IFF

INTERNATIONAL FIRE FIGHTER MAGAZINE

REPORTING TO MUNICIPAL, INDUSTRIAL AND FIRE TRAINING PROFESSIONALS

Issue 44 • December 2014
www.iffmag.com

G-Force Nozzles: The Inside Story

Based on a highly customizable global nozzle platform design, the unique G-Force series of fixed, selectable, and automatic nozzles combine over 40 years of Task Force Tips design innovation and experience into true next generation firefighting tools. Manufactured exclusively at TFT's USA production facilities, the G-Force series is supported by an extensive infrastructure of 24-hour technical service representatives, on-line documentation, digital video training library, exclusive product serialization and tracking capabilities, and a proven 5 year product warranty. Incorporating unique performance components such as a stainless steel slide valve, inlet debris screen and protective fog pattern choices, the G-Force series delivers high performance and rugged dependability.

Serialization provides track-ability and immediate access to on-line operational instructions

Integral Inlet Screen prevents debris from entering nozzle and affecting stream quality

Stainless Steel Slide Valve provides turbulence-free flow control when gated

Color-Coded Polymer Pistol Grip, Valve Handle and Covers offer rugged durability in harsh firefighting conditions

Your Choice of Fixed, Swiveling, Threaded, Storz or Articulating Inlet Coupling

Flush without nozzle shutdown or pattern adjustment

TASK FORCE TIPS®

FIRE FIGHTING EQUIPMENT

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The NEW GLOBAL FORCE in Nozzles

FM APPROVED

For a complete list of FM Approved models visit newforce.tft.com.

NFPA #1964 Compliant

Integral Tactile Indicator provides optional preset pattern selection or factory set lock out

Choice of:
- Fixed Metal
- Fixed Molded Rubber
- Spinning Stainless Steel (shown)

Choice of:
- Fixed Pressure and Flow
- Selectable Flow with Fixed Pressure, or
- 3 Automatic Pressure and Variable Flow Choices

Choice of:
- Tip Only
- Shutoff
- Shutoff with Grip Models

Bonded Rubber Bumper provides maximum durability in harsh conditions

Lightweight Hard Anodized Aluminum Alloy Body includes permanent laser engraved operational markings and highly visible reflective labeling

Large Index Ring with Indicator allows easy flow, pressure or flush selections with a gloved hand

G-Force™

www.newforce.tft.com

by: TASK FORCE TIPS

YONE

PROEYE 751-SNR

SONAR Plus™
PAT.P

Search out by SONAR and pinpoint with the Underwater Camera Head! Great result in dark and cloudy waters!

Sonar Image Display

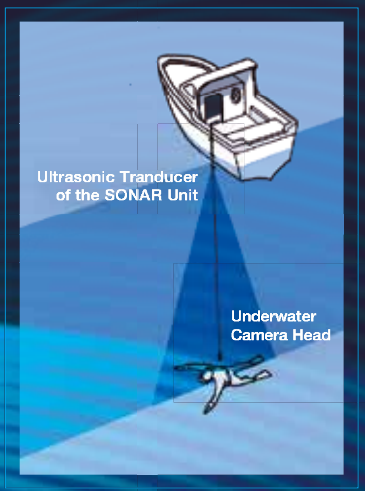
U/W Camera Image Display

With the unique PROEYE 751-SNR SONAR Plus , operators can see sonar images from the SONAR System and real-life images captured by the Underwater Camera Head at the same time. The forefront technologies built into SONAR provides clear images even when searching the dark or cloudy waters of lakes and rivers.

The system is designed compactly for optional use for various types of search & rescue operations.

GPS System indicates exact location on the display.

SONER Display image



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DECEMBER 2014 • ISSUE 44

Cover image: Task Force Tips Inc. Fire training is a critical component of preplanning. Industrial firefighters using a Protector Monitor at a live fire exercise.

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IFF is published quarterly by:
MDM Publishing Ltd
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Annual subscription free of charge.
Register at www.mdmpublishing.com

ISSN – 1744-5841

Printed in the UK

PROUD TO SUPPORT
The Fire Fighters Charity

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STORMALERT™

ALERT
FIREFIGHTING - WELL CONTROL
RISK MANAGEMENT SPECIALISTS

The New Global Standard

in high-performance firefighting foam technology

StormALERT™ high performance foam concentrates for successful extinguishment of Class B flammable liquid fires. An innovation in firefighting foam, StormALERT™ high performance foam concentrates are environmentally sustainable fluorosurfactant and fluoropolymer free products. Formulated using new synthetic foam concentrate technology, StormALERT™ high performance foam concentrates offer rapid knockdown and extinguishment, exceptional burn-back resistance, remarkable flow and rapid resealing characteristics and are designed to replace AFFF and FFFP foam concentrates and older fluoroprotein foams.

StormALERT™ high performance foam concentrates can be used with fresh, brackish or salt water. Foam discharge devices such as non-aspirating, as well as, aspirating equipment, including standard sprinkler heads, offer optimum performance. Compatible with most dry powder (chemical) agents. Approvals and Listings include UL162 (Standard for Safety for Foam Equipment and Liquid Concentrates), European Standard EN 1568 Part 3 and 4, and International Civil Aviation Organization (ICAO) Level B.

ALERT is an international one-stop source for custom-designed firefighting equipment and foam delivery systems, leading high performance firefighting foam concentrates, state-of-the-art emergency management solutions software, world-class training and proven global Emergency Response and Integrated Risk Management services.

Global Service Partner

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ALERT maintain an Integrated QHSSE Management System to ISO 9001, ISO 14001 and OHSAS 18001 Standards as Certified by Det Norske Veritas

Paul Darley

Paul Darley is President & CEO of W.S. Darley & Co. He is a Past President of the Fire Apparatus Manufacturers Association (FAMA) and served on the Board of Directors of Fire & Emergency Manufacturers & Services Association (FEMSA). He holds a BS Degree in Marketing and Finance from Marquette University and an MBA from Northwestern University's Kellogg School of Management.

The Millennials are Coming

From fighting fires to onboarding Millennials, times are changing. Embrace the changes.

Over the past 30 years, I've had the opportunity to visit fire services in more than 75 countries around the world. It's always humbling to meet with our customers, and it's an honor and privilege to be in an industry where we can assist those who give so selflessly.

American writer and humanist Kurt Vonnegut realized their contributions to society when he wrote, "I can think of no more stirring symbol of man's humanity to man than a fire engine."

A lot has changed over the years. Firefighting technology has seen significant advancements, including compressed air foam systems (CAFS), ultra-high pressure, water mist, touchscreen control panels, and on-board water purification.

The single biggest change that I've seen is the number of fires, at least in the USA. While your department may still have a name with "fire" in it, let's face it fighting fires is not where you spend most of your time. This is largely due to better fire prevention, including more stringent electrical and construction codes, fire sprinkler systems, fewer smokers, and flame resistant products.

The number of fires around the world is a fraction of what it used to be when I joined our 100-year-old family business. It might come as a surprise to you, but in 2013, less than four percent of all fire service responses in the USA were actual fire calls. According to NFPA statistics, roughly 65 percent of calls were for medical aid or EMS related. I encourage you to download the complete report from the NFPA website at www.nfpa.org.

The amount of statistical information on USA fire services in this report is extraordinary, and it probably reflects conditions in your country. Last year, the New York City Fire Department (FDNY) was the busiest fire station in the USA, responding to over 1.4 million calls. However, less than two percent of those calls were for actual fires.

Don't get me wrong: firefighting is still critical regardless of where you live. But you, and your equipment, should change with the times. While the fire apparatus, equipment, techniques and methodologies may vary from country to country, progressive fire departments around the world are becoming more practical in their approaches.

The hottest trend in the USA, for example, is toward multi-purpose vehicles. These vehicles still have a substantial pumping capability, but the pumps take up much less of the vehicle's overall footprint. This frees up space to carry more equipment for all the other responses, in a more compact package that allows for better vehicle maneuverability. These vehicles meet the true needs of today's fire service, rather than historical perceived needs.

In China, on the other hand, major cities have embraced our most sophisticated products, such as CAFS. The Chinese are not hamstrung by traditional firefighting methods, like many in the USA. With the explosion of high-rise housing, China simply needs the best equipment to protect its cities and citizens. Its fire service conducts research and then implements decisions quickly.

No matter where you live, two things haven't changed: First, we're still "putting the wet stuff on hot stuff," albeit at a significantly slower rate than we were just 10 years ago. Second, men, and a growing number of women firefighters, still fight fires similar to how they were fought for centuries. There isn't a magic pill. And while robots may have a place in the fire service, when it comes to fighting fires, they have not replaced humans, and probably never will.

That means for your department to grow and thrive, you'll need to onboard and inculcate new members. Most likely, they'll be "Millennials," those who are roughly 18-35 years old. Never before has one generation been more analyzed and scrutinized then the Millennials.

I'm a data-driven manager, and while I don't like to stereotype, you can't ignore the statistics about Millennials. To attract these fine young leaders, an organization needs to explain its vision, be transparent, provide encouragement and feedback, and allow for upward mobility.

According to a 2014 survey by the National Volunteer Fire Council, recruitment and retention is one of the biggest challenges facing volunteer fire departments today. New members are the lifeblood of any organization. Properly attracting, onboarding and training them is critical to long-term success. Our military customers know this better than anyone.

A 2010 Pew Research Center study found that Millennials place a higher priority on helping people in need (21%) than having a high-paying career (15%). If this is correct, then why are volunteer fire departments in the U.S. having recruitment challenges? I don't have the answer, but perhaps part of it has to do with leadership's inability to listen and then adapt to changing times. I find myself caught in this trap at times.

Whether you're a career or volunteer department, it's critical that today's fire service leader be constantly listening to this new generation – and I mean really listening. This generation is tech savvy and filled with ideas on ways to improve your department's level of service.

At Darley, most of our breakthrough ideas come from truly listening to our customers and employees. Whether volunteers, employees or customers, all stakeholders need to have a voice and be heard. The quickest way to turn off any group of constituents is to not listen. Action needs to be taken based on input. And if you can't implement certain changes, your constituents need to know why.

At Darley, we're going to continue to embrace and learn from Millennials while slowly adapting our culture. I would encourage your organization to do the same.

News

Delta Fire at Intersec Dubai 2015

Last year's Intersec Dubai 2014 proved highly successful for UK based Delta Fire who are delighted to announce their continued attendance in 2015.

Delta will be showcasing a number of their UK manufactured products which have achieved global acclaim in recent years with a particular focus on Fire Nozzles and Foam Fire Fighting Equipment.

With an export client base in more than 65 countries Delta's Export Team are rapidly expanding the Delta brand on a global scale. Premium quality, UK manufactured products are now recognised as providing the very best in performance, durability and long-term value for money in this very demanding sector, perhaps best endorsed by Delta's recent export successes in China.

The full range of Delta's Professional Nozzles will be on display including the well-respected Attack & Automatics now in service across multiple sectors worldwide. Dubai is in the top 5 countries in the world in density of high rise buildings and Delta's dedicated High Rise Nozzles will undoubtedly be of particular interest again at the 2015 show.

Delta's UK manufactured Foam Inductors, Branchpipes, Hi-Ex Generators and Mobile Foam Units will be on the stand and visitors will have the ability to meet the Technical Team behind the design of a hi-tech range of product at the forefront of Global Fire Fighting.

With a vast accumulation of Industry knowledge and expertise in successfully exporting their products around the world Delta's Export Team welcome the opportunity to meet prospective and existing customers onto their stand in the UK Pavilion.

For more information, go to www.deltafire.co.uk

Fhoss are Safely Lighting the Way

Have you ever found yourself out at night on a job and unsure if you are visible to oncoming traffic? Have you ever felt uncertain whether your fellow fire fighters are able to see you, particularly when there is no ambient light available?

Fhoss Technology is a company that is revolutionising the high visibility safety wear market and has developed a range of clothing which greatly enhances a fire fighter's visibility in all light and weather conditions.

The range of innovative safety products integrate powered light electroluminescence, which is combined with prismatic reflective tape with an illuminated core. This is then integrated to a range of high visibility garments that meets all required certifications and fire safety standards.

Specifically, the Fhoss Fi Harness, which sits over existing clothing, meets the FR EN469 and the ELECTRIC ARC F2621-2012 standard – making it an ideal garment for fire fighters to wear in periods of total darkness and in all light conditions.

Andrew Kimitri, CEO of Fhoss International, comments: "Safety sits at the forefront of our agenda. While traditional PPE works well with the presence of ambient light, it is of no use in darkness or in bad weather conditions. Fhoss represents a big step forward in the PPE market as a whole, as it means that emergency services workers can be seen at all times and in all conditions. By introducing Fhoss to the PPE arena, we pledge to help bring about a change in culture for the way in which the emergency services protect their staff. We believe strongly that our technology has the capability to save lives.

"Finalists in three national awards in 2014, it has been a great year for Fhoss as we move towards our goal of making our powered safety wear common place on Britain's roads."

The full range of products can be found on the Fhoss website together with some great video clips showing the products in action.

For more information, go to www.fhoss.com

DQE Helps Prepare for Ebola Scenarios

Since the first laboratory-confirmed case of Ebola was diagnosed in the United States on September 30, 2014, healthcare and emergency responders have rushed to provide the proper protection to their staff. DQE has been there every step of the way to ensure that customers have the protection they need for infection control. Orders have been limited to healthcare and emergency response personnel only, so that those with the greatest need receive them first.

"The SafePaq blood and virus protection kit has been our best selling product for the past two weeks," says DQE president Tony Baumgartner. "We have been answering calls non-stop and helping our customers prepare for an infectious event. These are the types of events that we plan for and DQE is continually updating its supplies to support the evolving CDC standards." The SafePaq provides coveralls that meet ASTM F1670/F1671 Standards for blood and viral penetration resistance. Its contents provide a foundation of protection against a wide range of fluid and viral threats and have applications in healthcare settings as well as with emergency responders who may encounter a patient with an infectious disease.

"Another product we carry that has a significant application to waste management during an infectious outbreak is the Sani-Bag+," says Baumgartner. The Sani-Bag+ is used, removed, sealed, and disposed of without the caregiver having direct contact with the waste, therefore eliminating the possibility of cross contamination from infectious microbes.

By sending infection control supplies to support healthcare workers around the United States and the world, DQE is fulfilling its mission of being ready now for what's next.

For more information, go to www.dqeready.com/InfectionControl

World Rescue Challenge 2014 – A Great Success!

The World Rescue Challenge 2014 was hosted at the Fire Service College, Moreton in Marsh which proved to be a great venue with excellent facilities for such a multifaceted event.

Over 1400 visitors attended during the morning of the first day and the event went from strength to strength as teams competed on Friday 10th October through to Sunday 12th October 2014.

There were a number of challenges and workshops which teams participated in, from extrication, trauma, heavy goods vehicles and new vehicle technology.

The overall extrication competition was extremely close with first place only being decided on a count back of the results. This resulted in Hampshire Fire and Rescue Service being crowned 2014 Extrication Team Champions with Carlow in second place and Valencia 1 in third.

The extrication trauma challenge was also very hotly contested with Humberside Fire and Rescue Service receiving top honours with Hampshire in second and the Luxemburg Red Cross taking third spot.

At the WRC Closing Ceremony on Sunday evening Jez Smith, Fire Service College managing director, handed over to Carlos Castro, councillor from Lisbon, who will be hosting the WRC in 2015.

Jez commented, “Congratulations to all the competitors – but particularly the two winning teams, both of which performed spectacularly. It was a fascinating event to watch and one that we were delighted to support. The World Rescue Challenge continues to go from strength to strength, as does the Fire Service College.”

He added: “As one of the world’s premier rescue training facilities, the Fire Service College is the ideal venue to stage such a large scale competition. Hosting the WRC also presented the College with a fantastic opportunity to open its doors to the public, to give them a chance to observe professional rescue teams in action.”

A full list of the results from this year’s challenge and details of forthcoming events can be found on the World Rescue Challenge website.

