably right, but again, we sometimes take shortcuts that can result in a serious accident.

Fit Matters

Before you buy a new vehicle, check to see that its seatbelts are a good fit for you.

Ask your dealer about seatbelt adjusters, which can help you get the best fit.

If you need a roomier belt, contact your vehicle manufacturer to obtain seatbelt extenders.

Seatbelt auditory reminders

Federal safety standards require a seatbelt reminder system for drivers that provides a warning light and an audible warning lasting 4 to 8 seconds. However, auditory reminders lasting 8 seconds or less have not been found to be effective in increasing seatbelt use. In contrast, enhanced belt reminders (auditory reminders that last longer than 8 seconds) increase belt use among drivers and front seat passengers by up to 4 percent. – Information courtesy of the National Highway Transportation Safety Administration (NHTSA)

- Of 2013 models sold in the United States, 90 percent came with enhanced seatbelt reminder systems for the driver as standard equipment, while 76 percent had enhanced reminder systems for right-front passengers.
- A 2010 study found that driver fatality rates were 6 percent

Oil and gas drivers "too comfortable" *continued*

lower in vehicles with enhanced seatbelt reminders compared to vehicles without them.

Interlocks

An interlock is a type of failsafe. For example, ignition interlocks require drivers to blow into a breathalyzer before the vehicle will start. Seatbelt ignition interlocks are restricted. Other types of interlocks, including ignition interlocks, have been developed but are not widely used:

Source for notes - Insurance Institute for Highway Safety, Highway Loss Data Institute, Highway Safety Research & Communications, article titled "Safety belts"

The bottom line is that we can use all the technology in the world to try to get people to do the right thing and wear their seatbelts. But nothing motivates more than the thought of not coming home to your family at the end of the day.

Fatalities are preventable: about half of Texans killed in crashes were not wearing seatbelts.

Remember the basics: Develop a written seatbelt policy, train employees, set the example, observe drivers and passengers.

Go beyond the basics: Consider auditory reminders, interlocks and tactile feedback.

Embrace responsibility: You are responsible for not only your safety but also your passengers' safety.

Make sure everyone buckles up every time, no exception.

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Texas Mutual hosts free workplace safety webinars the first Friday of every month. Our professionals teach employers how to identify workplace hazards, investigate accidents, prepare for OSHA inspections, and break down the silos between health and safety. Main numbers: (800) 859-5995, (512) 224-3800.

Tanks take charge in US oil and gas industry

Firstly don't panic, no one invaded our mighty industries with advanced ground weaponry.

But it is fair to say that Emergency Tank Showers are becoming more commonplace in Oil, Gas and Chemical plants as a preferred choice for operators and specifiers, keen to simplify and reduce installation costs of Emergency Showers and Eye Wash stations.

Tank Showers offer a perfect solution to get ANSI compliant, tepid water showers into multiple locations across large sites, with total control of water availability and temperature, localized to each unit without the concerns of distributed tempered water networks. Although many Tank Shower solutions connect to mains water for replenishment, it is the instant availability of potable, temperate water in guaranteed volume and flow rates that are making Tank Showers so popular in the US.

Early Tank Showers were developed over 30 years ago with the earliest examples designed and developed by Hughes Safety Showers. Since then the product has evolved in line with ANSI and International standards to become one of the most sophisticated and technically advanced drench shower solutions for any climate or conditions.

Research and development over that period has seen changes in specifications and materials leading other manufacturers to add Tank Showers to their product portfolio. The Hughes range is still the world leader and is the best-selling Tank solution globally, with Polar Standard products serving sites from Alaska to Siberia and Tanks with chiller and anti-scald technology keeping things comfortably cool in desert conditions from Texas to the Middle East and Australia.

Research over many years on the safe use of potable water in emergency showers has influenced material choice for tanks and insulation. Whilst stainless steel Tanks are still prevalent from some manufacturers, research from Hughes R&D in the United Kingdom found that bacteria can damage stainless steel tanks over time, ultimately creating leaks and reducing the lifespan of the product.

Polyethylene tanks remove this risk through the material's anti-microbial properties and extends product life. In addition, the ability to form a single piece polyethylene material adds strength and design benefits; for example the "heater well" present in all Hughes Tanks ensures immersion heater elements are always submersed in water to avoid burnout if the tank ever runs empty.

Material choice and smart design is now complemented by cutting edge wireless technology. One of the main benefits of Tank Showers is their flexibility on location. A Tank Shower will provide compliant emergency facilities in places not always accessible for standard drench showers, but this can mean remote locations, far from any centralized control facilities. Wireless monitoring systems have increased in popularity, measuring the high availability of emergency services including water temperature, pressure, volume, emergency lighting

Tanks take charge in US oil and gas industry *continued*

status and activation alerts. Tank Solutions such as the Hughes EXP-MH-14K/2000 can provide ANSI compliant showers combined with the Hughes Sentinel Hart Wireless Monitoring system. Sentinel provides constant status monitoring of the unit, exporting industry standard MODBUS data over a HART wireless network. Watch the video to discover more about the Sentinel system.

So it looks like Tanks have invaded after all, but this is a friendly invasion, designed to save lives and provide operators and EPC specifiers with affordable and reliable solutions for every challenging environment.

View our tepid water solutions online today.

Author: Steve Willock
Hughes Safety Showers – Houston TX, Sarnia ON
Marketing Director with J.D. Hughes Group PLC – UK, USA and Canada

About Hughes Emergency Safety Showers with Water Tanks

Hughes Safety Showers offer a range of emergency Temperature Controlled Drench Showers and Shower Cubicles developed for use in cold climates where it is necessary to maintain a tepid showering temperature or provide a warm environment for showering. Hughes offers products that provide a heated water supply that is also pre-insulated to prevent freezing during conditions of frost. There is an optional insulated Tank Shower range without heating to ensure a steady internal temperature is maintained especially in hot climates. Tank showers are available in five sizes; 350 liter which supplies a flow of warm water for several minutes and the 750 liter model which will deliver warm water for up to 15 minutes. Larger Tank Shower models include the 1200, 1600 and 2000 Liter models designed to meet and exceed ANSI Z358.1 2014 standards. These models are now the most widely specified and used Tank Shower Solutions in EPC contracts throughout the world.

It's all about water temperature

60-100°F

It's all about **your safety**

EXP-MH-14K-2000
with Chiller Unit

Hughes Safety Showers offer an extensive range of Emergency Safety Showers and Eye/Facewash stations designed to meet and exceed ANSI Z358.1 2014 standards. Our outdoor showers are heated and pre-insulated offering frost and freeze protection, providing tepid water temperature within the compliance range of 60-100°F. A wider range of unheated galvanized and stainless steel tubular showers, Tank Showers, mobile and portable units offer ambient, heated or chilled water for every hazardous environment.