For more information, go to www.wrescue.org

Pointing the way to fire safety with Goodpoint

Fire and Rescue Services in the UK are doing an amazing job of promoting the message that people should test their smoke alarms on a weekly basis. Ideas such as #testittuesday on Twitter ensure that this vital message is delivered in a unified and effective manner.

However, for many people, compliance with this message is also an invitation to put themselves in physical danger by getting onto chairs or stepladders in order to push the button. The resultant risk of falling simply prohibits large sections of the population from carrying out the task. Similarly, most of us are put off by the sheer inconvenience of doing the job! Be honest when did you last test yours?

Philip Martin, Area Manager responsable for Community Safety and Risk Reduction at Devon and Somerset Fire and Rescue, identified that the risk of injury was a barrier to the testing of smoke alarms and so designed a simple tool to make the task easier and safer. Philip said, "Sadly I have seen first-hand the tragic and needless loss of life in homes where smoke alarms were fitted but failed to operate when they were needed the most. It quickly became apparent that whilst the fire service was excellent at providing and helping fit smoke alarms, particularly in elderly people's homes, no provision was being made for a method of testing the smoke alarm safely on a regular basis."

Philip's simple idea became the Goodpoint smoke alarm tester and UK fire and rescue services are adopting it as part of their home safety visits, in increasing numbers. International interest is also gaining momentum with US fire departments taking up the product, an Australian distributor and enquiries from around the globe. The Goodpoint can be printed with both fire service details and safety message(s) which creates a highly visible reminder to test weekly. In short: this fun, eye catching, durable and cost-effective tool is fast becoming the medium of choice to deliver both the message and the means to safe test your smoke alarm weekly.

Statistics surrounding fire deaths within the elderly population are shocking. Almost twice as many people over the age of 50 now die in dwelling fires in the UK each year compared to those under 50 (CFOA). Similarly, vulnerability such as experiencing mental health issues, drug or alcohol misuse, living alone or having limited mobility are seen as risk factors involved in fire deaths.

Another interesting angle is that the problem (in numerical terms) of smoke alarms that do not work is now greater than that of houses which do not have a smoke alarm at all. If we take the accepted statistic that 85% of UK households have a smoke alarm fitted we can see that approximately 3 million homes crucially still need to get one. However, it is estimated that one in three of the smoke alarms that are fitted no longer work for one reason or another – this is reflected in the dreadful figure that 28% of fire deaths occur in a dwelling where a smoke alarm was present but failed to work when required. The number of UK smoke alarms that currently do not work could therefore be close to 5 million!

To adopt Goodpoint as part of your community/home safety programme contact Ian McCord on +44 (0)1392 683397 or email ian@goodpointcampaign.com

For more information, go to www.goodpointcampaign.com

Crucial role for FloodSax on the emergency frontline

The sandless sandbags are so easy to store on the appliance yet can be used in so many ways at emergencies from soaking up leaking fuel from crashed vehicles to diverting floodwater away from homes and businesses and even as barriers against torrential floods.

They have stopped tons of debris threatening to wreck homes in the aftermath of Hurricane Sandy in the USA in 2012 and in Scotland fire crews in the flood-risk town of Comrie see them as crucial with the River Ruchill often bursting its banks. They now have 2,000 FloodSax stored next to their station.

FloodSax have been endorsed by the National Disabled Fire Association as they are so easy to handle and deploy.

FloodSax are transformed from being as light as a pillowcase (700 grams) to become as tough and heavy as sandbags (20kg) within five minutes. They are vacuum-packed so take hardly any space to store and 20 fit into a cardboard box that one person can easily carry. Compare that to 20 sandbags that would need a pallet.

Bizarrely, just one FloodSax saved the day when an emergency centre faced being badly damaged by floodwater.

▲ **The wall of Floodsax in the distance held back all this debris and the deluge of water that swept it there.**

The FloodSax was a sample that had been given to the Georgetown County Emergency Management team in South Carolina – and when torrential rain started to leak under a doorway the sample was put there and immediately stemmed the flow.

Emergency Management director Sam Hodge said: "Within several minutes the FloodSax expanded to seal off the bottom of the door, literally keeping out gallons of water and saving water damage."

Emergency management expert Tim Shipman, who runs disaster recovery services for a company in the USA that has nine major distribution centres and around 1,700 retail locations, now only uses FloodSax instead of sandbags.

He said: "FloodSax are very easy to use and are less labour intensive than trying to use the normal type of sandbag and much more effective and efficient when used properly."

And in the UK Mary Dhonau, chairwoman of the Flood Protection Association, says sandbags are hopelessly outdated.

"I hate them with a vengeance," she said. "They do nothing but filter water."

Floodsax have become vital for firefighters around the world.

For more information, go to www.floodsax.com

GOODPOINT

Smoke Alarm Tester

Why just deliver the message, when you can also deliver the solution?

Join the growing number of Fire and Rescue Services who are adopting the GoodPoint Smoke Alarm Tester as part of their Home Safety Visits / Community Safety work.

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INTERNATIONAL DISTRIBUTORS REQUIRED

FloodSax®

The sandless sandbag

Firefighters worldwide have used FloodSax when it counts ... in action

The pioneering sandless sandbags have soaked up fuel from crashed vehicles, diverted floodwater down drains and acted as barriers to save properties from countless thousands of pounds damage.

They are small to store yet as soon as they come into contact with water expand to become tougher and easier to stack than sandbags and powerful enough to stop tons of water and debris.

Please go to www.floodsax.com to see just how they work.

Video Fire Detection – A New Affordable Solution

UK Fire losses have substantially increased over recent years and are now regularly exceeding £1 Billion per year. Proposed budget cuts across the UK Fire Service will see large reductions in fire-fighter posts, appliances and the closure of Fire Stations. In light of these facts and proposed manpower reductions, earlier intervention of the emergency services to a developing fire has become ever more important. This will give the emergency services a better chance of limiting damage to buildings and more importantly saving both lives and jobs.

Spotfire together with their partners have produced a dual purpose CCTV Camera that can work alongside existing Fire Detection systems. Its inbuilt software will, in the camera's field of view, look for both the presence of smoke (indoor only) and flame (outdoor and indoor) as well as monitoring for any signs of criminal activity. Tests have shown that detection of smoke or flame takes place typically within 20 seconds. It can operate inside and outside of buildings and its operating system works in both daylight and night time conditions.

An indication of how unique this product is that, at this time, there are no European or International standards currently available. The USA, with both UL and FM, has created standards and the Chinese Standards body also has their own standard. The International Standards Organisation (ISO) produced a committee draft of a proposed standard, ISO/TC21/SC3 N813, which completed public comment on 13 June 2014. This proposed draft was rejected by several agencies including BSI as some of the test fires were deemed as inappropriate. A revised draft, ISO/DIS 7420-29, has been published for further discussion. This would indicate that the potential marketplace is now looking to legitimise this unique product, but if the standards procedures run to form we are looking at an industry wide standard not becoming available for several years to come.

The duality of the Spotfire camera makes it an ideal solution for numerous locations. With arson attacks on Schools, Mosques and Business premises on the increase, the Spotfire camera has the ability to record such events as they happen. This true record of the events would be of interest to all parties, including property owners, the Police and Insurance companies. Areas at risk of fire due to their nature and storage of products would be Recycling Plants, Petro-Chemical Plants, Multi-Storey and Surface Car Parks, Warehouses, Distribution Centres and Airport Hangers. Public buildings such as Hospitals, Museums, Art Galleries, Libraries, Shopping Malls and Airport Terminals, particularly those with large atrium areas are prime candidates for this type of protection. The applications are numerous and its benefits are that by early detection it will minimise interruption to business and by association help to reduce insurance costs and claims.

Spotfire
Tomorrow's technology TODAY

It should be acknowledged that the siting of a camera or cameras will be dictated by a number of factors including the hazard involved, the field of view, the potential size and type of fire, obstructions to view and response time. The consequence of this is that a survey of the Spotfire camera potential locations should be undertaken by appointed competent installers prior to any installation, taking into account the above cited observations to ensure the correct maximum coverage. A huge plus for this equipment is its ability to be integrated into existing CCTV systems including CCTV security systems meeting the BS 5839 Pt1 statement as a complimentary item. For larger locations a standalone Spotfire system can be installed.

The conclusion that there are alternative means of fire detection available which can solve the impossible problem for consultants, installers and clients now has a proven case in the form of CCTV fire detection and in the foreseeable future will take its place alongside today's accepted means of fire detection.

For more information, go to www.spotfireltd.co.uk


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TO SAVE A LIFE OR A BUDDY.
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A New, Revolutionary Fire Extinguishing Agent

INTERNATIONAL PATENT PENDING

Dupré Minerals' AVD (Aqueous Vermiculite Dispersion) is a revolutionary fire extinguishing agent designed for flammable metal fires, specifically Magnesium powder and Magnesium swarf. It offers significantly superior performance across the flammable metal range and has key benefits over existing solutions. Dupré have proven that AVD is more effective at extinguishing metal fires, especially Magnesium, than conventional extinguishing agents.

What is AVD?

AVD is an aqueous dispersion of chemically exfoliated Vermiculite. Vermiculite is the name given to a group of hydrated laminar aluminium-iron-magnesium silicates. Raw Vermiculite consists of thin, flat flakes containing microscopic layers of water. When Vermiculite is exfoliated, either thermally or chemically, the microscopic layers of water are removed and this either causes expansion (thermally exfoliated) or creates microscopic, individual platelets that are freely suspended in water (chemically exfoliated). AVD is approximately 20% Vermiculite / 80% Water with a viscosity of 3000 cPs and a D90 of 180 microns (0.18mm). AVD is non flammable and has excellent insulation properties.

How does AVD work?

Due to the reactivity between a flammable metal fire and water, AVD is applied in the form of a 'mist' or 'foam'. The Vermiculite particles within the mist or foam are deposited on the surface of the burning fuel to create a film over the top of the fire. This film instantly dries and because the high aspect ratio platelet particles overlap and bind together, they produce a non flammable oxygen barrier between the fire and the atmosphere.

This process offers cooling to the surface of the fire and as the AVD platelets begin to build up they form an oxygen barrier over the fuel source, the fire is gradually cooled and brought under control. Unlike other Class D Extinguishing Agents where the fire has to be left for long periods of time before the fire is truly under control and completely burnt out, AVD offers quicker control to the fire.

What are the benefits of AVD?

AVD is suitable for both portable and fixed installations due to its fluid nature and a smaller volume of agent is required to extinguish the fire compared to conventional agents. The Vermiculite platelets within the AVD create a fire proof high insulation oxygen barrier that extinguish and not just suppress the metal fire whilst the water content cools the fire source.

AVD can be used in a Misted or Foamed format depending on the application and to date we have tested AVD in the following deployment systems:

- ✓ Portable Extinguisher Bottles
- ✓ Back Pack Extinguishers
- ✓ Trolley Based Extinguishers
- ✓ Fire Service Pump Systems
- ✓ Fixed Installation

In addition to its performance on metal fires AVD can also be used to extinguish Class A materials such as wood and plastic. The excellent re-ignition prevention properties of AVD provide a flame proof barrier to almost any substrate allowing the spread of fire to be contained.

For more information, go to www.avdfire.com

AVD AQUEOUS VERMICULITE DISPERSION

1 Flammable metal fires such as magnesium, can burn up to 3,000°C.

2 AVD is applied. The water content of AVD cools the fire source.

3 The Vermiculite platelets build a eramic type oxygen barrier on the fuel source stopping the fire and smoke/gas generation.

4 Further AVD particles fall on top of the solidified AVD crust, boiling off any water content and cooling the fuel source.

TEISEN'S Large Diameter Hoses
— Made in Japan!

Introduction

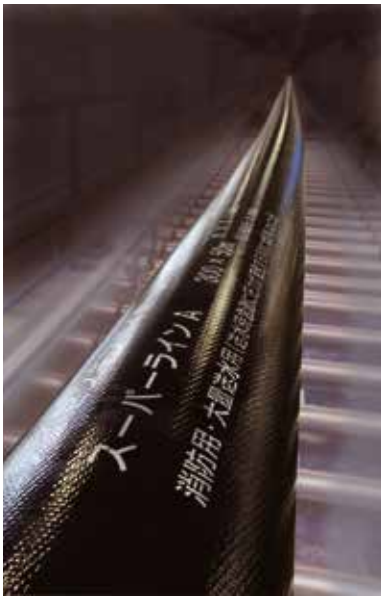
TEISEN produced its first firefighting hose in 1903, and since then, it has been the most experienced and largest firefighting hose manufacturer in Japan.

Super Line Large Diameter Hoses

TEISEN offers the Super Line LDH with a diameter of up to 300mm. Super Line LDH is manufactured using a one-piece construction method, extruding the cover and lining in one step, with polyurethane through a polyester jacket.

Features

- Minimized pressure loss
- Compact storage through a new kind of rubber-like, polyurethane material
- Available in long lengths
- Excellent resistance to heat, fuel, chemicals, UV, ozone, weathering, etc.



Diameter	mm	100	150	200	250	300
	inch	4.0	6.0	8.0	10.0	12.0
Color		orange	orange	orange	black	black
Wall thickness	mm	3.5	3.5	4.0	4.6	5.0
Weight	kg/m	1.1	1.6	2.8	4.0	4.8
Burst pressure	MPa	4.2	4.4	3.6	3.0	2.8
Maximum working pressure	MPa	1.6	1.6	1.4	1.4	1.4
Temperature range	℃	-20℃～50℃				

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The LEADER Sar all risks Helmet is suitable for many applications. It is tested to eleven different standards giving it the versatility to be used in a wide range of applications including:

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- Water rescue / Swift Water / Marine / Ribs / Hovercraft
- Forestry fire fighting
- Ambulance / E.M.S
- Wildland fire fighting
- Maritime Rescue / Coastal Security
- Technical Rescue / Assistance
- Working at height / Urban Climbing
- All Terrain Vehicles
- Snowmobile /Jet-ski / Quad bike / Equestrian

It is available in many colours including; Hi-Viz yellow, Hi-Viz orange, white, red, black, royal-blue, olive green and navy blue as well as Police, Marine and Security colour options. It has a great range of accessories including marine visor, forestry visor, integral eye shield and ear defenders.

For more information, go to www.leader-group.eu

Mahé Airport choose Kronenburg

The Airport Emergency Services of Seychelles International Airport on the island of Mahé in the Indian Ocean have received the first of two CT009 airport crash tender variants from Kronenburg BV in Holland.

This specific CT009 airport crash truck is based on a purpose built KME 6x6 airport crash tender chassis incorporating a 700 hp Caterpillar C18 diesel engine, Twin Disc 6 speed automatic transmission and coil spring suspension.

The spacious crew safety cab has seating for a driver plus three additional crew members. The top hamper bodywork features four spacious lockers per side and innovative easy engine access. The integral tanks hold 12,000 litres of water and 1,440 litres of foam. It also carries 250 kg of additional media.

The remote roof mounted monitor has an output of 6,000 litres per minute (lpm) and the bumper turret 1,325 lpm. The Kronenburg CT009 is available with an extensive range of options; in 4x4, 6x6 and 8x8 wheel drive plus an air transportable 4x4 variant.

For more information, go to www.kronenburgfire.com

Image courtesy of Kronenburg BV

Continued Global Growth For PBI

PBI Performance Products is enjoying continued growth across Europe as more fire and rescue services specify the company's outer fabrics as the preferred choice to protect their firefighters.

PBI fabrics are internationally renowned for their exceptional flame resistance and thermal protection from radiant heat, built on a 30-year heritage of technical excellence and innovation.

In Sweden, Gothenburg Fire and Rescue Service recently changed to PPE with a new outer fabric, manufactured by Viking, choosing Neo, which provides excellent tensile strength and tear resistance, along with the inherent protective properties of PBI fibre. Katarina Appelqvist, Gothenburg Fire and Rescue Service, said: "PBI is integral to our new PPE system which was chosen after a rigorous trial and evaluation process to ensure the best combination of protection and comfort for our firefighters."