10 seconds from hazard

20 gallons per minute water flow

15 minutes continuous water flow

EXP-SD-18G/25K

STD-MH-5K/11K

STD-TC-100K/11K

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Increase your **chances of survival**

Prevent arc flash burns by wearing the right clothing

By BENITA MEHTA, *ISHN* Managing Editor

Flame-resistant (FR) clothing can increase the chances of survival and decrease the need for medical treatment and the chances of subsequent infections. It can help preserve the quality of life of an oil and gas industry worker exposed to an electric arc flash.

Wearing ordinary clothes, especially synthetic fabrics like nylon, in an arc flash may make injuries worse than if the skin was not covered at all. Denim jeans and jackets, cotton shirts, cotton/synthetic T-shirts, sweatshirts, fleeces or nylon jackets are fuel sources that ignite, burn and frequently melt onto the skin. The heavier the weight of the fabric, the more fuel there is to burn. The explosion may be over in less than a second, but non-FR clothing may keep burning. It takes just three seconds to sustain third-degree burns.

NFPA 70-E

To help workers understand burn dangers more easily, the National Fire Protection Association assigns a 0-4 number to hazard/risk categories representing the danger level. The minimum hazard rating for arc flash puts the burn exposure at 4 cal/cm2, which is a NFPA 70-E "Category 1 Hazard" rating. Calories per centimeter squared is a number identifying the amount of energy that can be delivered to a point at a particular

distance from an arc flash. Once this value is known, the ATPV rating of the PPE required for work at that distance from the potential flash hazard is also known. FR apparel must be worn for the "Category 1 Hazard" level.

When selecting an FR garment for electric arc hazards, look for labels that show the arc rating as required by the ASTM F1506 Standard for Flame-Resistant Clothing. The standard has two basic requirements:

- A sample of fabric must self-extinguish with less than 2 seconds after flame and less than 6" char length according to ASTM Test Method D6413. This flammability test applies to an initial sample and after 25 washes/dry cleanings.

Increase your chances of survival *continued*

• The fabric must be tested for Arc Thermal Performance according to ASTM Test Method F1959. The results of the Arc Thermal Performance testing must be reported to the end user as an Arc Rating on a garment label.

• Different colors of the same fabric do not need to be tested separately.

A garment that meets ASTM F1506 complies with OSHA 1910.269, NESC and NFPA 70E.

ASTM F1506 is a pass/fail standard with requirements for reporting information not considered for the pass/fail criteria. All garments that meet the requirements of ASTM F1506 must be labeled with a tracking code, a statement that the garment meets the requirements of ASTM F1506, the manufacturer's name, size information, care instructions, fiber content and the arc rating.

> Look for labels that show the arc rating as required by the ASTM F1506 Standard for Flame-Resistant Clothing

Examples of such arc flash clothing could include a flame-resistant hat, face shield, flame-resistant neck protection, hearing protection, suit, insulated rubber gloves with leather protectors and insulated leather footwear. The term is primarily

Tolerating risks in the **oil fields**

Deciding to take a risk is up to you

By TEXAS MUTUAL INSURANCE

One morning, four young oil and gas workers climbed into their employer's pickup and set out for the job site. The driver fell asleep, and the truck began veering off the road. The driver overcorrected and lost control, and the truck rolled multiple times.

The driver was wearing his seatbelt, but his co-workers were not. All three were ejected from the truck and seriously injured.

The driver in this true story took a risk. He was tired, but he put himself behind the wheel anyway.

The passengers took a risk, too, by not wearing seatbelts.

Risk tolerance does not only apply to our work. It influences the way we drive, the food we eat and most other aspects of our lives.

We typically ask ourselves three questions before deciding whether to take a risk.

• Hazard identification

Do I see the risk? At home, maybe the risk is a wet spot on the kitchen floor. At work, the risk might be that I'm tired, and I have to drive 30 miles from the job site to the office at the end of the day.

• Risk perception

Do I understand the risk? If I drive while tired, I might fall asleep. If I fall asleep, I might run off the road and suffer serious, maybe fatal, injuries. I could also put passengers and other drivers at risk.

There are many tools available to help address the first two questions. For example, a Job Hazard Analysis, also known as Job Safety Analysis, can help identify and correct hazards. Tool box talks and pre-shift meetings can help with understanding and addressing the risks at hand.

• Risk tolerance

The last question is simply whether we are willing to take the risk associated with a task. This decision is strongly influenced by perception, which is often based on experience and/or emotion.

Perception #1 relates to a belief that one's physical ability, strength, agility, reaction time and reflexes will help prevent an incident. In other words, we overestimate ourselves. This factor also relates to situations where an experienced worker

Tolerating risks in the oil fields *continued*

will rely on their experience and their knowledge of the task as justification for doing the work a certain way, a way that may in fact have higher risk.

"I can lift 150 pounds in the gym…surely I can lift this nitrogen bottle."

Fit workers may believe they have exceptional strength or cat-like reflexes to avert a risky situation.

"I have driven in worse conditions than this and done just fine." Years of driving experience can build confidence in one's driving skills, but can also lead to overconfidence because conditions and circumstances can change.

Mitigation strategies

Know yourself. Acknowledge your capabilities and limitations, and follow correct procedures and guides (such as material handling and lifting guides).

Stay alert. Be on the lookout for situations that may require your capabilities and experience to get you out of a risky situation.

Watch co-workers' backs. Look out for other workers who may be overestimating their capability and putting themselves at risk.

Perception #2 goes from overestimating our ability is underestimating the risk.

"How bad could it be?" That's the question that too often gets us into trouble.

Why do we underestimate negative consequences of taking a risk?

1. We might have experienced a negative outcome, but it was minimal.

- Low-speed vehicle crashes resulted in only minor scratches to our vehicle.
- A history of minor H2S leaks
- A series of overpressure events where the protective devices have worked properly could lead to a belief that a vessel failure would not be possible.

The more often we experience only minor consequences, the more likely we are to believe we will never experience a serious consequence.

2. We might use language and descriptors that trivialize the true nature of the risk – "pinch point," "sweet gas," "low-speed vehicle crash," "hot water"

Does a "pinch point" sound serious? What about "sweet gas"?

Communicate. Use incident communications and safety alerts to demonstrate the seriousness of the outcome.

Learn from the past. Ask what is being done about safety incidents to prevent future incidents.

Get descriptive. Use language that more accurately describes how serious an outcome could be. For example, "scalding water" versus "hot water."

Question yourself. "How bad could it be…really, how bad?" And be honest.

We're more likely to underestimate risk if we have not personally experienced negative consequences.

Tolerating risks in the oil fields *continued*

For example, if we have lost a family member or a friend to a drunk driver, we have less tolerance for drinking and driving. And it is the same with workplace activities. Conversely, if we have not experienced a serious or traumatic event, we may perceive that it could not happen. Consequently, we are more risk tolerant.

Compounding the issue is that memories of lessons learned tend to fade with time.

New workers are particularly vulnerable because they may not have experienced past incidents.

Our challenge is to ensure that all workers know that a serious outcome could still happen, even though they may not have seen it personally.

Mitigation strategies

Talk about the past. Keep the "corporate memory" alive by communicating experiences to new workers.

Show evidence. Demonstrate that incidents have occurred because of not following a safety procedure:

- Is "hot water" really able to cause serious burns?
- Can static electricity actually cause a fire?
- Is H2S as dangerous as it is made out to be?

Communicate. Use Safety Alerts and Incident Summaries from within the company, from industry associations and from other companies to reinforce that incidents have and could happen.

Complacency

Personal experience can also make us more comfortable with a task. We've done the task a certain way so many times, without getting injured, that we don't worry about the hazards or risks.

Being comfortable is good, but not if it leads to complacency.

Mitigation strategies:

Act like a rookie. Every time you do a task, act like it's the first time you've done it.

Talk it through. Verbalize the steps each time you do the task.

Teach it. Think about how you would teach a new employee to do the task.

False sense of security

Closely related to complacency is a false sense of being in control.

The decision to voluntarily take a risk is determined by our sense of control over the situation. This could apply to sports, or to a decision to drive on snow or slick roads.

Often the desire to engage in a risky activity results in an "adrenalin rush."

Being in control of the task or activity reduces our awareness of other unknowns, and therefore the risk is perceived as being lower. When we feel we have 100 percent control of a task, we tend to underestimate the risk. For example, many people decide to drive to a location rather than take a plane because

Tolerating risks in the oil fields *continued*

they feel they have full control over the driving, whereas they are dependent on others when flying.

Mitigation strategies

Stop and think. Stopping first and thinking about your decision is a conscious action in which you consider assumptions about risk taking.

Test assumptions. "Am I really safer driving because I'm in control rather than flying when that choice is available?"

Weighing costs and benefits

Often, we do a kind of cost-benefit analysis when deciding whether to take a risk.

If the cost of non-compliance (e.g. taking a risk) is going to be very high, we may decide to not to take the risk.

Examples:

- A speeding ticket of $200 may be viewed as acceptable by some drivers.
- A ticket of $10,000 and confiscation of the vehicle – Would a driver be willing to accept that?
- Commercial Passenger Aviation – Very high cost of non-compliance, strictly regulated: low tolerance for risk
- Private Aviation – Minimal cost for non-compliance, minimal regulation, voluntary: significantly higher acceptance of risk

Would I be doing it this same way if my supervisor or the safety officer were watching?

Mitigation strategies

Raise the stakes. Increase the cost of non-compliance on critical tasks. Be selective, and only apply this where the standard can always be applied (do not use this where exemptions or deviations to the standard exist or have been allowed).

Remove barriers that prevent conformance to standards. Inadvertently rewarding non-compliance can be a barrier.

Increase the reward for compliance. Incentives can be used as a positive motivator for compliance.

Tempting rewards

Just like the cost of non-compliance can motivate us to avoid a risk, the possibility of a reward can make us more likely to take a risk.

The greater the potential reward, the more risk we will take.

This can occur at an individual level, where a person may profit from their own action. It can also occur at the corporate level, where a company or business can profit from taking higher risks.

Increasing oilfield activity is leading to greater profit, but also an increase in injuries and fatalities.

Examples:

- "Let's Get'r Done" culture
- Cost cutting
- Finding "creative ways" of getting the job done to

Tolerating risks in the oil fields *continued*

save money

- Working longer hours for the increased overtime and pay
- Compromising on personal safety equipment (i.e. using a worn-out equipment)

Mitigation strategies

- Don't reward behavior that encourages cutting corners and not following standard procedures.
- Enforce compliance with laws, regulations and company policies.
- Recognize and reward people "caught in the action of doing things right."

Too much trust in equipment?

A false sense of security drives risky behavior. That sense of security can even extend to the equipment we use.

Sometimes, we have excessive, unwarranted trust that the equipment or tool we are using will always perform exactly as designed. This may be especially true as equipment safety design improves.

Could these ideas create a false sense of security?

"It has never failed as long as I have been using it."

"It's fail-safe."

"It's brand new! Of course it will hold!"

"The equipment will automatically take care of a failure."

The possibility that the equipment could fail is discounted, minimized or not considered.

Overconfidence in equipment is reinforced through studies done in the U.S. and in Britain. A 1995 study on drivers using vehicles with anti-lock braking systems (ABS) and air bags showed that drivers were more confident that they could stop faster with ABS, and therefore tended to drive faster. There was no net gain in the reduction of incidents where braking was a factor.

Mitigation strategies

- Train on the limitations of the tools. For example, do workers know how much force can be applied to a pipe wrench before it breaks? Teach workers to look for the ratings on the slings and lifting equipment (and to know the weight of the load to be lifted).
- Incidents have occurred where the operators were expecting the engineered shut down systems to look after things if anything went wrong. Workers need to understand the shutdown parameters, including things like delays, response time of instruments, etc.

Overconfidence in PPE

Closely related to overconfidence in equipment is overconfidence in personal protective equipment (PPE).

If something does go wrong, we may be overly confident that peers or emergency personnel will rescue us.

- This can apply to outdoor adventure activities. A lone

Tolerating risks in the oil fields *continued*

adventurer knows nobody is nearby to rescue him, so he limits risk.

- On the other hand, a member of a large group is confident that others will bail him out of a bad situation.

Mitigation strategies

Eliminate misconceptions. Make it clear that PPE is a last line of defense, and that it does not prevent accidents.

Define limitations. Teach employees the limitations of PPE, such as the working range of a gas monitor, the cut or chemical-resistant properties of gloves. Similarly, explain the limitations of emergency response personnel.

Think differently. Challenge staff to ask themselves, "Would I do this task differently if there was no PPE to protect me or nobody to save me?"

If role models take risks...

We've all been influenced by someone in our lives. We've all had role models. We can also have role models in our personal lives and at work.

Some are formal role models, such as supervisors and managers. Others are informal role models, such as senior workers, experienced workers or well-respected workers. If role models take risks, especially without consequences, their teams are likely to follow their lead.

Mitigation strategies

Find good role models. Remember, they don't have to be managers or supervisors. They can be informal role models as well. You're looking for people with low risk tolerance and track records for following safety procedures.

Scrutinize standards. Over time, role models' risky behavior can lead to an erosion of standards among the team. "That's the way we've always done it" is not a good reason to keep doing it that way.

Ask questions. If you are in a situation where your leader or peers are taking risks, ask questions and seek the help of other leaders and good role models.

Ask yourself 3 questions:

- Do I see the risk?
- Do I understand the risk?
- Do I accept the risk?

Stop, think, act

Do these three things before you decide whether to accept a risk:

Stop – Consider what could go wrong and how serious the consequences could be.

Think – Do you understand the task? Are you physically and mentally ready for the task? Do you have the right equipment and tools?

Act – Reduce risk by using the right tools and following safety procedures.

And last but probably most important…

Tolerating risks in the **oil fields** *continued*

Think back to the story of the four workers at the beginning of this article. Their decision to accept risk didn't just affect them. It affected their co-workers, family, and friends, too. Before you accept a risk, think about how the consequences could trickle down to everyone else in your life.