In the UK, Manchester Fire and Rescue Service have also opted to protect their firefighters with PBI Matrix fabric in their new PPE ensemble, designed and manufactured by Bristol Uniforms. Steve McGuirk, County Fire Officer and Chief Executive, Manchester Fire and Rescue Service, said:

"Our focus is on providing the best possible protection for our firefighters and PBI fabric plays an important role in achieving that in our new PPE."

In the Netherlands, Rotterdam Fire Department's firefighters will be protected by PBI Matrix fabric, which combines the high performing heat and flame protection of PBI Gold with a durable matrix of high strength denier filaments to reduce wear and tear. The brigade's new PPE is manufactured by Texport. Jan Bosch, insert title, Rotterdam Fire Department said: "We are very happy with the new firefighting suit, which was chosen after a series of extremely challenging wearer trials and tests, during which the team praised the suit's comfort and performance."

PBI Matrix is also the preferred choice in Ireland, where Dublin Fire Brigade's firefighters will also benefit from the high standards of protection delivered by the fabric, supplied by Hunter Apparel Solutions.

In procuring their new fire-fighting ensembles, all of these fire and rescue services undertook detailed and demanding evaluations, setting extremely high performance standards for the component fabrics, as well as the complete suits. In all of these tests and criteria, PBI fabrics exceeded the required standards.

Since the North American introduction of PBI Max in 2012, there has been huge success in PBI growth. With over 35,000 sets in the field, the comfort, protection and durability of PBI Max is unquestioned. Major metro city conversions include Phoenix, San Francisco, Philadelphia, Baltimore, Montreal, San Diego and many others.

Further new additions are Gemini XTL and Titan 1260 complementing the internationally renowned PBI Matrix and PBI Gold fabrics.

PBI fabrics are lightweight and strong and achieve a high standard of flame resistance. They will not become brittle, shrink or break open when exposed to flame and high temperatures. This also means that the integrity of the internal layers of the garment is protected and the transfer of any radiant heat is slower, allowing more time for firefighters to escape to safety in a situation such as a flashover.

The outer fabric is the first line of defence in any protective clothing ensemble and has to be strong and durable to cope with the impacts and abrasions that come with the job. It doesn't matter how well a fabric protects the wearer if it won't hold up to the working environment. PBI fabrics are very durable with high tear and UV resistance. They have a proven track record of maintaining performance and protection levels throughout the lifetime of the garment and that high durability also helps to ensure low maintenance.

Helmut Zepf, Vice President, International Sales & Marketing, PBI Performance Products said: "The continued success and growth of the business across all of our markets is a result of the quality and performance of our products and the commitment of our team to work closely with fire and rescue services to fully understand their needs.

"The specialist knowledge and expertise that we have developed through close relationships with our fire service end users and supply chain partners over the last 30 years informs our continued innovation and product development.

PBI fabrics protect front line firefighters all over the world in Australia, New Zealand, Asia, the Middle East, North America and much of Europe, including Scandinavia and Germany.

For more information, go to www.pbiproducts.com

Enhancing Situational Awareness with Advanced Thermal Imaging

As the world leading provider of advanced thermal imaging equipment to the fire industry, ISG prides itself on its unique ability to enhance the performance and operability of its thermal imager's well beyond their core and most basic function. Our cameras are well-known for providing firefighters with the ability to fully interpret a fire scene and make better, safer, tactical decisions

ISG employs one of the largest and most comprehensive engineering teams of any firefighting TIC manufacturer in the world. Based across two continents in three separate facilities, our exceptional in-house development team are able to create and develop product enhancements that ensure our thermal imagers remain at the forefront of technological advancement.

We offer a wide range of thermal cameras to suit all budgets, in fact, ISG is the only camera manufacture to offer two different NFPA models, our E380n was the very first thermal camera to ever be NFPA certified and now our personal format camera the X380n is the newest.

ISG has invested huge resources in streamlining our internal processes so that any camera returned to us for repair or service is submitted to our internal Repair Centre within 30 minutes of arrival at the factory. Our expert engineers can then assess the returned camera and provide a diagnosis and proposed solution within a matter of hours so that we can respond quickly, and get your camera retuned to you within 48 hours.

One thing is guaranteed with every ISG product purchased: you'll be getting the most technologically advanced thermal imaging solution, designed specifically for your application in the most extreme environments, and you'll get total peace of mind and absolute support with our complete after-sale service throughout the life of your product.

If you are interested in becoming a distribution partner with ISG please contact us to discuss this further. information.

For more information, go to www.isgfire.com

FLIR Systems launches new AX8 Fixed-mount Temperature Sensor

FLIR Systems recently announced the launch of its new AX8 fixed-mount temperature sensor. Combining thermal and visible cameras along with FLIR's proprietary MSX® technology in a small, affordable package, the AX8 is easy to install in space-constrained areas for automated and uninterrupted condition monitoring of critical electrical and mechanical equipment.

Enabled by FLIR's ground-breaking Lepton® thermal imaging core, the AX8 provides early detection of temperature-related issues in electrical and mechanical equipment, guarding against unplanned outages, service interruptions, and equipment failure, The AX8 is the ideal temperature sensor for continuous condition monitoring and fire prevention without the need for periodic manual scans.

The AX8 thermal imager has 4,800 active temperature points per image, provides streaming temperature data over industry-standard interfaces (Ethernet/IP and Modbus TCP) for easy analysis, has a built-in web interface, and includes a full suite of Analysis and Alarm functions that automatically send alerts when the AX8 detects elevated temperatures.

Measuring only 54 x 25 x 95 mm, the AX8 integrates easily into electrical installations or any manufacturing environment. The AX8's streaming thermal, visual, and MSX video is output in standard MJPEG, MPEG, H.264 formats, adding multipurpose image capabilities.

With all of these features in a compact form factor, the FLIR AX8 addresses the condition monitoring and safety needs for many environments, including:

- Process and manufacturing industries
- Data centers
- Energy generation and distribution
- Transportation and mass transit
- Storage facilities
- Refrigeration warehouses
- Engine rooms

"With the AX8, FLIR is continuing to find new and innovative uses for its increasingly-more affordable thermal imaging technologies," said Andy Teich, FLIR's President and CEO. "The AX8 is another example of how our new Lepton core's revolutionary price, size, and low power consumption is creating a new product category and corresponding applications."

At a groundbreaking price of 995 USD, the AX8 will be available for global order and delivery in the fourth quarter of 2014.

For more information, go to www.flir.com/ax8

The push for clean PPE and Healthy Fire Fighters

In the past decades, firefighters have been glorified for their tough and dirty exteriors that demonstrate their heroic efforts to fight fires and save lives.Soot covered turn out gear often served as a badge of honor, illustrating how courageous these men and woman are in their day to day job.

Recent research, however, has suggested that the fire flames are not the only battles our fire fighters are fighting. One other unforeseen battle is cancer.

Combustion by-products are pollutants that firefighters are exposed to when encountering fires. These contaminants include benzene, formaldehyde and even asbestos, which are known or suspected to cause cancer. In 2013, the U.S. Fire Administration (USFA) and National Institute for Occupational Safety and Healthy (NIOSH) announced that their multi-year study of a group of 29,993 U.S. firefighters concluded that they are at higher risk of cancers of the digestive, oral, respiratory, and urinary systems when compared to the general population. Although many of these exposures are inevitable in this field, there are unnecessary exposures that can and should be eliminated to reduce the overall risk. One way to do this is through the proper washing and drying of personal protective equipment (PPE).

Turnout gear becomes heavily saturated with carcinogens after an encounter with fire. The contaminants are not only on the outside of the gear, they become embedded in the fibers of the material. Firefighters take extra precautions not to inhale harmful toxins during the line of duty, however, they overlook that these hazardous particles are left with them on their PPE to be absorbed through the skin or ingested.

Podab Inc., a commercial laundry manufacturer based in Sweden, has exclusively partnered with the organization 'Healthy Firefighters' to aid in the prevention of carcinogenic exposures through proper washing, drying, and handling of contaminated gear. Stefan Magnusson, the founder of 'Healthy Firefighters' and a firefighter himself, has developed a method of disposing dirty PPE through properly extracting and containing it immediately after an exposure so that it can be washed and dried promptly upon arrival to the station. He emphasizes that for this procedure to be effective, washing and drying must be done with equipment that can clean and dry it quickly enough so that it can be re-used again as soon as possible.

Stefan said, "The heavy duty turnout gear is absolutely essential to keep firefighters safe, however, it is important to realize that after attending an incident the PPE can also act as a potential danger. Soot and other particles can contaminate the garments, making them a health hazard for our firefighters. In order to prevent this contamination, PPE should be removed immediately after every operation and washed and dried in a timely manner."

Podab presents a complete range of washing and drying equipment that has been developed in cooperation with Healthy Firefighters. It has developed the FC20 Protective Gear Drying Cabinet specifically to dry turnout gear. This cabinet was the first drying cabinet on the market with the unique ability to dry PPE from the inside and outside by directing hot air through its hangers, significantly cutting drying time.

The FC20 bears a crucial component to the decontamination of PPE. Fire stations across the globe will be more likely to wash their gear if they can have it dry and ready to re-use as soon as possible. Damp turnout gear can be just as dangerous as dirty gear. If gear isn't fully dried, the moisture left can turn into steam during a fire and subject the firefighter to burns. Any moisture left in the gear can also mold or mildew. The FC20 cabinet is equipped with humidity tracking system (HTS) that measures the level of humidity every second to determine exactly when textiles are dry, eliminating any risk of dampness.

These cabinets are a predominant feature in fire stations across Sweden. By spreading awareness about the importance of clean PPE, Podab and 'Healthy Firefighters' hope to aid in the prevention of cancer in our firefighters worldwide. Our mission is to help protect the men and women who protect us.

For more information, go to www.podab.com

Image courtesy of Podab

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There's No LNG In My District ... Think Again!

Liquefied Natural Gas (LNG) has been in use for many years. In the past it had been more common in Europe and Asia than in the USA but that is changing rapidly. Large LNG ships have been loading in Africa and unloading in other parts of the world.

Tom Guldner

Tom is a retired Lieutenant of the New York City Fire Department's Marine Division and is a Principal Member of the NFPA Technical Committee on Merchant Vessels. His company Marine Firefighting Inc. is involved in consulting and training mariners and land based firefighters in all aspects of marine fire fighting. Tom can be contacted at marinefires@aol.com or visit www.marinefirefighting.com.

For the past 15-years I have been training tug boat crews who escort large LNG ships into and out of ports throughout the USA and Mexico. This training not only dealt with understanding the properties and dangers of LNG but I was also training these tug boat crews to use the powerful firefighting equipment installed on their boats. In addition to that training I have also conducted full scale evaluation drills at LNG facilities. These drills included the facility personnel, the tug boat crews, and the LNG ship's crew.

I have written about LNG and the procedures used to mitigate small fires and emergencies dealing with this super cold product in the past and will not repeat it in its entirety here. However, I will repeat some of the information regarding the properties of LNG of which you should be aware.

Liquid Natural Gas is a colourless, odourless liquid that is natural gas in a liquid form. Previously, the world's major supplies of natural gas have not been available to areas remote from the gas wells, as the cost of shipping natural gas in its gaseous state was simply too expensive. Liquefying natural gas reduces its volume 600 times and, because of this reduction in volume, it became profitable to export natural gas in its liquid form.

LNG is formed by subjecting natural gas to extremely cold temperatures; at –260°F (–161°C) the gas becomes a liquid at atmospheric pressure. Liquids at these temperatures are considered cryogenic. The weight of LNG is also important. LNG weighs just 3.9 pounds (1.8 Kilograms) a gallon. This is important because the weight of a gallon of water is 8.3 pounds (3.8 Kilograms), which means that the LNG will float on the surface when spilled onto the water. After regasification and warming the gas from LNG will become lighter than air, but until then it will remain at ground level where it may find a source of ignition. LNG is almost pure methane, and so when LNG vapour burns, there is generally no visible smoke.

In this article I want to discuss some recent news about the wide spread proliferation of LNG being used as a fuel in our society.

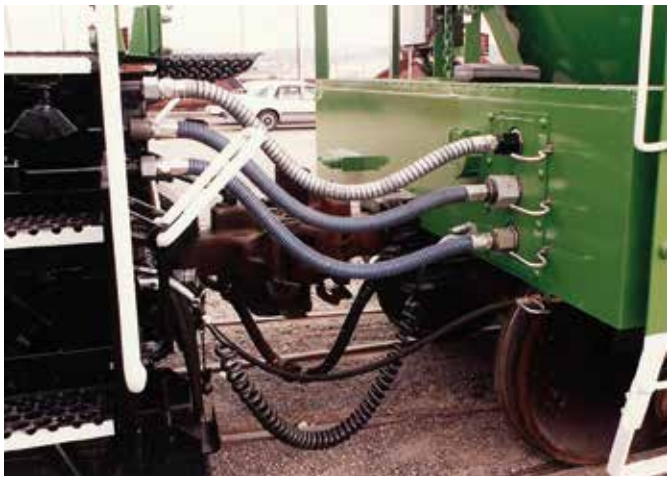
Fire Departments which have LNG marine transfer facilities located in their response areas have been (or should have been) well aware and well trained in the properties of this super cold liquid and the measures needed to mitigate a fire or emergency involving LNG. Hopefully you have worked and drilled with the facility personnel so that you will conduct a coordinated response.

Without coordination among the parties involved there can be no meaningful attempt to control a fire or emergency involving LNG.

But what if your Fire Department does not have an LNG export or import terminal in your port? Your Fire Department may not even be located on a coast nor have a port of any kind within your jurisdiction. You may feel that, because of this, you have no need of the knowledge nor the tools to fight an LNG fire or emergency.

Well, welcome to the 21st. century!

For those of you who are located in or near a port, even if there has been no LNG presence in the past, you may have to deal with it now! LNG is no longer confined to massive cargo ships and land based tanks. Today you may find LNG almost anywhere. Recent discoveries of huge quantities of natural gas trapped



Images courtesy of www.nextgenfueling.com

underground within deposits of shale have made LNG much cheaper and much more readily available than it has in the past.

Add to that the new environmental regulations soon to be put in place, which will make it extremely expensive to use petroleum based fuels, and you will understand why there is such a large proliferation of LNG used as a fuel not just in ships but in all forms of transportation.

Currently, in Europe, there are ferries and tug boats using LNG as their only fuel. There are plans for most new work boats and ships to be built to either exclusively use LNG to fuel that vessel or have some form of duel-fuel engine which can burn LNG or switch while underway to a petroleum based fuel.

So, even if your port does not have an LNG import or export terminal, you still may have to deal with the LNG aboard another vessel which is using your ports facilities. Also of importance to firefighters is where these new vessels will re-fuel their LNG tanks. Many ports are now planning or building LNG "bunkering" facilities to re-fuel LNG powered vessels. Other ports are using LNG "bunkering" barges (Photo right) to use as a mobile re-fueling station. In some cases LNG tanker trucks will be used to re-fuel these vessels and other vessels will have portable LNG fuel tanks which can just be exchanged with full tanks when needed. Currently, a ferry and a tug boat in Norway are both fueled by tanker truck which drives out on the vessels dock to transfer the fuel.

OK, that accounts for the Fire Departments who are located on the coast or even on a commercial river. (I think that there are a few of those rivers in Europe and the USA!)

But, even if you are not located on or near any of those bodies of water you may still have to deal with LNG. Due to the previously mentioned fact that LNG will be more plentiful and thereby less expensive than it has been in the past, and also because it is considered a "clean fuel", it is being employed in more and more uses and modes of transportation everyday.

So, those of you who are located inland and no where near a body of water big enough for commercial shipping may still find LNG powering something in your area. It could be a vehicle of some kind or just a piece of machinery that may now be powered by LNG.

There are LNG powered generators and pumps being put into use and there are or will be LNG powered busses, trucks, construction equipment, and locomotives[1]. (Photo of locomotive tender car hook-up above left)

"These railroads are considering the use of LNG in locomotives because of the potential for significant fuel cost savings and the resulting reductions in fuel operating costs. Given the expected price difference between LNG and diesel fuel, future fuel savings are expected to more than offset the approximately $1 million incremental cost associated with an LNG locomotive and its tender."[2].