Texas Mutual Insurance Company www.texasmutual.com is on a mission to make Texas a safer, more productive place to work. A solid workplace safety program can help employers: • Protect your employees' well-being • Lower your workers' compensation costs • Reduce the costs associated with workplace accidents • Maintain productivity by keeping experienced workers on the job. Texas Mutual offers free resources to help you launch a workplace safety program or improve an existing program.

Texas Mutual hosts free workplace safety webinars the first Friday of every month. Our professionals teach employers how to identify workplace hazards, investigate accidents, prepare for OSHA inspections, and break down the silos between health and safety. Main numbers: (800) 859-5995, (512) 224-3800.

FR Workwear: Ensuring Worker Compliance Using Innovative Textiles

In working environments where hazards such as arc flash and flash fires are present, safety standards are imperative to protect today's workers. To meet these standards, FR garments are made from FR fabrics that utilize high-performance, high-tech fibers, yarns and finishes. Workers in the oil/gas, electrical and chemical industries not only expect the best protection available, but also demand comfort so that the person wearing FR garments can focus on the job. Protective fabrics producers, such as GlenGuard™, are responding to the demand in innovative ways.

Multiple Fiber Blends

The advancement of yarns utilizing multiple fibers in a blend has been a major driver of innovation in FR protection. These advances allowed FR fabrics to be created in new ways—utilizing the most useful properties of each fiber, and then blending them together. For instance, aramid fibers do not perform well on their own for protection against arc flash and other hazards. However, when combined with other FR fibers—such as modacrylics—the overall protective performance of the fabric is dramatically improved. Modern fiber blends can include five or more different types of fibers, which achieve various end-product characteristics (weight, breathability, moisture wicking, level of protection, etc.). Ultimately, new developments in FR fabrics allow garment manufacturers to focus more intently on garment design.

Engineering Comfortable Compliance

In addition to common assumptions about the weight of the fabric, there are several additional factors that influence the overall comfort of the fabric including the type of yarn and fibers, the yarn spinning process, the weave pattern and fabric finishes. Understanding how these elements work together is crucial when developing FR workwear that is comfortable. "We've looked into weave patterns to increase the strength and protection of the fabric while reducing weight. It's based on yarn size and construction. But you have to do enough testing to figure out how to do that," says GlenGuard Vice President of Product Development, Gary Zumstein. "How you manage all of these factors is critical. Weight is not the only factor that makes the difference in comfort."

From the beginning of production, fibers are specifically selected based on their protective qualities, ensuring they are also gentle to the skin – like fibers with circular cross-sections. By utilizing ring spun technology, the fibers can be aligned in a more parallel manner, which produces a smoother yarn. Then fabric constructions and respective treatments are manufactured to optimize performance, emulating the characteristics of athletic

FR Workwear: Ensuring Worker Compliance Using Innovative Textiles *continued*

materials. As Zumstein confirms, "At the end of the day, if the worker wearing FR is comfortable, they will tend to perform necessary tasks in a compliant manner."

Constant Innovation

As technological capabilities increase, so do the possibilities for the future of FR workwear. Textile trends that are popular in Europe, such as inherent anti-stat properties, will influence trends in North America as well. New developments will help ensure body burn percentages are reduced while ATPV ratings increase.

"It will be quite interesting to see how the North American market continues to develop," says Zumstein. "You will continue to see a lot of changes and new fabric offerings as technological advancements are made." Even related industries such as nanotechnology, color chemistry and surface modification can be used to help push protective fabrics forward in the name of wearer safety, comfort, durability, chemical resistance and colorfastness. With the innovative technologies and breakthrough development that brands such as GlenGuard are continuing to consistently improve upon, workers will be more comfortable and compliant while on the job.

For more information on GlenGuard, visit GlenGuard.com.

IF THEY CHEAT WHEN THEY WEAR IT, IT'S NOT COMPLIANT.

There are no shortcuts when it comes to worker compliance. Because you can see the big picture, you must provide workers with FR garments that make them less likely to cheat. With GlenGuard, you can promise your workers lighter, more comfortable work wear. That's because we are dedicated to making the lightest FR fabrics in the world. It's also why we make sure our fabrics:

- **HAVE SUPERIOR BREATHABILITY**
- **REDUCE THE RISK OF HEAT STRESS**
- **ARE THE MOST COMFORTABLE IN THE INDUSTRY**
- **WICK AWAY MOISTURE**
- **ARE LIGHTWEIGHT**

Specify GlenGuard.
They will wear it more compliantly.

GLENGUARD™
COMPLIANCE

GLENGUARD.COM

FLAME RESISTANT FABRICS FOR WORK WEAR

OSHA® Occupational Safety and Health Administration Region VI

"Step-Up for Safety"

OSHA's 2016 awareness campaign in the upstream oil and gas industry

By DAVE JOHNSON, *ISHN* Editor

OSHA has announced the 2016 "Step-Up for Safety in the Upstream Oil and Gas Industry" to raise awareness among employers and workers about hazards in oil and gas exploration.

During Step-Up events, employers around the country will take time out to conduct site inspections, safety training and other activities. These events were to be held mid-February until the end of March.

The Step-Up is an activity of the alliance between OSHA; the National Service, Transmission, Exploration & Production Safety (STEPS) Network; and the National Institute for Occupational Safety and Health (NIOSH). Twenty-two regional STEPS Networks will coordinate and promote the events.

"Hazardous working conditions are taking the lives of a growing number of workers employed in oil and gas extraction," said Assistant Secretary of Labor for Occupational Safety and Health Dr. David Michaels. "This safety step-up will help emphasize the tremendous value in dedicating time during a workday to improve safety and health."

Top OSHA violations in oil and gas extraction (NAICS 211)

OSHA keeps records not only of the most frequently cited standards overall, but also within particular industries. The most recent statistics from OSHA reveal the top standards cited in the fiscal year 2015 for the oil and gas extraction industry.

This top 10 list comprises establishments that operate and/or develop oil and gas field properties. Such activities may include exploration for crude petroleum and natural gas; drilling, completing and equipping wells; operating separators, emulsion breakers, desilting equipment and field gathering lines for crude petroleum and natural gas.

1. Process Safety Management of Highly Hazardous Chemicals – Preventing or minimizing the consequences of catastrophic releases of toxic, reactive, flammable or explosive chemicals.
29 CFR
1910.119 **$2,423**

2. Guarding Floor and Wall Openings and Holes – Ensuring every stairway floor opening has proper railings and other protection.
29 CFR
1910.23 **$1,539**

3. Respiratory Protection - Properly administering a respiratory protection program, selecting correct respirators, completing medical evaluations to determine which employees are required to use respirators and providing tight-fitting equipment.
29 CFR
1910.134 **$2,283**

"Step-Up for Safety" *continued*

The National STEPS Network, founded in 2003, is a volunteer organization that includes industry operators, contractors and associations, OSHA and NIOSH representatives, and educational institutions that promote safety, health, and environmental improvement in oil and gas exploration and production in U.S. onshore operations.