These locomotives are being designed with LNG tanks built into the tender-car which follows the lead engine. Photo right shows the LNG controls located in the tender car.

Do you have any locomotives in, or passing through, your District? Then you will need to know what procedures will be needed to handle emergencies involving these LNG powered trains. Even if there are no trains in your district, you still need to read on.

Busses are already using LNG as a fuel in many areas of the world. Many bus and truck fleets will have their own re-fueling facilities at their fleeting locations. Personnel have been trained in the safe procedures needed in the LNG re-fueling process.

Many International Trucking companies are either switching to LNG as a fuel or they are adding more LNG fueled tractors to their truck fleet.[3]

Image courtesy of NLI Solutions

Image courtesy of US Dept of Energy

LNG liquefaction plants have been huge sites where massive LNG ships either deliver or pick up cargos of this super-cooled product. Some enterprising companies have developed a portable, modular LNG liquefaction plant that can be set up in remote areas. Some have even been placed in areas where they are actually drilling for the natural gas. As the gas is removed from the ground some is liquefied on site and used to fuel pumps and generators making the site self-sufficient.

National and International regulatory agencies have been attempting to keep up with new regulations and safety guidelines regarding both marine and land-based use of LNG as a fuel. These regulations should be understood and updates to safety bulletins should be reviewed to see if existing procedures need to be amended. For many Fire Departments this will be a new area of concern. In the past, Fire Department administrators have been criticized for re-acting rather than acting. Let's not wait until there is an emergency to train our Firefighters.

You will need to know what to do in fires and emergencies involving LNG. Many Fire Departments may have written guidelines for LNG in the past. It may be time to dust-off those guidelines or write new ones.

The National Fire Protection Administration (NFPA) offers valuable information as well as suggested rules and guidelines dealing with LNG. There are also many industry web-sites devoted to explaining LNG's safe handling and emergency procedures. One is the Center for Liquefied Natural Gas (CLNG). Their web-site is located at http://www.lngfacts.org/

All of these modes of transportation will need to be re-fueled. Fleets of busses, long-haul trucks, construction equipment, government vehicle fleets will be looking for a local LNG gas station.

You will see more and more LNG re-fueling stations along your highways and in your cities. If you and your Firefighters are not current on your LNG training then you should get started now. The next vessel or vehicle fire you go to may have a placard like this one.

Will your Firefighters be ready?
Until next time, stay safe.

In my previous article dealing with Fire Plans I inadvertently included bulkheads and doors as places where you would find the icon for a fire damper. Fire dampers, of course are found in air handling ducts. The closure for an opening in a bulkhead is called a FLAP and would be indicated by the icon below.

References

1 EIA projects that liquefied natural gas (LNG) will play an increasing role in powering freight locomotives in coming years. Continued growth in domestic natural gas production and substantially lower natural gas prices compared to crude oil prices could result in significant cost savings for locomotives that use LNG as a fuel source, according to EIA's Annual Energy Outlook 2014 AEO2014).

2 http://www.eia.gov/todayinenergy/detail.cfm?id=15831 Author Nicholas Chase

3 "UPS is adding even more natural gas vehicles to its existing fleet of 112 LNG tractors, augmenting recently announced plans for some 700 new LNG trucks with word that it would add 250 more..." Fleets and Fuels web-site - http://www.fleetsandfuels.com/fuels/cng/2013/07/ups-boosts-lng-plans-adds-cng/

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Global Progress on PPE Standards

Delegates from around the globe helped to ensure that international standards for PPE took a significant step forward when they met in Sydney at the end of July.

Simon Burnett-Boothroyd

More than 40 representatives from 12 countries and a further 30 observers were present for the International Organization for Standardization (ISO) TC 94 SC 14 meeting hosted by Standards Australia and the Australasian Fire and Emergency Service Authorities Council (AFAC).

During the intensive five-day meeting, a number of work programmes were either signed off or developed. One particularly exciting and substantial development was the decision to create a new transport rescue incident (TRI) standard that would provide the benchmark for firefighter PPE clothing in any transport related environment.

After a number of hours of discussion and debate, the SC 14 committee agreed to move forward under the TRI banner. The programme, which had previously been discussed at an SC 14 meeting in Edmonton, Canada, will now be developed to include a number of key areas including clothing, gloves, helmets and boots.

Image courtesy of Davis Hainsworth

Simon Burnett-Boothroyd is Sales and Innovation Executive at Hainsworth

Image courtesy of Davis Hainsworth

The momentum gained in Sydney will not be allowed to slacken with a strict timetable in place to ensure that the TRI programme is ready to be advanced when SC 14 meets again in 12 months' time.

International (ISO) standards are becoming increasingly important as the world continues to shrink. Firefighters from around the world now routinely attend major disasters in other countries and continents, often facing very different firefighting environments to those they are perhaps used to at home. Indeed, this was brought home to delegates attending SC 14, who watched the tragedy of the Malaysian airliner shot down over the Ukraine while attending the conference. During August, firefighters from Australia were called to support the efforts of exhausted Canadian fire crews tackling large-scale wildfires in British Columbia.

The sense that the world is a much smaller place than it was even ten or twenty years ago is helping to drive the importance of ISO standards. The impressive attendance and wide range of countries at the SC 14 committee points to a realisation that the global firefighting community needs to work much more closely in order to ensure the best possible response to incidents. In time, this may mean a comprehensive set of ISO standards, but with territorial nuances to take proper account of varying firefighting environments.

Rather than lots of different standards depending on where you happen to be in the world, it is likely that we will move ever more towards a harmonisation of standards with the end goal that wherever you are in the world, there is a standard, a vital term of reference.

The most exciting and heartening aspect of the recent SC 14 discussions was the appetite of the attending countries to engage in working together for the common good. There was a genuine sense that delegates understood the responsibility placed in them to educate and inform on a global level.

Meetings like SC 14 also provide the opportunity for leading manufacturers, such as Hainsworth, to monitor the latest trends in areas such as firefighting techniques and buying processes. One of the biggest changes we are seeing is the ever greater collaboration among fire services both in terms of sharing intelligence, supporting each other operationally and joining forces for purchasing their PPE.

While collaborative buying will increasingly become the norm, it is clear from various conversations that, long-term, value rather than short-term cost savings will be a key driver in the market. This is something Hainsworth and other leading manufacturers have argued for some time, namely that true value is to be found in quality products that are still performing as well as ever after several years. The industry preference would appear to be for highly engineered, innovative garments that last as long as possible, providing cost savings over the lifetime of the product.

Hainsworth was delighted to hear recently that the Country Fire Authority (CFA), which helps to protect over three million Victorians, is conducting trials of the company's wildland Eco-Dry Shield fabric, while Fire and Rescue New South Wales continues to provide its structural firefighters with Hainsworth Titan 1220.

This month's AFAC in Wellington will have provided Hainsworth and other companies operating in the industry with the opportunity to continue the discussion around harmonisation of standards, collaborative buying, cost vs product durability, current and future technologies and many other topical issues.

There should be complete compatibility between the work of companies such as Hainsworth and the various standards committees around the globe. Both should be about driving quality – in innovation and product design – and improving the survivability of firefighters wherever they are in the world, and whatever firefighting environment they face. While the technologies that are harnessed to develop today's PPE and the discussions that go on around the table of committees such as SC 14 may, at times, be highly complex, no one working in the industry should ever lose sight of the very simple brief given to all of us. That is to ensure that firefighters are able to return home safely to their loved ones at the end of every working day.

By playing its part on various standards committees in Europe and elsewhere in the world and by continuing to innovate and develop new fabric technologies, Hainsworth has, over the past 150 years, aimed to be a lot more than merely a manufacturer. Hainsworth, and a small number of other established companies, are operating in a very specialist sector; one in which we are talking about the difference between life and death on a daily, indeed hourly, basis.

It should never be a cold, transactional business but rather one in which all parties – firefighters, procurement officials, manufacturers, standards committees and others – work in partnership to ensure that our fire crews are afforded the greatest possible protection.

For more information, go to www.protectsyou.co.uk

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SINCE **1953**

Airport firefighting – protection and training for unique hazards

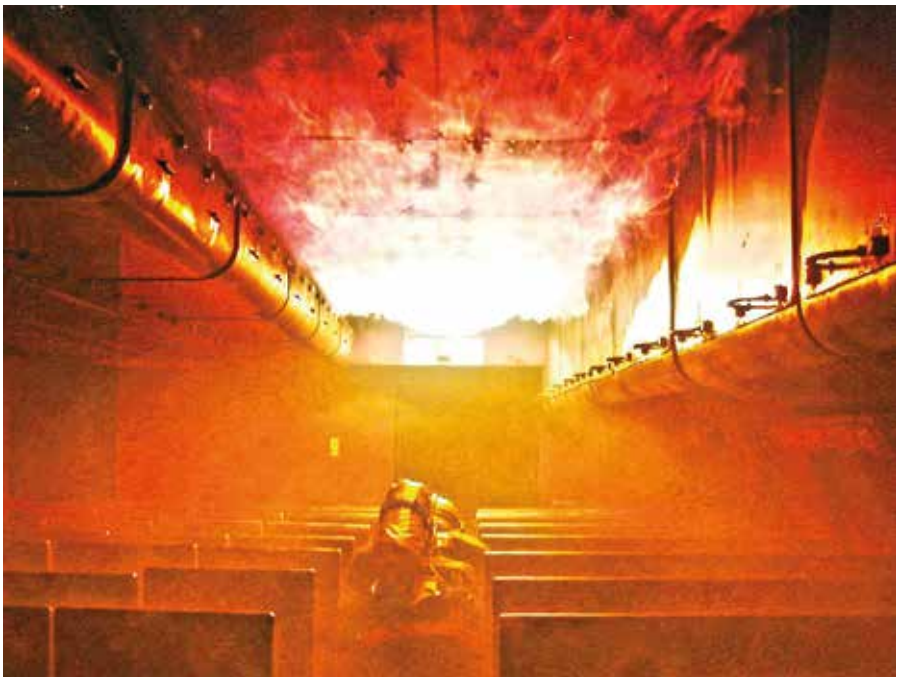
They happen rarely, but when they do, air accidents at or near airports present rescuers and firefighters with particular challenges which are quite different from those met daily by structural firefighters.

Paul Gibson

Despite the media coverage given to mid-air aircraft accidents, such as the Malaysian Airlines' flight MH370 which disappeared over the Indian Ocean or MH17 which was shot down over Ukraine, such accidents are very rare but inevitably catastrophic.

Most aircraft accidents take place during take-off and landing and the level of a firefighter's skill and equipment can, and does, play a major part in minimising injuries and loss of life in such situations. Airport firefighters in many countries are specially trained in hot fire emergency response in which increasingly sophisticated specialist training rigs are used. Given the nature of hot fires and the risk of explosion when take-off, landing and runway collisions are involved, the type, and level, of protection provided to firefighters should be selected on its performance, confronted with the particular hazards associated with a range of aircraft fires.

In recent years, international airports in the advanced economies of the world have invested substantially in upgrading their capability and preparedness for major incidents. This has included both the quality and performance of firefighting equipment and the level of firefighter training. As our understanding of the nature and behaviour of fires increases, so has the level of effectiveness in dealing with rapid evacuation and fire suppression. Aircraft fires require a combination of emergency services skills and close collaboration between the fire and rescue teams and ambulance paramedics. Clearly the first priority of the firefighters is to minimise the impact of the fire whilst at the same time extricating the injured from fire in the cabin areas. For the ambulance crews their priority is to assist with the extrication and provide on-the-spot medical assistance to stabilise the injured before getting them to hospital. Rapid transit to hospital will be



Paul Gibson is International Sales Manager with Bristol Uniforms.

by ambulance but, on occasion, may also call on the services of local air ambulances to fly casualties needing specialist treatment to specific hospitals where these facilities are available.

Airport firefighters encounter a variety of emergencies which range from a full blown runway disaster to smaller incidents, such as wheel, brake and undercarriage fires, as well as incidents involving airport buildings or vehicle fires anywhere on an airport site. A burning aircraft is a hot fire and presents special dangers of ignited aviation fuel, other inflammable liquids and the possibility of explosion requiring special firefighting equipment, foam suppressants and special clothing and training. Airport fire incidents involving buildings or vehicles require skills and equipment similar to those used by municipal firefighters whose assistance would often be called upon to deal with such incidents.

Training and special firefighting skills

Firefighters spend many hours honing new skills such as rescue techniques and may be part of special teams, such as rapid intervention or rescue teams. By necessity, airports store large amounts of hazardous materials, such as aviation fuels, and other flammable products which can burn at extremely high temperatures. Some may react adversely to water so chemical suppressants are frequently deployed. Airport firefighters must also be aware of the environmental impact of the chemicals stored at airports and, in the event of a spill, must know how to properly contain and control those chemicals and require their PPE to provide penetration protection. They must also re-qualify every four years to be deemed competent partly due to the fact that they do not respond to as many incidents as municipal firefighters whose competency can normally be demonstrated by the number of calls they deal with annually. Many are also trained emergency medical technicians to render medical care and first aid.

Protecting firefighters across the world

Bristol is a major supplier of firefighter personal protective equipment (PPE) to airport fire services across the world as well as to around half the major airports in the UK, including Gatwick, Manchester and Birmingham. In Australia, Airservices is a government-owned organisation providing ARFF services at 22 of Australia's busiest airports. It responds to some 8000 aircraft and airport emergency assistance requests nationally (2010 figures). Their ARFF service is one of the world's largest providers of aviation rescue and firefighting services with more than 800 operational and support personnel based around Australia. Their 650 firefighters are equipped with Bristol PPE through a contract signed in 2010. Their largest ARFF stations are located at Melbourne, Sydney, Brisbane and Perth airports. Airservices Australia chief executive Greg Russell commented at the time, "This equipment is the very latest, we looked long and hard around the world to find the right equipment,"

In Europe, Bristol's kit is the protection of choice at European airports including Budapest, Oporto and Amsterdam Schiphol, a major intercontinental hub and Europe's fourth busiest airport handling over 52 million passengers in 2013. Michel Wendel, Business Controller Operations at Schiphol Group, explained that his firefighters are called upon to deal not only with aviation related incidents but many others in and around the Schiphol area which are more closely related to normal fire duty callouts. On average there are in the region of 50 aviation related precautionary standbys with several hundred other callouts for various fire and other related hazards during the year around the large Schiphol site. Although the airport only has one terminal building this is split into three large departure halls which serve the 6 runways which range in length from over 2km to 3.8km. The most recent runway to be built was completed in 2003 and there are already plans to

add a seventh in the near future. Schiphol is the world's lowest major airport being 3 metres below sea level.

At Schiphol training is carried out on a daily basis. There are 125 full time firefighters on station who all work shifts of 3 teams over 24 hours. The size of the airport complex is such that the firefighters operate out of 3 fire stations, Rijk, Sloten and Vijfhuizen which are located around the site. The Fire Manager explained, "Fire training is carried out at the main station, Sloten, on a daily basis. Firefighters are on rotational duty and their training is undertaken when they are on main station duty. Normally, training sessions last about 4 hours. A range of training is carried out including simulated firefighting on a Boeing 747 test rig with a computer controlled gas fire".

Schiphol has a very good air traffic accident record. There has only been one major aircraft incident involving loss of life over the past 20 years. In February 2009, a Turkish Airlines flight from Istanbul crashed on approach. The plane carried 128 passengers and seven crew on board. Nine people were killed and a further 86 were injured, including six with serious injuries. The crash was attributed to a malfunction in a radio altimeter which failed to provide the correct height above the ground. A non-aviation related incident occurred in 2005 when fire broke out at the airport's detention centre, killing 11 people and injuring 15. The complex was holding 350 people at the time of the incident.

PPE selection

Most, if not all, airports use a selection procedure for purchasing firefighter PPE which routinely involves trialling samples of kit from several manufacturers. The alternatives are inspected and supplied to firefighters to carry out wearer trials. Selection is based on a number of criteria including wearer comfort, durability, price, sizing, availability of stock, and the provision of an efficient managed care service to ensure the cleanliness and protective integrity of the kit as well as its longevity. A garment construction able to meet the highest Level 2 performance rating to EN469:2005 is normally considered essential in Europe, whilst North American NFPA1971:2013 or other national standards apply elsewhere.
A number of airport fire teams are being, or have been in recent years, re-equipped giving them the opportunity to take advantage of the new lighter weight designs being introduced to the market and which provide greater wearer comfort with reduced heat stress associated with prolonged periods of wear.

Richard Cranham, Bristol Uniforms' International Sales Manager, who is responsible for the company's supply contracts with airports across Europe and South America has witnessed considerable change in the specification and purchasing of PPE in recent years. He commented, "The operational demands placed on airport firefighters may vary considerably from site to site, but many rely on Bristol Uniforms' PPE to protect their firefighters. We have seen a steady move to replace traditional PPE designs with our XFlex™ lightweight jackets and trousers, introduced to the market in 2011, whilst also demonstrating a growing interest in adopting our integrated managed care services."

For more information, go to www.bristoluniforms.com

Trends in High Volume Pumping

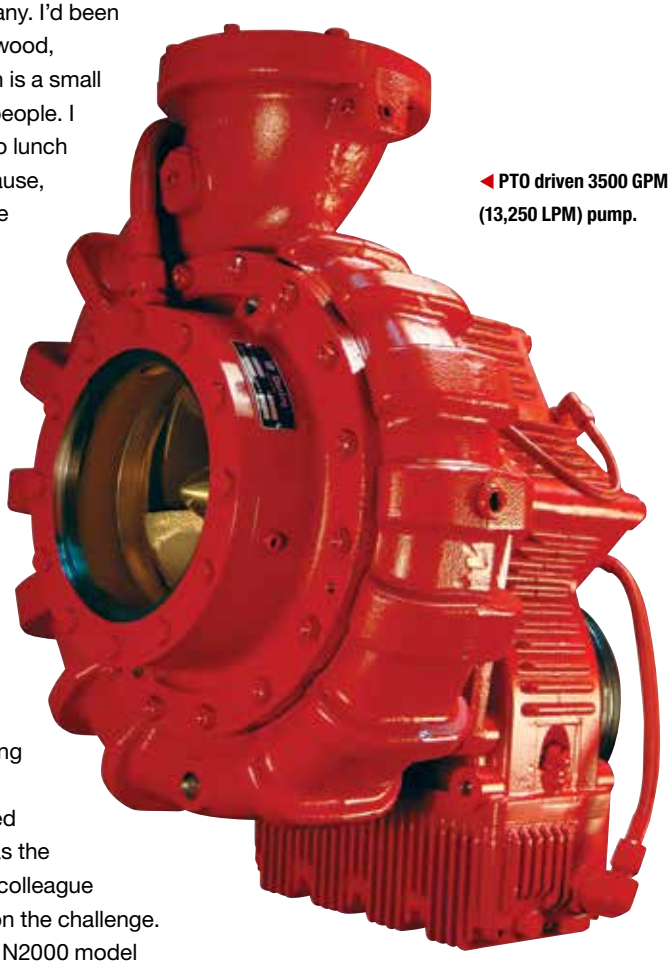
Trends in the fire industry are slow but persistent. When I started in this industry some 30 years ago, in the USA, a 1000 GPM (4000 LPM) pump was most popular. Over the years, this has risen to 1250 GPM (5000 LPM) and again to 1500 GPM (6000 LPM) pumps. This is a trend that continues to this day.

Michael C. Ruthy
Chief Engineer, W.S. Darley and Co., Pump Division

What drives this? Some of this is the nature of fire response. In the US, very few emergency responses require a truck to pump water at all, and certainly not at full capacity like this. Yet when they need to, they may need to give it all they have. This has led to larger and larger pumps. There are also incentives from insurance organizations that favor larger pumps. There are also bragging rights.

Clarence Saylor was a salesman for the now defunct New Lexington Fire Apparatus, and a good friend of mine and my company. I'd been to his plant in Rockwood, Pennsylvania, which is a small town of about 950 people. I recall we went out to lunch at a local diner because, in his words, "It's the only place in town that serves food." In their heyday, they were probably building nearly 100 trucks per year. One day he approached me wanting to build a pumper for his own department, and he wanted the highest flow possible. Local departments in his area had been playing this game for years, and everyone wanted to be championed as the best. Being a good colleague of Clarence, I took on the challenge. We started with our N2000 model and custom machined the impeller for maximum flow. I recall we got over 2300 GPM (8700 LPM) out of it, making it our highest maximum flow N series pump in our history. Clarence was ecstatic. But these are bragging rights, not practical points.

New Lexington was located in a largely rural area as were the surrounding communities. It is doubtful that they needed this large of a pump, or that they could supply it with enough water even if they did. That said, even small communities have some large structures,



◀ PTO driven 3500 GPM (13,250 LPM) pump.

Image courtesy of W.S. Darley & Co.

Michael C. Ruthy graduated from Lafayette College in Easton, Pennsylvania, USA in 1985 with a Bachelor of Science degree in Mechanical Engineering. He was employed by Hale Fire Pump Company in Conshohocken, Pennsylvania, before working for W.S. Darley & Co, in Chippewa Falls, Wisconsin, USA, in 1989, where he took the position of Chief Engineer in 1996. He has worked with over 100 companies internationally and is available at mikeruthy@darley.com.

Image courtesy of MetalCraft Marine

▲ **High volume fire boat for Melbourne Fire Brigade.**

or various difficult to defend facilities such as petroleum storage tanks, that are going to require large amounts of water. While it is possible to make up for a large pump by tasking several smaller models on the fire, this can get unwieldy and difficult to coordinate. The number of hoses and connections make maneuvering difficult, and trucks can get caught in a single position, unable to move, even when conditions have changed, without disrupting the water flow for other pumps. Clearly, there is an advantage to having a single large pump in some circumstances.

Back when I started in the fire industry, a 2000 GPM (8,000 LPM) rating was the largest available. Even these were not terribly popular at the time, as you needed a truck with a very large engine in order to achieve such a rating. But as chassis power rose over the decades, this limitation was overcome. Currently, it is not unusual to see a chassis equipped with a 450 HP (335 KW) or even larger engines. That is good, since for some of the pumps on the market now, that is barely enough.

Pumps on the market now can exceed 3500 GPM (13,250 LPM). Many of these are at lower pressures, say 100 psi (8 bar) and need to be run from huge water mains to achieve these flows. This is not an issue with many large petroleum facilities, but could be a challenge in some municipal markets.

Another area that is embracing high volume pumping is the maritime industry. Many of our boat manufacturers are ordering very high volume pumps and reporting extraordinary results. In our testroom, we need to operate from a lift condition and are therefore limited to about 3500 GPM (13,250 LPM). These vessels operate with no lift requirements and achieve much higher reported flows. Our latest sale involves a 1000 HP (750 KW) engine. We look forward to seeing what this will do for performance. I'm expecting flows in excess of 4000 GPM (16,000 LPM) and for vessels, unlike industrial truck ratings, this would be at 150 psi (10 bar). They certainly have the power, unless they need to reserve a lot more than I think they will for propulsion and maneuvering. These vessels are being furnished by MetalCraft Marine out of Canada to Tacoma, Washington and will be used for firefighting, or that is their intended purpose. My cynical colleague, Kevin O'Sullivan, suggests that these are more likely to be used for photo opportunities and to impress the mayor. That said, there are a lot of structures and other large vessels in many harbors that could benefit from high volume pumping.

Another area we've entered that needs super high volumes is the petroleum (shale) fracturing industry. We don't supply the pumps that do the actual fracturing, but rather supply the pumps for water supply to feed those pumps. Although this isn't an actual fire fighting application, there are a lot of similarities, and a few dissimilarities. These fracking feed lines, as they are known, can be several miles long, perhaps up to 50 miles (80 KM). This requires staging several pumps in relay to complete the entire chain of pumps and hoses.

The location where our pumps eventually discharge is a bulk water storage facility near to the actual well location. Much like the fire industry, reliability is highly prized. Once fracking operations have commenced, they must be continued until completed or the well must be capped. Such a disruption carries an enormous expense. This daisy chain of pumps need to be able

Image courtesy of Davis Pump and Supply

to communicate with each other so that they can detect a disruption in the flow rate that requires some intervention. As noted, there is a short period of time to correct any complications. Our ability to coordinate communication between units, and to the command post, has also shown useful in military operations to move fuel over long distances, though the US military has not been interested in so high of flow rates. The experience we've gained in telemetrics and telematics may be useful in the future of firefighting, as vehicles can know the location of other vehicles and communicate operating status for smoother operations.

The high flow rates of the new pumps on the market require the builder or procurement officer to carefully consider the entire system. Is there truly a need for such high flow performance? How will it be fed and discharged? Is there sufficient power available for such operations? While a single high volume pump sports many advantages, it also requires careful study on the front end.

While there are instances where high volume pumping is worthwhile, or even plainly needed, smaller pumps shouldn't be ruled out. The Red Rhino vehicles being produced in Singapore are a great example, where a small 500 GPM (2000 LPM) pump equipped with a compressed air foam system (CAFS) is being installed on a small, maneuverable vehicle for highly effective first attack. It is good to know that large volume pumps are now available, but it is not going to eliminate the need for smaller pumps.

One caveat to consider with high volume pumps is that they are not well suited to smaller flow rates. When a pump is designed for high flow rates, it should be operated at those rates. Using a 3000 GPM (12,000 LPM) pump to fight a 10 GPM dumpster fire is very hard on the pump, much harder than if a 500 GPM (2000 LPM) pump were being used for the same situation. Pumps work best when operated near their best efficiency point, and the further away from that one gets, the more trouble and wear there can be from operations, from flow vibration issues to overheating or cavitation damage.

▲ A Frac supply pump with 10" (25mm) suction and discharge flowing over 3500 GPM (13,250 LPM).

Darley, and most other pump manufacturers, offer a wide variety of capacity and pressure ratings to suit many different applications – high volume pumping being just one.

I think the days of Clarence Saylor saying that he just wants the highest capacity pump he can get are long gone – a lot more study is required to take it to this next level.

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Russian Helicopters Airborne Fire Brigade

As skyscrapers increasingly dominate city skylines across the world, firefighters are being equipped with helicopters to fight blazes in built-up urban centres. In 2013 about 90,000 people died in fires across the world with the problem being most acute in wealthier, more developed countries.

In the USA, firefighters were called out to deal with almost 1.5 million fires in 2013, including 400,000 in residential areas. Twenty-three fires were categorised as particularly severe and were among the most destructive. Last year alone, more than 3,000 Americans died in fires.

It is not just in the USA – in China, according to official Public Security Ministry data, the first day of the New Year holiday week saw about 3,000 fires break out. Most were caused by fireworks, and cost the country's economy more than 7 million yuan (about £707K / US$1.1M).

Also in 2013, the world's largest country, Russia experienced over 153,000 fires in residential buildings which caused damage estimated at US$400 million.

Skyscrapers blaze like matches

Modern urban centres are developing upwards. Skyscrapers of course define the cityscapes of New York, Toronto, Sao Paolo, Shanghai, Tokyo, Moscow and cities across the UAE. As they develop in this way, urban centres become increasingly dangerous. It is much harder to extinguish a fire in a heavily built-up high-rise area, as ground-based crews are markedly less effective. As a result, even a small incident can quickly escalate into a major tragedy.

In early February 2011, two neighbouring sky-scrapers caught fire in Shenyang in north-east China. One was about 200 metres high with the other being 150 metres high.

Fire-fighters battled the blaze for six long hours but the buildings were totally gutted. In February 2009, the Mandarin Oriental Hotel in Beijing had just been opened. It was 159 metres high and burned like a match and there was precious little left to rebuild. About 90 people were poisoned

Images courtesy of Russian Helicopters

Images courtesy of Russian Helicopters

by smoke inhalation in a fire that broke out in a 35-storey building in the centre of Sao Paolo, Brazil, in January 2005.

Statistics indicate that about 70% of all fires worldwide break out in cities and helicopters are increasingly being looked to as an irreplaceable weapon in every firefighter's arsenal – both for putting out fires and for evacuating people.

In Moscow in spring 2012, it was helicopters that came to the rescue when a fire broke out on the 66th and 67th floors of Moscow City's "Vostok" tower which is Europe's tallest business centre. It was still under construction at the time and with 300 square metres engulfed in flames, strong winds made putting the fire out at that altitude almost impossible. People feared the building could be critically damaged in the inferno and that it might even collapse onto neighbouring buildings. It seemed doomed.

However, two helicopters – a Ka-32A11BC and a Mi-8MTV – came to the rescue. They weaved their way through the flames, which blazed seven metres high, to put out the fire and save the buildings. Darting back and forth between the towering inferno and a nearby river the Ka-32A11BC directed its horizontal fire-fighting water cannon at the windows, and the Mi-8MTV dumped tons of water onto the blaze, dousing the flames and saving the building.

The helicopters also proved their versatility in summer 2013 in Indonesia, fighting a massive forest fire on the island of Sumatra. A Russian Ka-32A11BC was also deployed as part of the international firefighting mission. The Ka-32A11BC has put out fires in Idaho (USA) and Vancouver (Canada), leading American specialists to recognise it as the best in its class.

Firefighters' emblem

The Russian-made Ka-32A11BC is so successful at fighting fires that it has been adopted as the emblem of the Global Helicopter Firefighting Initiative (GHFI). João Velloso, CEO of Brazil's Helipark Taxi Aereo commented, "This helicopter boasts unique capabilities for its class, making it highly effective at achieving its goals. It is particularly known for its reliability and resilience. It has never let us down."

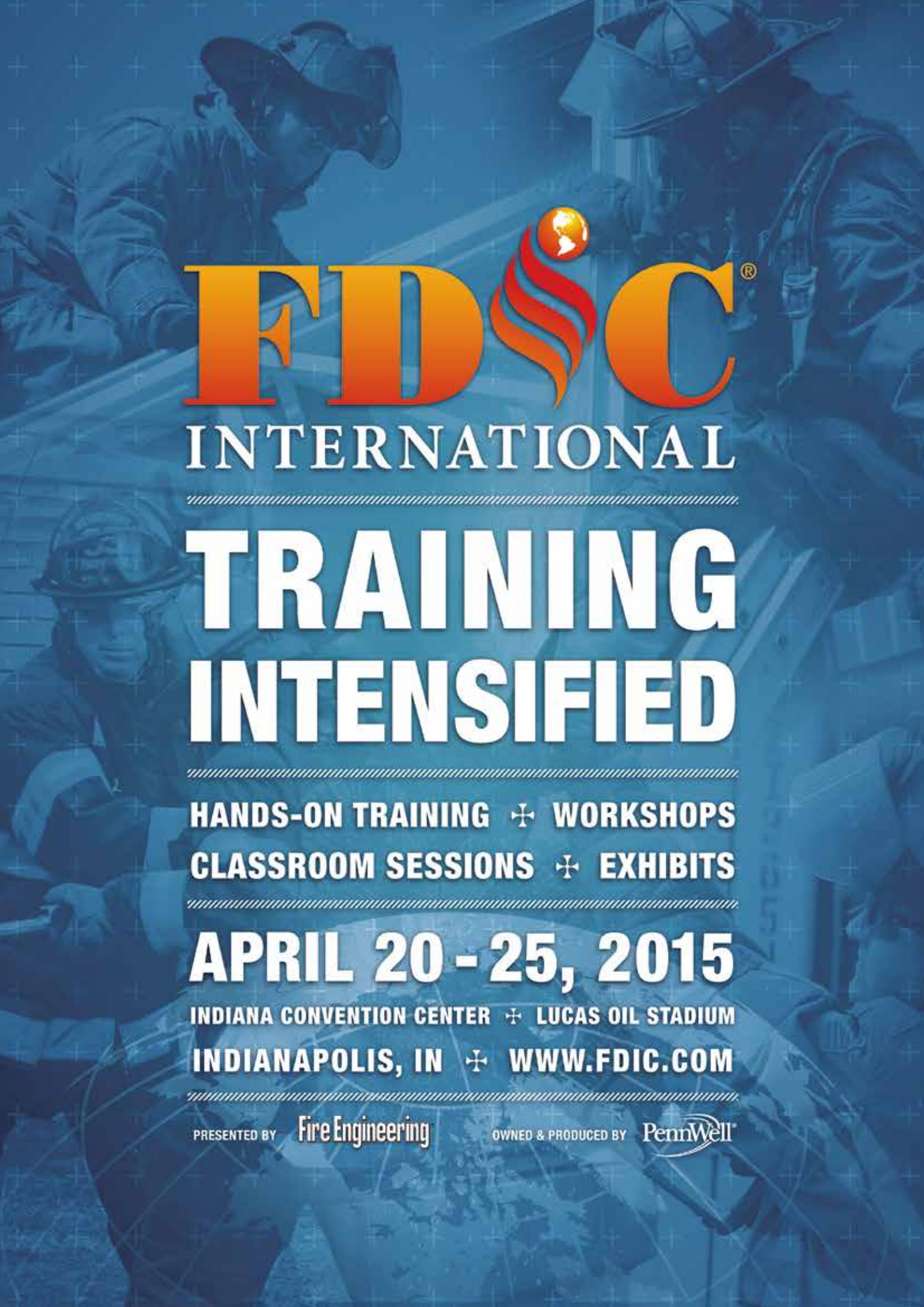
The Ka-32A11BC's coaxial rotors mean it can be deployed in difficult environments, where traditional helicopters cannot operate due to the risk of damaging their tail rotors and potentially crashing. The Ka-32A11BC needs just one pilot, and is highly manoeuvrable in high winds – it can turn sideways or tail-first into the wind and small handing errors have no impact on its operation. It can carry loads of up to 5 tonnes on its external sling.