For more information, visit the Step-Up for Safety Website, which includes a menu of resources that employers can use during their events.

Companies can conduct a Step-Up for Safety by taking a break to have a toolbox talk or by completing another safety activity such as a hazard hunt or inspecting safety equipment. Numerous topics are being provided in an effort to reach as many employees and employers involved in the varied oil and gas industry.

Once you have provided the training, OSHA asks that you return to the Step-Up for Safety Website and record the number of employees you reached, the amount of time you spent training (number of employees x the amount of time), or the number of hazards you identified and corrected. This information is requested only so OSHA can quantify the impact of the 2016 Step-Up for Safety.

Top OSHA violations in oil and gas extraction (NAICS 211)

4. Control of Hazardous Energy (Lockout/Tagout) – Servicing and maintenance of machines and equipment to control hazardous energy.
29 CFR
1910.147 **$1,454**

5. Medical Services and First Aid – Ensuring the ready availability of medical personnel and first aid supplies on-site.
29 CFR
1910.151 **$3,032**

6. Hazard Communication – Properly transmitting information on chemical hazards through a comprehensive program, container labeling, SDS and training.
29 CFR
1910.1200 **$1,717**

7. Wiring Methods, Components and Equipment for General Use – Using proper wiring techniques and equipment to ensure safe electrical continuity.
29 CFR
1910.305 **$1,498**

8. General Walking/Working Surface Requirements – Maintaining a clean, orderly and sanitary establishment, including passageways, store rooms and service rooms.
29 CFR
1910.22 **$1,888**

9. Mechanical Power-transmission Apparatus – Following the general requirements on the use of power-transmission belts and the maintenance of the equipment.
29 CFR
1910.219 **$1,271**

10. Hazardous (classified) Locations – Following the requirements for electric equipment and wiring in locations that are classified depending on the properties of the flammable vapors, liquids or gases, or combustible dusts or fibers that may be present therein and the likelihood that a flammable or combustible concentration or quantity is present.
29 CFR
1910.307 **$3,500**

"Step-Up for Safety" *continued*

The National STEPS Network is partnering with key groups on this effort, including OSHA; NIOSH; the Association of Energy Service Companies (AESC); Texas Oil and Gas Association, (TXOGA); American Petroleum Institute (API); PEC Safety; The University of Texas at Arlington; and Red Rocks Community College.

Go ahead - get defensive

Despite the downturn in oilfield activities, motor vehicle crashes remain a leading cause of worker fatalities and crippling injuries.

According to NIOSH, motor vehicle accidents account for 29 percent of workplace fatalities in the oil and gas industry. So far this year, the TXOGA safety group has suffered one motor vehicle fatality. Although still one fatality too many, this represents a significant reduction compared to the eight fatalities experienced over the same period one year ago.

Defensive driving is fundamental to keeping workers safe on roadways. It requires a constant awareness and commitment to do everything reasonable to avoid collisions, in spite of road conditions and other drivers' actions. Defensive driving programs teach workers to identify hazardous road conditions, anticipate dangerous situations and make well-informed decisions.

Get involved

For employers, defensive driving is a good investment, helping save lives, time and money. According to the National Safety Council, defensive safety training has proven to help employers:

- Control liability costs associated with work-related vehicle crashes
- Reduce insurance premiums and fleet repair bills
- Reduce motor vehicle incident rates
- Decrease workers' compensation claims
- Improve productivity by keeping employees safe, on and off the job
- Protect your brand by improving public perception of your driving practices

Defensive driving courses can help drivers learn how to overcome negative psychological factors, such as stress, fatigue, emotional distress and road rage. They also offer tips for developing a positive attitude behind the wheel and focusing on the driving task.

Defensive driving presentation

Brought to you by the Oil and Gas Safety Roundtable and Texas Mutual Insurance Company

To help prevent motor vehicle crashes, the Oil and Gas Safety Roundtable developed a defensive driving presentation with instructor talking points that employers can use for training or in safety meetings to educate employees. The presentation explains what defensive driving is, provides tips for sharing the road with aggressive drivers and explains how to develop good defensive driving skills.

New ASTM standard used to protect workers during flash fires

Workers in oil refineries and the natural gas industry need access to flame resistant rainwear. ASTM International standard, F2733, Specification for Flame Resistant Rainwear for Protection Against Flame Hazards, provides minimum requirements for flame resistant (FR) rainwear to be used by workers who are exposed to industrial flash fires and other petrochemical fire hazards.

In addition, the NFPA 2112 Standard on Flame Resistant Garments for Protection of Industrial Personnel Against Flash Fire, which specifies the requirements for typical FR clothing used for industrial flash fire hazards, was not applicable for FR rainwear due to the different types of material used in the manufacture of FR rainwear. It is expected for the 2017 revision to include requirements for rainwear.

Of course, the ASTM F2733 standard requires that flame resistant rainwear material protect the wearer from rain, but the FR rainwear must also provide a specified protection level when tested in a laboratory flash fire exposure. The predicted body injury in a controlled laboratory flash fire exposure cannot exceed 40 percent of the total instrumented mannequin body area. This level was selected to provide a high level of survivability for workers exposed in an industrial flash fire accident. For workers in the age group from 40 to 49, 86 percent would be expected to survive with a 40-percent body surface area burn (BSAB), but for the age group from 50 to 59 only 74 percent would be expected to survive a 40-percent BSAB. If more protective FR rainwear is selected so that the predicted burn injury is reduced to 25 percent BSAB, more than 90 percent of all age groups from 20 to 59 would be expected to survive.

One of the key advantages of the F2733 specification is that it provides the user with information on the relative protection level of the FR rainwear options. Prior to the F2733 specification, only basic flammability pass/fail testing was available using the ASTM D6413 “Vertical Flame” test method, but these pass/fail results do not provide any measure of the protection level provided by the FR rainwear. In addition, for coated or laminated fabrics used for rainwear, the D6413 flammability test is not by itself a sufficient test even for flammability since some rainwear fabrics consist of a

New ASTM standard used to protect workers during flash fires *continued*

flammable nylon or polyester substrate fabric laminated or coated with a flame retardant material. In these cases, the nylon or polyester fabric will shrink away from the flame exposure used in the D6413 Vertical Flame test, which allows marginal rainwear materials to meet the pass/fail criteria set for D6413 testing. With the new F2733 specification, marginal rainwear materials of this type will not pass the flash fire testing requirements.

The F2733 specification lists a total of 11 test method standards that are used to evaluate and specify a wide range of performance parameters for FR rainwear including predicted burn injury, flammability, water resistance, breathability, material strength, stiffness at cold temperatures and laundry shrinkage.

Workers in the industries that will use ASTM F2733 often need to work outdoors during weather conditions involving heavy rain, so they have a need for flame resistant rainwear that provides the appropriate protection against rain as well as their workplace hazards. It is expected that most rainwear that meets the requirements of F2733 will also provide protection against hot liquid splash hazards. Flame resistant rainwear that meets ASTM F2733 can also be tested to ASTM F2701, Test Method for Evaluating Heat Transfer through Materials for Protective Clothing Upon Contact with a Hot Liquid Splash.