In Brazil it is used to build electricity transmission lines in the Amazon. It can operate for up to 32,000 hours and boasts low running costs. The Ka-32A11BC can be fitted with over 40 different kinds of firefighting equipment, from Bambi Bucket and Simplex systems to water cannon for horizontal firefighting.

In further testament to its success, this helicopter is currently in service in numerous countries around the world – Spain, Brazil, Azerbaijan, Canada, Indonesia, Japan, South Africa, Switzerland, Kazakhstan and Portugal. Several multirole Ka-32A11BC helicopters have also been bought by China and Republic of Korea has a fleet of 40.

To date, Russian Helicopters has produced about 140 such helicopters, half of which operate outside Russia.

For more information, go to www.russianhelicopters.aero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Are You Ready for the Next Disaster?

This article aims to answer one simple question and that is, "How do I prepare my department or organisation to respond to the next natural disaster that will affect my country or community?"

David Dickson

Basically your organisation needs to follow some accepted protocols beginning NOW, it needs to develop a capacity to respond that is appropriate and flexible NOW, you need to reach out to those organisations that you will need to support you NOW. Don't reinvent the wheel because you don't need to. Don't wait for the disaster to arrive to do these things because by then it will be too late.

Now, having answered the question that this article sets out to answer in only sixty nine words, it seems appropriate that I take this opportunity to expand on the advice offered and share the benefits of my experience in the development of local and national capability, preparing organisations for the day that disaster strikes. Whether you decide to read on or not, the essential fact is that you need to start NOW. Don't delay, start today.

For those readers who have decided to read on, there is good news and bad news. The good news is that there are many people and organisations in your position that have gone though this process in the past and the result is that there is plenty of experience and advice. Consequently, there is a wonderful methodology that you can adapt and use for your own organisation and situation. We will look at this methodology shortly, but first the bad news.

The bad news is that the world is changing and changing fast, what worked in the past may not work in the future, you and your organisation faces new threats, new challenges but also may benefit from new opportunities. Those of us involved in developing emergency response are facing a kind of double jeopardy. On one hand, the world is still firmly in the grip of a global depression with the world economy now predicted to contract by 1.7%. There are profound inequalities of income, with approximately half the world's population living on less than 1% of its wealth. All these factors result in even more demand for humanitarian support, which in turn makes funding for any form of response development harder to obtain.

David Dickson is a Director of Civilience Limited. He was formerly the National Coordinator for the UK International Search & Rescue Team (UK-ISAR) and worked for the UK Government to develop a national urban search and rescue capability in the UK Fire and Rescue Service. He has worked within the United Nations and European Union Civil Protection (EUCP) mechanisms as well in the USA, China, Australia, Asia, the Middle East and Africa.

In direct contrast to increasingly limited resources, the disaster response community is facing unprecedented increases in demand for its services. The number of recorded disasters has doubled from approximately 200 to over 400 per year over the past two decades and in the past 18 years, 11,000 extreme events have claimed the lives of 600,000 people and cost 1.7 trillion dollars (US) across the globe.

Today, the global population is 6.8 billion and 80% of the world's most populous cities are situated in fault zones. By 2025, the global population will reach about 8 billion and the world will add another eight megacities to the current list of nineteen. Today, about 55% of the global population lives in rural areas and 45% in urban areas; by 2025 it will be 41% rural and 59% urban.

Therefore, we can see that factors such as increasing urbanisation of the planet, changes to our climate resulting in more extreme weather events coupled with an on-going financial crisis will make the development of credible and effective response to natural disasters much more challenging that it has in the past. However, those of us working within the emergency response field are, by nature, adaptable, resilient and flexible, we have to be in our daily work lives and we need to bring these qualities to the longer-term process of developing a response that is capable of dealing with the next disaster, whatever that may be.

To help us achieve, what might seem at first glance impossible, a number of organisations, mechanisms and tools have been developed to help guide and support emergency disaster managers and developers through the necessary steps. Some of these are global, some more regional in their approach and some are specific to a particular risk or hazard. All these support mechanisms and tools can be linked into one integrated methodology termed the "Preparedness Development Cycle (PDC)", allowing you as the manager to decide which tools, methodologies or supporting organisations are relevant for your organisation and can be used to help you navigate around the PDC.

The PDC has been developed from the five 'Priorities for Action' identified within the Hyogo Framework for Action (HFA). The HFA is a 10-year plan to make the world safer from natural hazards. The UN General Assembly endorsed the HFA following the 2005 World Disaster Reduction Conference (www.unisdr.org).

Develop Governance & Management

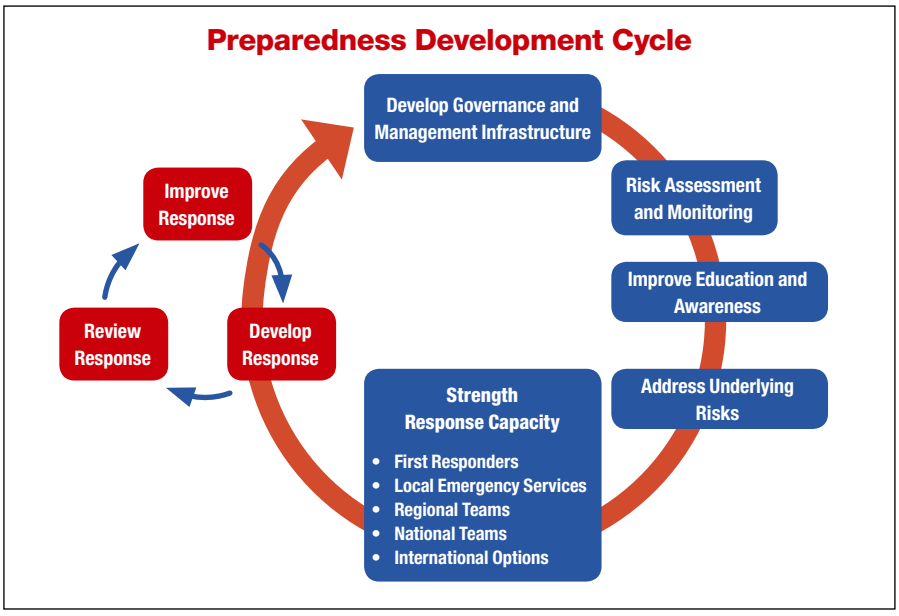
The cycle commences with the key task of developing a structure that will be responsible for disaster management and capability development, if one does not already exist. This entity, usually a state or regional government function, will need the legislative and financial powers to prepare and to respond. These organisations, your organisations, must capitalise on their relationship with government ministries to encourage the adoption and implementation of disaster plans, codes of practice, supporting legislation and guidelines. Once your management structure is in place, has a legal basis and is mandated and financed to prepare for disasters and to respond, you can move onto the next step.

Risk Assessment

The second step in the cycle and the starting point for reducing disaster risk and for developing an appropriate response lies in the knowledge of the hazards that the communities you are seeking to protect actually face. There is little point in educating, reducing risks and preparing to respond to a potential earthquake when the communities you are seeking to protect are subject to regular flooding. Once the hazards are known and the risks analysed then priorities for action can be determined.

Education & Awareness

The impact of disasters on communities can be substantially reduced if people are well informed and motivated towards a culture of disaster prevention and resilience, which is the next stage in the Preparedness Development Cycle. Disaster education requires the collection and dissemination of knowledge and information on hazards, vulnerabilities



and capacities. However, there is often a considerable time lag between major disasters and this makes building and sustaining awareness amongst the population particularly challenging. The International Federation of the Red Cross and Red Crescent Societies (IFRC) publish a useful guide for public education and public awareness for disaster risk reduction (www.ifrc.org) that suggests four approaches to increasing awareness of disaster risks across various stakeholders, namely:

- Campaigns
- Participatory Learning
- Informal Education
- Formal School-based Learning

At first glance, it may be questionable that a response organisation should spend time and resources on education and awareness. However, it has been shown that better educating the population about disasters both reduces the number of people actually requiring help following a disaster and increases the cooperation and goodwill towards the rescuers as they work within the disaster zone.

Address Underlying Risks

"Earthquakes don't kill people, buildings do," said Charles Richter, inventor of the Richter scale of earthquake magnitude measurement. It is well known that buildings, the objects within them and the infrastructure surrounding them are the major factors of death due to earthquakes. Similarly with other disasters, risks related to changing social, economic, environmental conditions and land use impact directly on the casualty numbers. As with education, time and resources employed by response organisations to address and reduce the underlying risks will result in fewer people trapped and injured, thus reducing the impact of the disaster on the responders and making the response more effective and sustainable.

One example of reducing underlying risks is the advocacy of national building codes by response organisations. National building codes exist in most countries, but the problems lie largely at the implementation level and so construction follows no regulations or standards. This is the reason that a large earthquake in the developed world may barelydestroy any buildings, but a similar one in a developing country leads to large-scale collapse and loss of life.

Strengthen Response Capability

At times of disaster, impacts and losses can be substantially reduced if authorities, individuals and communities in hazard-prone areas are well-prepared and ready to act and are equipped for effective disaster response. This is the core responsibility for your organisation and there is a range of options available to you, ranging from the development of first responder networks, improving the capability of the local emergency services, up to the creation of specialist rescue/response teams. No single response option will meet all needs and the generally accepted principle is to develop a tiered response to any disaster or emergency.

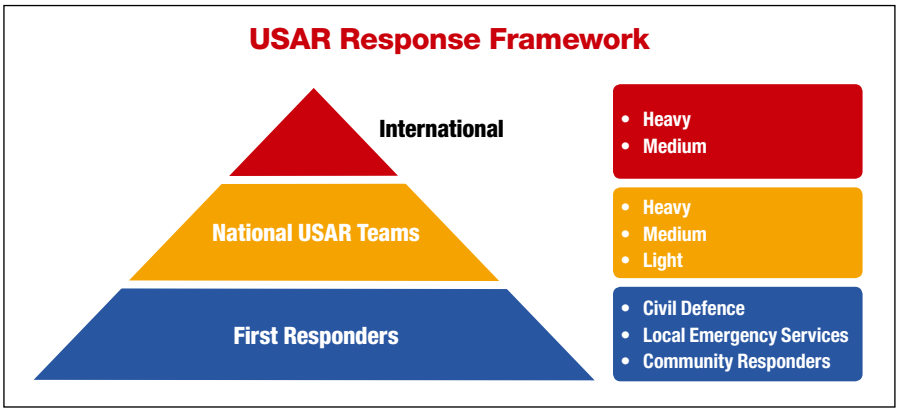
Experiences in the past have shown that members of the affected communities play a critical role in rescuing and providing first aid to the injured and are far more effective in doing so than national and international teams that reach an affected community much later. Therefore, it is important that your disaster response has, as it's base tier, some form of first responder or citizen's response capability.

The International Search & Rescue Advisory Group (INSARAG) has developed some excellent guidance material focused around a diagrammatic representation of all levels of response. Termed the "USAR Response Framework", it starts with spontaneous community actions immediately following the disaster, which are supplemented initially by the local emergency services and then by national rescue teams. Finally, there is the response of international USAR teams, supporting national rescue efforts. Each new level of response increases the rescue capability and overall capacity but has to integrate with and support the response already working at the disaster.

In order to ensure inter-operability between the levels of response, it is vital that working practices, technical language and information are common and shared across the whole response framework and this is a key task for your organisation. Great information and advice can be found within the INSARAG Guidelines (www.insarag.org) and the new Guidelines, being ratified in February 2015 will contain enhanced guidance supporting capacity building projects and response preparedness. The INSARAG Guidelines also contain useful advice and information regarding the final part of the Preparedness Development Cycle (PDC). This is the important process of reviewing and improving your disaster response capability, once it has been developed. Exercising, auditing, 'lessons learned' reports and peer review are all useful mechanisms for reviewing your capability but it is vital that these mechanisms actually result in improvements to your response capability.

In summary, when developing a response to natural disasters, it is important to follow a clear methodology such as the Preparedness Development Cycle and to use the vast amount of information, advice and experience available to your organisation. Learn from the mistakes of others and you will be ready for when disaster strikes.

For more information, go to www.civilience.com



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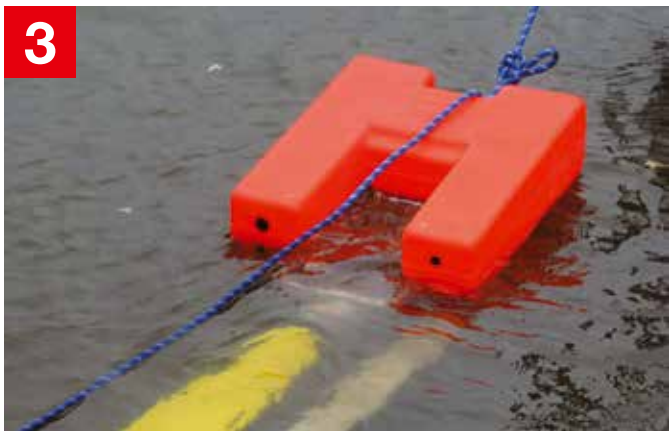

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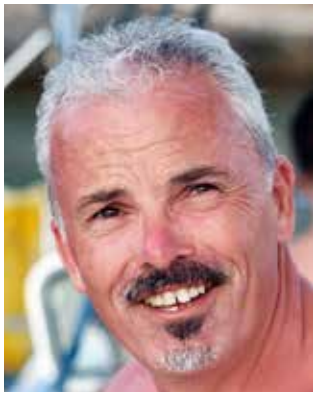
Drugs and alcohol and what is it to the Fire Service?

How often have you been involved in a nasty incident when you suspect it was caused by a drunk or drugged driver? Have you ever had the same thought about a colleague when turning up for a shift? That's the bottom line, you need to trust your colleagues, surely it's implicit in the job, is it not?



Ean Lewin

Ean Lewin served his apprenticeship in Barrow working on nuclear submarines and then worked around the world in the oil industry and later the automotive market. With an Engineering degree and a Masters in Business, he saw an opportunity with the novel DrugWipe device. He formed D.Tec International Ltd in 1996 and performed the world's first Police drug driver screening trials in the UK during 1997/98. Dtec have implemented over 300 workplace drug testing systems in small local businesses, blue chip national companies and test around 90% of the London bus drivers. DrugWipe is currently with the Home Office for 'type approval' to start police roadside testing in March 2015.