For more information, visit www.nascoinc.com or call (800) 767-4288.

Short service **employee program**

Newly assigned oil and gas workers suffer the highest rates of fatalities & serious injuries

By TEXAS MUTUAL INSURANCE

Purpose

This program is intended to help employers keep new employees, whether experienced or inexperienced, safe and on the job. Employers should adapt the program to fit their unique needs.

Importance

During the past decade, newly assigned employees in the Texas Oil and Gas Association safety group suffered the highest rates of fatalities and catastrophic injuries.

Approximately 65 percent of fatalities occurred within the first year of service. About 34 percent of fatalities occurred within the first three months of a new assignment.

There is clearly an urgent need and opportunity for employers to address this problem and safeguard newly hired workers. The following information will help you create a Short Service Employee Program or improve an existing program.

Scope

This procedure applies to all company facilities and worksites. It is important to ensure that newly placed employees work under the direction of experienced personnel.

Short Service Employees should make up no more than 50 percent of a single crew at one time. Further, a crew of five employees or less should include no more than one Short Service Employee at a time. Subcontractors should be included in this program.

A Short Service Employee (SSE) should be under this program for at least six months and until the SSE demonstrates the knowledge and skills necessary to perform their tasks safely.

Definitions

Mentoring – a process of transferring skills and knowledge from one person to another in a work environment.

Supervisor – The individual responsible for the direct supervision and oversight of an employee.

Short service employee program *continued*

Short Service Employee (SSE) – A newly placed full-time or temporary employee or subcontractor with less than six months' experience in assigned job.

Short Service Employee Mentor – Person with at least 6 months' employment with the company who has demonstrated safe and efficient work habits.

Management responsibilities

The responsibilities of company leadership and management are to set expectations, evaluate effectiveness and:

- make and demonstrate a personal commitment to a strong and functional Health Safety and Environmental work culture,
- establish a written, signed and dated HSE policy that sets compliance expectations for management and employees,
- provide employees access to company policies, standards and procedures,
- establish written HSE Orientation and Short Service Employee Programs for all employees newly assigned to any job or task,
- ensure that all employees new to a job assignment are identified to the responsible supervisor(s) and placed into the HSE Orientation and Short Service Employee Programs, and
- audit, review performance and take timely corrective actions to continually improve the effectiveness of the orientation and Short Service Employee Programs.

Supervisor responsibilities

The responsibilities of supervisors in the Short Service Employee Program are:

- know which jobs and crews are using Short Service Employees,
- ensure Short Service Employees are appropriately identified per this plan,
- develop and communicate Job Safety Analyses (JSAs) to affected personnel upon initial assignment and when the operation changes,
- ensure Short Service Employee Mentor possesses proper knowledge and skills in the job task assigned,
- ensure Short Service Employee Mentor is adequately training SSE,
- ensure Short Service Employee is gaining the necessary knowledge and skills in the job tasks, and
- follow all safety rules and company policies.

Mentor responsibilities

The responsibilities of the Mentor in the Short Service Employee Program are to:

- be an experienced and responsible person assigned by the supervisor to work with the new employee,
- be selected based on a history of safe work and policy/procedural knowledge,
- be able to communicate the expectations and characteristics of work tasks and their associated hazards,
- have a patient disposition, as well as the desire and

Short service employee program *continued*

willingness to devote the necessary time to succeed as a mentor,

- possess knowledge and skills in the job tasks assigned to the SSE,
- be willing and able to effectively listen to the SSE to determine if the SSE is learning and retaining the knowledge being shared,
- be willing to watch an SSE perform a job without interfering as long as the SSE is not in a position to harm themselves, others, the environment or the equipment,
- adopt a positive safety attitude, avoid criticism, and strive to build confidence and self-esteem in the SSE,
- be able to teach the SSE the proper way to create a quality JSA and to follow that JSA in performing tasks,
- keep abreast of new equipment in their field of expertise,
- refrain from taking shortcuts and doing anything else that jeopardizes health or safety,
- demonstrate a positive work ethic at all times, and
- introduce the SSE Checklist to the new employee,
- review the checklist with the new employee periodically over a six-month period, and forward the information for supervisor and management review, and
- follow all company policies and procedures.

Short service employee responsibilities

The responsibilities of the Short Service Employee are to:

- be willing to watch and listen to the mentor,
- establish a positive safety attitude toward assigned job tasks,
- learn how to create and follow JSAs,
- be willing to learn how to do each task in a safe and environmentally sound manner,
- stop and report unsafe conditions immediately,
- participate in safety meetings, and
- follow all safety rules and company policies.

HSE coordinator responsibilities

The responsibilities of the HSE Coordinator in the Short Service Employee Program are to:

- serve as subject matter resource to support the supervisor and SSE,
- ensure the SSE gets the necessary safety training, and
- follow all policies and procedures.

The following procedures apply to the Short Service Employee Program.

Notification

The HR department notifies worksite management/supervision and safety department of all newly hired or reassigned employees. In turn, management will notify the safety coordinator of new employees in their region who require training.

Orientation

- Management will provide a company-approved orientation.

Short service employee program *continued*

The orientation will include a Job Orientation Checklist that the supervisor reviews with each newly hired employee.

- Each SSE will be provided orientation specifically based on job position and job-related topics prior to performing job tasks.
- Each SSE will be taught how to access company policies, standards and procedures.
- Satisfactory completion of the orientation must be signed and dated by the employee and supervisor.

Training

The supervisor will ensure that each SSE is properly trained per federal, state, industry, company and operator requirements before starting work when:

- the employee is hired;
- the employee is appointed a new job assignment; and
- the employee is exposed to new substances, processes, procedures, equipment, etc that represent a new hazard to the employee.

The supervisor will ensure that each SSE is properly trained in:

- the hazard(s) present in the workplace;
- the policies, procedures, processes and PPE utilized to control these hazards and prevent illnesses, injuries, property damage and/or environmental incidents; and
- the skills necessary to conduct their assigned jobs safely and efficiently while providing quality and economy.

Identification system

It is important for supervisors, co-workers and project managers to recognize a Short Service Employee; therefore, an identification system is developed for this purpose. The identification system is a means of communicating to the workforce that the Short Service Employee is in a transitional period. It will not be a designation of in-experience or used to mark an employee as having lower skill sets.

The SSE will be identified by a vest, colored hardhat, decal or other clothing or PPE that prominently identifies the employee as an SSE employee. For example, if a hardhat decal is used, it should be placed on each side of the hardhat with a label under the decal indicating the date when the employee is no longer considered to be a Short Service Employee. The supervisor and the SSE mentor will provide supervision and not allow the SSE to perform any task in which they have not been properly trained. The supervisor and the SSE mentor will ensure that the SSE understands the task to be performed and the associated hazards.

The supervisor removes the decals and other identifiers upon expiration of the SSE term, and after verifying that the SSE exhibits a knowledge and skill level to perform the job tasks assigned.

Documentation

The HR specialist completes the SSE Notification Form for new employees and forwards to the supervisor.

Upon completion of training, supervisor signs off and forwards notification form to HR.

Short service employee program *continued*

All records for the SSE Orientation and Training should be maintained at the employee's location by the supervisor.

SSE quality assessment and control

- Management should review the effectiveness and quality of the Short Service Employee Program at least annually.
- SSE Orientation and Training documentation should be audited for accuracy, timeliness and completeness.
- Onsite inspections should be conducted to ensure that supervisors, mentors and Short Service Employees are adhering to the SSE Program.
- The number of incidents involving new employees should be measured, compared to the general workforce and evaluated for trends or performance variations.
- Management should ensure that all program deficiencies are promptly corrected and documented.

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Your life can change in a single breath or with one spark

By: THE OSHA NATIONAL STEPS ALLIANCE

Opening thief hatches of storage tanks can lead to the rapid release of high concentrations of hydrocarbon gases and vapors. Those may result in very low oxygen levels and toxic and flammable conditions around and over the hatch. Recent reports have documented fires or explosions, and described workers experiencing dizziness, fainting, headache, nausea, and, in some cases, death while gauging tanks, collecting samples, or transferring fluids. Tank gauging, thieving, and fluid handling can be performed safely with proper precautions.

Hazards that can be encountered by workers:

- Oxygen Displacement/Deficiency (gauge on empty/yellow background)
- Fires/Explosions (fire placard)
- Chemical Toxicity (exclamation mark placard)
- Hydrocarbon Vapors
- Propane
- Butane
- Benzene
- Hydrogen Sulfide (H2S)

Potential effects of exposure:

- Death
- Chronic illness
- Burns from flash fires
- Dizziness
- Irregular heartbeat
- Irregular breathing
- Respiratory irritation
- Fatigue or exhaustion
- Nausea, upset stomach
- Eye irritation
- Headache

Tank gauging hazard alert *continued*

Employers:

- *Must conduct exposure and hazard assessments at worksites to determine needs for:*
  - Engineering controls
  - Respiratory protection
  - PPE
- *Monitoring devices such as:*
  - Multi-gas meter
  - Other direct-reading toxic gas meter (benzene)
- *Must provide training to workers:*
  - Hazard Communication
  - Lone Worker Policy
  - Proper use of PPE and respiratory protection
  - Types, use, and limits of respiratory protection equipment as appropriate
  - Recognizing ignition sources
  - Tank gauging work practices/procedures
  - Emergency Response Plan
  - Procedures for alarm response and site re-entry
  - Use and limits of toxic gas or multi-gas meter(s) for O2, H2S, LEL, and CO
- *Should implement engineering controls such as:*
  - Remote Gauging
  - Closed Loop Systems
  - Auto Gauging
  - Sight Glasses/Gauges
  - Remote Venting
- Verify sub-contractors are following work practices/procedures

Use proper PPE to protect:

- Head
- Eyes, Ears and Face
- Body
- Respiratory Tract
- Hands
- Legs and Feet

Workers:

- Follow your employer's Hazard Assessment and established Work Practices/Procedures
- Use toxic- or multi-gas meter provided by your employer as per your training
- Heed all alarms
- Stop flow into tanks prior to gauging when possible
- Minimize leaning over open hatches – Stand away/upwind/crosswind when possible
- Inversion/high humidity/lack of wind could increase danger
- Follow your employer's "lone worker" policy
- Allow tanks to ventilate after opening thief hatches
- Evacuate unsafe work areas and report immediately
- Know the limits of your respiratory protection as provided during employer training
- Immediately report any health symptoms

Tank gauging hazard alert *continued*

- Wear PPE as required/provided
- Attend Hazard Communication Training
- *Be aware of potential ignition sources:*
  - Static
  - Cell phones
  - Sparks from tools or metal objects
  - Open flames
  - Non-approved electrical equipment/devices
- Ensure proper grounding/bonding
- If you are not sure, STOP the job and ask!
- Everyone has the right to STOP work that is unsafe.

Through the OSHA National Steps Alliance, this Tank Gauging Hazard Alert is for informational purposes only. It does not necessarily reflect the official views of OSHA or the U.S. Department of Labor.

Tyco Launches New Gas and Flame Detection Brand

It was the perfect union—Tyco, a leader in fire protection and security solutions and IST, a group of global gas detection companies with roots as far back as 1840. In February of 2015, Tyco announced the acquisition of Industrial Safety Technologies (IST), with plans to integrate the Detcon, Oldham, Gas Measurement Instruments (GMI) and Simtronics brands into the gas and flame detection portfolio of the Life Safety Products division, Scott Safety.

February 18, 2016, Tyco announced the formation of Tyco Gas & Flame Detection, the culmination of successful integration of the combined companies. Under this new brand, Tyco intends to be the global solutions provider of choice for all entities with gas and flame detection needs.

"The newly created brand has the ability to deliver unprecedented solutions to the marketplace," said Andrew Chrostowski, president of Tyco Life Safety Products. "Leveraging our unmatched talent, capabilities, and experience, we will deliver 'Expert Protection' to our customers, and offer them not only great products, but world-class solutions."

Tyco is a global enterprise that employs nearly 60,000 people worldwide. Operating under a single gas and flame detection business offers employees opportunities to leverage their diverse skills and talents to bring innovative solutions to the market quickly.

"We have the best talent in the industry and we fully intend to disrupt the market and change the industry," said General Manager of Tyco Gas & Flame Detection, Sean Magee. "We are on mission to become the global technology leader and provider of gas & flame detection solutions that protect people, assets and the environment."

As the brand matures, creating connectivity solutions that are not currently available in the market is a priority. Every idea, concept, solution and service is created to "protect what matters most," Tyco's overarching business goal. As the brand matures, the industry has a lot to look forward to. Armed with the unparalleled capabilities of Tyco enterprise, the Power of More is here. Five leaders in life safety and gas detection have united and set to lead the industry.

Meet Tyco Gas & Flame Detection, the product of the union between the industry's power couple (IST and Tyco). The future looks pretty bright.

Silica sand hazards

Hydraulic fracking can pose exposure risks

By J. RUSH BOWERS, CIH, CSP

Hazards associated with inhaling crystalline silica had been known for hundreds of years when the project to divert the Gauley River in southern West Virginia for electric power generation began in 1930. Despite that knowledge, a large number of workers involved in the tunnel project died from acute silicosis, a crippling disease that can arise within a few months to as long as two years following exposures to extremely high concentrations of respirable crystalline silica.

Hearings in the U.S. House of Representatives in 1936 after the project was completed cited the official death toll from silica exposure in the West Virginia tunnel project at 476, although an epidemiological study placed the number as high as 746 (Cherniak, 2015). The Hawk's Nest Tunnel Disaster, as the event has come to be called, has been identified as America's worst industrial disaster, and resulted in the inclusion of silicosis as an occupational disease in most states' workers compensation laws (Torrey, 2013).