I want to discuss in more depth and in more modern times, the whole area of workplace drug and alcohol screening. Where the Corporate Manslaughter Act fits in for an employer and just what are the potential effects of the new drug driving amendments to the Road Traffic Act starting 2nd March 2015.

My experience of the UK Fire Service is from going up in a Snorkel when on a visit with the Boy Scouts in the 60's. Followed some years later by arriving at a RTC having seen the head on collision with a family trapped in one car so badly smashed none of the four doors would open, and a driver of the offending vehicle trapped behind the wheel of his own car. A freind and I set to, sending another driver to a house to phone for you guys, stopping the other traffic and trying to check passengers through smashed windows and blood, all alive but barely conscious. Then it got worse, the families car caught on fire. Now we tried in vain to force open the front doors, then to extract them through the broken windows, only for the mother to tell us that their children were in the back – we hadn't seen them for the carnage – two tiny ones, trapped on the floor under the front seats. By now suffering minor burns and loss of body and facial hair, we were forced away to leave it all to burn. The only thing we could do was to push away the other car with the trapped driver who had caused it all, away from the inferno and await the Fire crew. Respect to you guys.

Since then, for my old job in the oil industry, I have been trained on several occasions in Singapore, Aberdeen and Norwich for fire-fighting and rescue in smoked chambers.

Nowadays, well away from the oil

rigs, I am running a drug and alcohol screening business in the UK and Ireland, and in odd but unique position to understand the implications of all three main issues facing any manager. They are the changes in legislation, the new activities of the police and the implications on the workplace. This knowledge comes from having spent 18 years on constructing police drug driver law with government departments, advising senior police, civil servants and MP's including speech writing for the Lords and appearing in front of the Transport Select Committee. I also sat on the UK Legally Defensible Workplace Drug Screening Guidelines steering group and through my company, D. Tec International Ltd. have started the D&A screening for hundreds of local companies and national blue chip corporations.

The UK has a long list of well-proven legislation and regulations dealing with health and safety in the workplace, no doubt familiar in some degree to all managers and company directors in all organisations. The specific area we are concerned about here is the employee being in a fit state to work and not impaired or affected by alcohol, medicines or illegal drugs and other stimulants. We could discuss the morals of consumption, but our key issue here is when it might affect their own safety, the safety of colleagues and the general public.

In another entirely different scenario, we also have the Road Traffic Act 1984 and subsequent revisions (RTA) – legislation familiar to us all in our personal lives with regards to drink driving and as always the moral argument of "Don't Drink and Drive." There is a general knowledge that in the UK "the limit" is 35 but most people have no understanding of what 35 is other than "it's about a couple of pints."

Going back to our workplace legislation, Health & Safety at Work etc. Act 1974 and revisions (H&S@WA), it says you must be in a fit state, to take care for your own and others safety, and importantly for managers, if you know or suspect a problem, you have to do something about it.

More recently and more of a concern should be the Corporate Manslaughter and Corporate Homicide Act 2007 (CM&CHA). With apologies to our legal brethren, this says "it is not enough to have a policy in place, rather, there must be operational systems and controls and an ability to prove they are being applied." The consequences in the case of a fatality are that a judge may apportion blame, not to the company but to managers deemed responsible for the system failings. So personally, this could be a prison sentence and fines the magnitude of people's homes!

In 2014, the CM&CHA eventually showed some teeth with multiple prosecutions and note, the majority were backed up by failsafe H&S@WA prosecutions. There is no easy get out!

So let's switch back to the Road Traffic Act (RTA) which in its simplest form says, "do not drive if impaired" and this is through alcohol or drugs, or even through lack of sleep. This is RTA "Section 4" (Sec4) and remember the key point here is impaired through drink or drugs.

The difficulty with Sec4 has always been the Officer proving to the court the subjective level of impairment of the driver, at the time of the incident. Hence, many decades ago, the RTA was amended to add a prosecution if simply "over a limit" of alcohol. This is RTA "Section 5" (Sec5) and levels are set in blood, urine and breath. This is the source of the number "35" familiar to all, the road side breathalyser limit. The important part here is that the screening

is from a breath sample and the evidential sample is blood or in the very near future, from breath on an "evidential" road side device!

We have all grown up with the shift from drinking and driving to not drinking and driving, either because of the morals of knowing you are factually "twice as likely to have an accident" at the legal level of alcohol, or from the effective deterrent of automatic loss of licence for 12 months or greater, plus fines and massive insurance hikes. In your roles, the visions similar to mine on that fateful day must reinforce that message?

Nowadays drugs are no weaker than years gone by, they are the same or stronger, and more readily available and taken in higher numbers. Please remember, people take drugs because it affects them, they wouldn't bother if they didn't! For a Police Officer at the road side (or a manager at the start of a shift), drug impairment can be more difficult to see and prove, yet with multiple drugs, or drugs taken with alcohol, impairment can be many times worse than alcohol alone. Only 10's of people are prosecuted each year for drug driving in the UK in sharp contrast to our 80,000 drink driver prosecutions, or even in contrast to the 35,000 drug drivers prosecuted annually in Germany. So the RTA is now amended with the addition of "a limit for a list of drugs and medicines" called "Section 5a" (Sec5a) and it will come in force in England and Wales on Monday 2nd March 2015.

The novelty of the new Sec5a is that it is in two parts, firstly, the list of illegal drugs will be at a Zero Tolerance level and secondly, the list of impairing medicines will be at "above therapeutic dose" that will cause increased road risk, thus allowing for appropriately taken medication. For the RTA Sec5a, these drug levels will be screened at the roadside in saliva and then confirmed in blood.

Please remember that RTA Sec4 still exists. If you are impaired for whatever reason, you can be prosecuted with an automatic minimum of loss of license for 12 months.

So, where is the crossover for an organisation? Firstly you need to consider all risks in the job, not just the road. So if you are already Drug & Alcohol screening, you probably need to review your policy and systems, or if you are not screening, as a manager you need to look to sort it out for your own personal protection!

As far as the risks on the road are concerned, if the employee is driving for work, the road risk is the company's, but the liability of loss of license and possible subsequent loss of employment is the employee's. Presumably, as all employees are valuable assets to the organisation, there is a mutual and vested interest in being safe and legal. The employees should know better than to drink or drug drive, however make sure you can show a court that you advised them of this and you check it regularly.

The key point is that the RTA cannot be replicated in the workplace as an organisation cannot take the blood samples the police can, so direct comparison of results will never be possible. However it can be used as a lead. Organisations can, with the correct policy, take breath, saliva and urine samples for screening and confirmation. They can also use the same specification or similar quality screening devices to those of the police, and look to achieve or better those levels accepted as workplace best practice.

Drug and Alcohol screening seems a complex problem but working with an expert provides a simple, effective and secure solution.

Actions to take away

Policy: Have it in place and in practice. Have it reviewed regularly and by a specialist.
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Thermal Imaging Cameras – the Future of Firefighting?

The price and way we use thermal imaging technology is changing significantly. What does that mean for the firefighting industry, and how could these developments aid firefighters?

Rachel Hemsley

Thermal imaging technology has been incorporated as an everyday tool for most fire fighters; the primary strength is the cameras ability to detect heat signatures – enabling fighters to locate individuals in extremely low visibility conditions (in darkness and smoke) and providing crucial insights for search and rescue of civilians, and potentially trapped team members.

Thermal imaging cameras can also be a help with the initial assessment of a scene, in terms of both understanding a building's structure and hotspots, which means the strategy for tackling the fire can be more informed. This can be especially helpful if the fire is isolated or hidden within the structure.

It's been well established that thermal imaging cameras are an essential for modern day firefighting because their use really can make a difference in saving a life. In the United States, the NIOSH (the National Institute for Occupational Safety and Health) Fire Fighter Fatality Investigation and Prevention Program, has repeatedly recommended the use of thermal imaging cameras as best practice. For example, after an investigation into a firefighter fatality in 2011, NOISH recommended that fire departments should use thermal imaging cameras during firefighting operations and has listed it as one of the items of minimum equipment that should be readily available to a rapid intervention crew.

Advantages of Thermal Imaging Cameras Becoming Cheaper

More Cameras

The steep price of thermal imaging technology has been a limitation of it becoming widely adopted in firefighting. However, this technology is becoming cheaper and more readily available – thermal imaging cameras can now even be bought as an add-on to an iPhone.

The image quality of the iPhone thermal imaging case is unlikely to be of a high enough calibre for use in this professional context, but this does represent a shift in the market, where thermal imaging technology can be bought for a few hundred instead of thousands.

Currently it's unlikely for every fire fighter to have thermal imaging equipment, it's generally shared amongst a team, but imagine the difference that could be made if every fire fighter had the information thermal imaging can provide, no matter where they were in the field – even it was at a lower resolution for the sake of being economical.

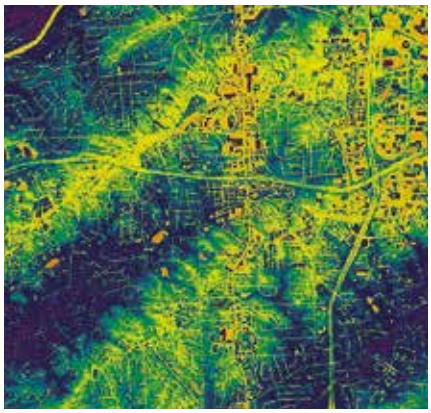
If each team member had a thermal imaging camera, not only could this speed up operations, but there could be a real time live feed to a central system monitored by another individual. This could add another pair of eyes with videos from various angles from the team members in the field, which could provide even more information about the scene to avoid dangers and create a more effective strategy.

Camera's with Better Usability

Thermal Imaging cameras' real strength is in the extra intel they can provide, which enables fire fighters to make more informed decisions. Part of the challenge of ensuring this technology gets used to the full extent is making it user friendly within an emergency environment.

This can come from simple adaptions of the technology; for instance, thermal imaging cameras within helmets are often preferred because of the hands-free functionality. If a thermal imaging camera can be adapted to a light simple iPhone case, surely it can be changed into other

Written by Rachel Hemsley on behalf of Instrument Sales and Services.
rachel@foutainpartnership.co.uk



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similarly convenient incarnations that might be of benefit to firefighters and emergency service individuals.

If it was standard issue for fight fighting equipment to come with a cheaper and integrated thermal imaging camera, more lives could be saved on a daily basis. Whilst projects like this may not seem like a revolutionary change to the technology, smart innovation in the usability of the tech has the potential to make a significant change in the outcomes of emergency scenarios.

Overall, simply more availability and use of thermal imaging technology may make the biggest difference when it comes to firefighting; technological advancements and lowering price tags could help this become a realistic option.

Innovative Developments of Thermal Imaging Technology for Fire Fighting

There are projects in several areas looking into this kind of development, and trying to assess how to best utilise thermal imaging technology to save lives and control fires.

Fire Detection and Prevention Sensors

Although a lot less funding goes towards fire prevention as opposed to fire containment, monitoring, early detection and prevention are the most effective tools in stopping a forest fire and limiting its damage. One device that is now being adopted in Santa Barbara in the USA (because of the areas high risk of forest fires), are known as “Flamesniffer” units.

They are placed on electrical poles within at risk areas and utilise infrared and thermal imaging for a mile in all directions to detect possible signs of fire. The cameras are only activated when their smoke detecting sensors are triggered. The cameras then send images to the closest fire station. These units can withstand up to 485 °C temperature, so they can transmit helpful images for a considerable amount of time even if they get caught in the fire. They cost $20,000 US dollars per unit; at that price it is unlikely this piece of technology will be widely adopted anytime soon in lower risk areas.

Aircraft’s with Thermal Imaging

Colorado have recently invested $20 million dollars in their own air fleet, two of these aircrafts feature thermal imaging technology and will be partially utilised to aid emergency services with forest fires. This technology is not new, it has been used in the military for over a decade, but it is the first time it’s been purposely adopted for firefighting efforts in this way.

Having thermal imaging integrated into aircrafts offers two distinct advantages, they help with detecting the fire earlier, when time matters most. Part of the catalyst for this investment was the 2012 Waldo Canyon fire, where it took almost 6 days for the source of the smoke to be found by which point a vast amount of damage had already occurred. Theoretically this technology should enable pilots to fly over areas and quickly locate the source of smoke, hopefully meaning the fire is dealt with and contained more quickly, leading to less damage.

The other advantage this use of thermal imaging technology is that the planes are specifically made to withstand pretty much any condition, even flying through smoke, meaning they can easily provide crews with real time data of hotspots and the progression of the fire. This type of information is vital when trying to plan a successful firefighting strategy.

Scouting Robots that create a 3D Image of the Scene

Engineers from UC San Diego are currently developing a scouting robot that could become an indispensable tool for the future of firefighting. These robot scouts utilise thermal imaging, stereo RGB cameras and other sensors to provide fire fighters with a 3D scene of a burning building in real time. Also providing information about the state of the fire including sensing volatile gases, temperatures and structural integrity all while looking for survivors. The prototypes are Segway-esque devices which are autonomous, can climb stairs and can work collaboratively with other scouting robots to provide a full picture of the scene in a very short period of time.

If this technology was to become available to the public, affordable and widely utilised, it would undoubtedly help save lives, and if the protocol became for robot scouts to assess the scene it has the potential to significantly lower fatality rates of fire fighters.

Thermal Imaging technology has already aided firefighters in saving many lives, but it has the potential to help save so many more. With all the adaptions and developments of this technology it will likely become an even more integral tool for fire fighters in the future.

For more information, go to www.isswww.co.uk/thermal-cameras/

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Fire and Ice

We all know what a danger fire can be. But have you also considered what a danger ice can be? If your station is in an exposed area or on a steep incline, chances are you'll have to be on full alert the minute you step outside during the winter months.

Andrew Henry

Winter in the UK is firmly here and brings with it the usual challenges – increased danger of slips and trips and restricted vehicle movements being just two dangers regularly faced by organisations throughout the UK. Fortunately the UK Highways Agency will grit major roads in a carefully planned priority system, though organising gritting on site falls under the remit of the organisation and can be an onerous additional task to coordinate.

It is often the case that roadways are clear enough to get to a place of work but the site itself can be icy, slippery or even under snow – leading to many logistical issues and often loss of business.

Fire stations and other emergency services are not immune from this problem and it is vital that these issues are addressed to ensure trouble-free ingress and egress at any point during the day, whatever the weather.

Clearly the emergency services have many tasks to perform – but predicting the weather ahead of a potentially cold snap and minimising the associated dangers come towards to bottom of a very large 'to-do' list – so it makes sense to consider utilising the services of a private gritting and snow clearing contractor who will monitor the weather and treat key areas before ice or snow form, mitigating risk and helping ensure uninterrupted service.

Awareness

In the UK, the Met Office works together with Public Health England to raise awareness and motivate people to take precautions during long periods of cold weather by providing cold weather alerts. These alerts are sent to all National Health Service Trusts throughout England as well as the general public through the Met Office website, public weather forecasts on radio and TV and also through social media. The alerts become active in November and end in March.

© Image courtesy of Icewatch

Andrew Henry is Sales Manager with Ice Watch Ltd.

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The Cold Weather Alert system has two clear trigger points:

1. When mean temperature remains below two degrees Celsius for 48 hours or longer.
2. When a region experiences heavy snow and/or widespread ice.

The trigger points have been developed in consultation with the Department of Health and the Health Protection Agency and only one of them needs to be breached in order for one of the following cold weather alerts to be issued:

- Level 1 (Green) – Winter preparedness and long-term planning: This is the lowest state of alert during the winter months. At this level social and healthcare services will ensure that people are aware of and prepared for potential cold weather.
- Level 2 (Yellow) – Alert and preparedness: Once the risk for any of the thresholds is above 60%, the Met Office will trigger a yellow alert. At this point social and healthcare services will ensure they are ready and prepared to act in order to reduce harm from prolonged periods of cold weather.
- Level 3 (Amber) – Cold weather action: Amber alerts are issued as soon as any of the thresholds have been breached. Once in place, social and healthcare services will put in place specific actions to support those perceived to be at high-risk.
- Level 4 (Red) – Emergency: This is the highest level of alert and is reached when cold weather is so severe and/or prolonged that its impact reaches beyond the health and social care system. It is issued on the advice of, or in collaboration with, the government and when health risks extend to the wider population.