Employees in many industries today are potentially exposed to respirable crystalline silica, including the oil & gas industry, through its use of silica sand in hydraulic fracturing, or "fracking." OSHA estimates that 25,000 workers in hydraulic fracturing are exposed to respirable silica from the large amounts of sand used in the fracking process (Federal Register). Sand is used as a "proppant" that fills or "props-up" the fractures created in rock, allowing oil and natural gas to flow to the well casing. As the practice of fracking continues in the United States the demand for frac sand is expected to increase to about 95 billion pounds of sand in 2016 (Wile, 2014).

OSHA's outdated protection

The current OSHA general industry Permissible Exposure Limit (PEL) for quartz, the common form of crystalline silica found in sand, is more than 40 years old, having been adopted from the 1972 American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs®). The PEL is an eight-hour time-weighted average (TWA) exposure to respirable dust, calculated using the percentage of silica in the dust.

OSHA has acknowledged that employees exposed to respirable crystalline silica are at significant risk of developing silicosis at the current PEL, and on September 12, 2013, proposed lowering the PEL to 0.05 mg/m3, which is in line with the current ACGIH TLV (Federal Register). OSHA estimates that the proposed rule will save nearly 700 lives and prevent 1,600 new cases of silicosis

Silica sand hazards *continued*

per year, once the full effects of the rule are realized (OSHA); 12 fatalities and 41 cases of silicosis could be prevented by the proposed rule each year in the oil and gas industry alone.

Evaluating fracking exposures

In response to the growth in hydraulic fracking and the absence of exposure data for this industry sector, a partnership between various leaders in the oil and gas industry, health and safety professionals, OSHA, and NIOSH has been established to evaluate hydraulic fracking worker exposures to a variety of potential hazards (CDC, 2010).

As part of this initiative, NIOSH conducted air monitoring for respirable silica at 11 hydraulic fracturing sites in five states. NIOSH collected 116 full-shift air samples on employees performing various tasks at the fracking sites. Of the 116 samples collected, 47 percent showed silica exposures greater than the current OSHA PEL, and 79 percent showed silica exposures greater than the NIOSH recommended exposure limit (REL) of 0.05 mg/m3. Thirty-one percent of all samples indicated silica exposures ten or more times the current NIOSH REL, and one was more than 100 times the proposed PEL.

In response to the results of the NIOSH study and out of concern for the health of their workers and subcontractors, a large oil and gas exploration and production (E&P) company retained Terracon Consultants to conduct air monitoring for respirable silica at a fracking site in the U.S. Results of that exposure monitoring showed that 75 percent of monitored workers had hazardous full-shift exposures to respirable silica.

As evidenced by the results of the recent exposure monitoring, OSHA's proposed lowering of the PEL for respirable crystalline silica, coupled with the projected increase in the use of silica sand, point to upcoming changes and challenges for the oil and gas E&P industry. The findings of the NIOSH field studies identified seven specific exposure pathways and suggested a combination of material substitution (alternative proppants), engineering controls, work practice changes, and protective equipment to reduce silica exposures at fracking sites. With the collaborative effort between OSHA, NIOSH, oil and gas industry leaders, and health and safety professionals, these challenges can be overcome provided the risks have been identified and communicated to employees, monitoring is performed, and the appropriate PPE is made available to at-risk workers.

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"In the moment" training

One of three methods to prevent serious injuries & fatalities

By ROBB ZUREK

It is especially important in high-risk industries, such as oil and gas and chemical, that workforce training and education is prioritized beyond that of an afterthought in a company's safety plan. Strengthening the need to account for frontline worker training and educational programs is the Bureau of Labor Statistics' 2014 Census of Fatal Occupational Injuries Summary report that oil and gas industry fatal work injuries increased by 17 percent from 2013 to 2014.[1]

With rapid technological innovation occurring in this field and the development of new equipment and regulations attempting to keep pace, it's essential that companies be proactive about training and education. Consider a combination of the following three types of training sessions to guarantee employees are properly equipped on the worksite:

1 - Instructor-led classroom training

A routine group training session is often the most common used by companies because it lends itself to easy and efficient planning. It presents material to a large or small group of employees, everyone receives the same information at the same time, it can be cost-effective, and workers will have face-to-face contact with the instructor.

But companies must understand that it's both the "what" and the "how" they teach frontline workers that enhances their capabilities to safely handle day-to-day and operational duties.

Consider these tactics when designing an effective and engaging training session:

- Have onsite workers drive the discussion. Involve the individuals responsible for day-to-day duties to share their best practices and experiences about a near-miss incident, as well as encourage them to ask any questions they may have about the training topic at hand.
- "Tell" and "Show": Integrate pertinent technologies and

"In the moment" training *continued*

devices into trainings in order to both orate about and demonstrate their importance. Not only will this provide clarity in the training, but it also serves as a nice lecture alternative.

2 - Hands-on training

Despite the fact that hands-on application training may require more resources from company management, a committed investment to improve employees' safety knowledge through tangible exercises will far outweigh the additional spend. Through these sessions, onsite workers have the opportunity to immerse themselves in the physical practice of a new process or equipment. This method is extremely valuable for onsite senior leadership, as it provides a window into behaviors that can help evaluate workers' level of understanding prior to real-site work.

Analyzing nearly 40 years' worth of research, a 2011 study published in the Journal of Applied Psychology found that in jobs where workers are placed in high-risk, hazardous environments, hands-on training proved to be the most effective at improving safe work behavior.[2] For companies dedicated to a stronger safety culture, educating onsite workers with the skills and confidence on how to avoid potential risks while using equipment is a crucial piece of the puzzle.

3 - "In the moment"

Most people can gain insights from their personal experiences, and while formal training sessions are certainly necessary, consider capitalizing on "teachable moments" when appropriate. Senior leaders should consider providing in-the-moment learning for all onsite workers, especially after a potentially life-threatening incident occurs. This comes after ensuring that every worker is out of harm's way, of course.

Consider capitalizing on "teachable moments" when appropriate.

Senior leaders must take the time to observe their employees and understand how they can best facilitate self-analysis in these events. By both explaining to workers how to resolve issues and also asking staff questions, taking the time to approach the problem from multiple angles can lead to the discovery of solutions aimed at best minimizing the chance of a recent event reoccurring. To ensure workers truly understand which processes were correct, as well as the areas where something went wrong and the risks, consider asking the following to promote real-time teaching:

- Is this a new or existing work process? Is there new equipment involved? Are we following compliance regulations that have been updated?
- What was the outcome versus what was expected? Were the processes followed correctly, and where might have

"In the moment" training *continued*

gaps existed?

- If the opportunity existed to redo the process, what should be done differently?

> Take time to approach a safety problem from multiple angles to discover solutions aimed at best minimizing the chance of a recent event reoccurring.

In an industry where a well-trained and knowledgeable workforce is vital for a safe and efficient worksite, companies must focus on incorporating a comprehensive training program into their safety plans. Investing in a combination of training methods will provide the foundation for a thriving future.

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