Action

Reputable private gritting contractors work closely with the MET office and other private forecasting companies along these lines, operating a similar traffic light system of risk analysis to decide when gritting and/or snow clearing is to be undertaken.

Image courtesy of Scottish FRS

- Level 1 (Green): Road Side Temperatures (RST) are forecast to be +2 °C or higher. It is unlikely that ice will form.
- Level 2 (Yellow): RSTs are forecast to be between +0.6 °C and +1.9 °C – there is a lower risk of frost, ice or snow but taken together with moisture and precipitation levels, this may trigger an alert and pre-emptive gritting.
- Level 3 (Amber): RSTs are forecast to be +0.5 °C or below (including dry roads below 0.0 °C) – there is still a risk of frost, ice or snow and depending on location and moisture levels, gritting often takes place.
- Level 4 (Red): Frost, ice and/or snow are forecast to occur. Immediate action is required.

It seems a simple formula, however, locations and microclimates must also be factored in. Microclimates are local atmospheric zones where the climate differs from the surrounding area. These zones can range in size from a few square feet to several square miles and are influenced by a number of contributing factors including:

Altitude

The higher you are above sea level, the colder the temperature will be. This occurs because the air is thinner at higher altitudes, thus it absorbs and retains less heat. The temperature usually decreases by 1 degree Celsius for every 100 metres in altitude that you climb.

Image courtesy of Scottish FRS

Distance from the Sea

As a result of oceans heating up and cooling much more slowly than land, coastal locations tend to be much cooler in the summer and warmer in the winter compared to inland locations at a similar latitude and altitude. For example, Glasgow is at similar latitude to Moscow, but experiences much milder winters as a result of being closer to the coast.

Prevailing Winds

The direction of prevailing winds can impact upon temperatures and weather conditions:

- Winds blowing off the sea will often bring rain to the coast and dry weather to inland areas.
- Winds blowing from warm inland areas, such as Africa, tend to be warm and dry.

- Winds blowing from cooler inland areas, such as central Europe, will often be cooler and dry.
- The UK most frequently experiences south westerly winds from the Atlantic, bringing cool winds in the summer and mild winds in the winter.

Urban Climates

Urban climates refer to atmospheric conditions (temperature, humidity, wind speed/direction and air quality) in an urban area that differ from those in the surrounding rural environment. On average urban temperatures are between one and three degrees Celsius higher, but can be as much as 10 degrees Celsius higher than rural environments under calm and cloud-less conditions.

Hills and Mountains

- Anabatic/Upslope Winds: During the day, sun facing hills, mountain slopes and the air above them get heated faster than the adjacent atmosphere. As a result the density of the air decreases, causing it to rise. This causes more air to rise from below to replace it, producing wind.
- Katabatic/Gravity/Downslope Winds: In the evenings, as the highland loses heat, the air coming into contact with it also begins to cool. This causes it to become denser than the air around it and it therefore begins to flow downhill, generating a wind.

Gritting

One or more of these factors can have a direct impact upon local climates and therefore have an effect on the decision as to whether proactive gritting and/or snow clearing should take place.

Where weather forecasts and detailed climate analysis concur, gritting and/or snow clearing should be undertaken ideally at the optimum time from both a weather and site operations viewpoint. For example, gritting is most effective before ice forms but cannot be undertaken before all risk of rain has gone. If it is undertaken too early rain will wash away the salt used. The gritting contractor should be able to advise and treat the agreed areas within a narrow timeframe.

Site specific gritting and snow clearing plans should be agreed and in place well before the risk of bad weather – the plans should show the areas to be gritted, the type of equipment, the route, hazards and areas that snow is to be stacked in the event of snow clearing after a heavy snow fall. This should

be reviewed regularly during the course of the contract and also include matters such as entry and exit points to the site, security/check-in arrangements and the issuing/withdrawing of access cards. As well as the site plans, site-specific risk assessments and method statements should be in place for every site – most of this is a prerequisite for the £10 million Public Liability insurance that reputable private gritting contractors should have in place.

Unpredictable Winters Ahead

In recent years weather unpredictability in the UK has been very evident:

The winter of 2009/10 saw the UK experience its coldest winter for 30 years.

Weaker westerly winds also brought cold weather during the winter of 2010/11.

However 2013/14 was much more mild and stormy, resulting in the devastating floods that caused considerable disruption to many areas of the Country.

This unpredictability highlights the importance of being prepared for whatever the winters ahead may throw at us. Choose your winter risk management partner with care and discuss with them how best to be protected from the threat of ice and snow – so you can concentrate fully on the service you provide.

The right partner will help you by ironing out all the variables and unpredictability and allow you to make decisions in black and white.

Or fire and ice, if you prefer.

For more information, go to www.icewatch.co.uk

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Firefighting Foam – Making Water Wetter

As a largely misunderstood firefighting tactic, the use of foam has at times been confusing to the fire service. The result is that many municipal brigades/departments have just avoided the use of foam, especially Class A foam and have transitioned to using emulsifiers or wetting agents.

Dave Pelton

Dave Pelton is Vice President, Global Marketing for The Solberg Company. Dave entered the fire protection industry in 1984 and has served on several trade association boards and industry technical committees on both a domestic and international level including Fire Equipment Manufacturers Association (FEMA), Fire Suppression Systems Association (FSSA), National Fire Protection Association (NFPA), and International Standards Organization (ISO).

While the end objective is to stretch valuable and at times limited water resources, it is more important to fully understand the fit for purpose of each of these technologies. This assures that these valuable tools provide maximum benefit. Foam is a very effective firefighting tool for flame knockdown, fire control, extinguishment, and burn-back resistance (Class B foam). Control, extinguishing time, and burn-back resistance are paramount to the safety of firefighters everywhere. So where do we start?

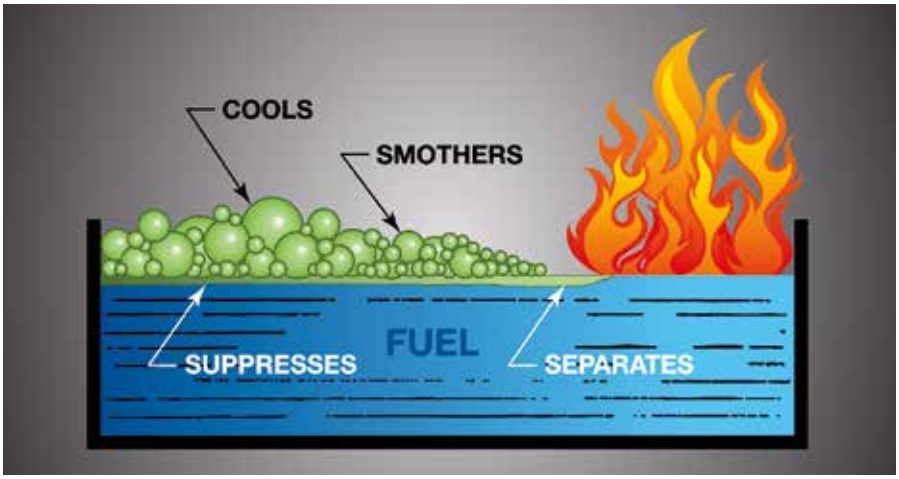
What is Foam? Firefighting foams have been in commercial use since the early 1900's. The National Fire Protection Association in (NFPA) 11 – Standard for Low, Medium and High Expansion Foam, Section 3.1.10, defines foam as "a stable aggregation of bubbles of lower density than oil or water." Foam is made up by three component parts: foam concentrate + water + energy. Energy can take the form of air or mechanical agitation and when added to foam solution (foam concentrate mixed with the appropriate amount of water) finished foam is produced through means of a discharge device. The finished foam is very fluid and readily flows over liquid surfaces to extinguish fire in four ways:

- Excludes Oxygen (separates fuel from vapor)
- Cools Fuel Surface (water content of foam)
- Prevents Release of Vapors (flammable fuel)
- Separates Flame from Fuel Surface

Class "B" Foam

While there are many different types of foam concentrates available on the market, the two most commonly used forms are Aqueous Film Forming Foam (AFFF) and Alcohol Resistant Aqueous Film Forming Foam (AR-AFFF). NFPA Standard 11, Section 3.3.12.1 defines AR-AFFF as "a concentrate used for fighting fires on water-soluble materials and other fuels destructive to regular AFFF or FFFP foams as well as for fires involving hydrocarbons."

Section 3.3.12.2 defines AFFF as "a concentrate based on fluorinated surfactants plus foam stabilizers to



produce a fluid aqueous film for suppressing hydrocarbon fuel vapors and usually diluted with water to a 1%, 3% or 6% solutions."

Each Class B foam concentrate is developed for a specific application. Some firefighting foams are thick and form a heavy, heat-resistant covering over a burning liquid surface. Other types of foams are thinner and spread much more quickly over the fuel surface. Still, other types of foams will generate a vapor sealing film on the surface of the fuel. Additional foam concentrate types, such as medium and high expansion foams, can be used in applications requiring large foam volumes to flood surfaces and fill cavities within a hazard.

Class "A" Foam

Developed in the mid-1980's Class A foam was predominately used for wild-land fires but as their popularity grew throughout the 1990's the use of Class A foam was expanded for use on structural fires.

Class A fires consist of ordinary combustible materials such as paper, cloth, wood, and plastics. These type fuels require the heat-absorbing effects of water (cooling) or water solutions. Class A fires consist of two types: flaming combustion involving gases which result from the thermal decomposition of the fuel. The second type is deep-seated or glowing combustion. This type represents combustion within the mass of the fuel and has a slow rate of heat loss and a slow rate of reaction between oxygen and fuel.

As a synthetic based foam concentrate, Class A foam is applied at low concentrations ranging from 0.1% to 1.0% (see proportioning rates below). Cooling and wetting are the primary extinguishing mechanisms. The use of Class A foam makes "water wetter" on average increasing the effectiveness of water tenfold.

Typical Class "A" Foam Proportioning Rates

- Exposure Protection: 1.0%
- Fire Brake: 0.75%
- Initial Suppression or Fire Lines: 0.5%
- Overhaul: 0.25%

These proportioning rates make the use of Class A foam a cost effective means of combating fires because smaller amounts of foam concentrate can be used to make effective foam. Class A foam is biodegradable and non-toxic, so it is environmentally sustainable. Class A foam is deployed through a variety of portable and fixed appliance devices ranging from firefighters' backpacks, brush and fire apparatus, to rotary and fixed wing aircraft.

Using Foam Increases Operational Efficiency

Many rural and small urban fire brigades have already embraced the use of Class A foam as part of their everyday operational tactics. Their use of Class A foam, quite simply, makes good sense for them. For any brigade that has to bring their water to the scene with them and has to establish water tanker shuttles, using Class A foam can easily increase operational efficiency of fighting the fire. The reason for this is that, Class A foam, when properly deployed, allows the fire to be extinguished more quickly and with far less water than would be required if it were not being used. On average, the use of Class A foam increases water's wetting capability 10 fold. In more simplified terms... "making water wetter." In addition, the amount of time required post extinguishment during overhaul or mop up is greatly reduced.

"The use of firefighting foam by the fire service is not a single extinguishing solution, rather a tool (amongst many tools) that when combined with tactics create a more efficient operational scenario.

With the introduction of CAFS some brigades have taken the approach believing they could reduce water consumption (lpm) but the reality is whether using CAFS or traditional foam application appliances like line eductors or foam nozzles, water is still needed to suppress fire.

The use of foam, like other resources available to the fire service, is a force multiplier that when employed with traditional tactics stabilizes the fire hazard thus allowing fire personnel to enter the structure for overhaul. While there are efficiencies associated with the use of foam be it advancements in system hardware technology or the foam concentrate itself, the use of firefighting foam and Class A foam in particular is an asset the fire service should not overlook for structural protection.

One area frequently overlooked for the use of Class A foam is zero lot line properties or multi-family dwellings where the likelihood of multiple exposure fire scenarios is high. The ability to use foam for both internal and external exposure protection and simultaneous active fire suppression is an extremely valuable

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CRITERIA	UL Requirements NFPA 18	UL 162 Requirements NFPA 11	NOTES
	Class A Wetting Agent (GOHR)	Class B Foam Liquid Concentrate (GFGV) [also suitable for Class A use]	Not comparable agents as indicated by separate listing and test criteria
Fire Test	1.5" depth n-heptane floated on water 50 sq. ft. (4.65m2) 1 minute pre-burn	2.0" depth n-heptane floated on water 50 sq. ft. (4.65m2) 1 minute pre-burn	55 US Gallons (208 liters) fuel on each test
Application Rate	0.2 gpm ft2 (10 gpm nozzle) (8.15L/ min/m2)	0.04 gpm ft2 (2 gpm nozzle) (1.63L/min/m2)	Application rate for wetting agent test is 5 times higher with less fuel
Extinction Time	No time limit – pan must not overflow before extinction	3 minutes or less for full extinguishment	Unlimited dilution (emulsion) of foam providing pan does not overflow
Water Type Used for Test	Fresh water only (no salt water test)	Fresh water and salt water test performed	Wetting agent (emulsifiers) perform much better with fresh water compared to salt water
Vapor Seal Tests	NONE	2 seal tests conducted during 9 minute waiting period	
Burn-back Test	NONE	Foam blanket must resist breakdown from flame for 5 minutes after foam blanket has rested for 9 minutes post fire extinguishment	Critical for post fire security
Polar Solvent Fuel Test	NONE	AR type foam tested for use on alcohols and other polar solvent fuels	Fuel containing greater than 10% Ethanol considered polar solvent fuels. AR type foam for extinguishment

resource for those in the fire service. Another advantage in using Class A foam is that lower nozzle flow rates are capable of being used. Fire flow rates can easily be reduced by half or more when Class A foam is deployed.

Wetting Agents and Emulsifiers – Alternative Products?

The use of firefighting wetting (mid 1960's) and emulsifying (early 1990's) agents were introduced to the firefighting community claiming use on Class A and B fires. The goal of these alternative agents is similar to foam agents in that they aim to reduce the surface tension of water. However, instead of forming a "foam blanket" on a Class B fuel surface, the solution is "vigorously" mixed with the fuel to form a non- flammable emulsion. Emulsifiers have limited foaming capabilities. Emulsifiers must be mixed with water at a given percentage and "forcefully applied" onto the entire surface of the burning fuel source. The resulting solution then mixes with the fuel, breaking it into very small droplets (the definition of an emulsifier). These droplets of fuel are surrounded or encapsulated by the emulsifier/water mixture to extinguish the fire.

The Underwriters Laboratories Inc. (UL) Directory defines wetting agents as "liquid concentrates which, when added to plain water in proper quantities, materially reduce the surface tension of plain water and increases its penetration and spreading ability." Water to which a wetting agent has been added to is sometimes referred to as "wet water" because of its increased ability to wet surfaces it is applied to. Wetting agents improve the efficiency of water in extinguishing Class A fuel fires. Use on Class B combustibles require much higher application rates than those requiring foam agents and is limited to non-water soluble flammable liquids (hydrocarbons only). Little if any burn-back resistance is present on Class B fires extinguished with "emulsifiers or wetting agents."

The NFPA Glossary of Terms defins an emulsifier as "a chemical or mixture of chemicals that along with some energy input promotes the formation of an emulsion." Use of emulsifiers or wetting agents does not afford use as a "fire brake or passive structural protection" (i.e. exposure protection). In contract to Class A foam the use of wetting agents and emulsifiers does not provide adequate exposure protection again radiant heat or an advancing fire. A note of caution here that Class A foam, wetting agents or emulsifiers should never be used on Class E (energized electrical) Class D (combustable metals), or Class F (cookin goils) fires as the water content in these products is not compatable with the fuel hazard.

Shown above is the UL test performance criteria for wetting agents. It should be noted that there are distinct differences in the criteria for wetting agents vs. foams. All to often questions arise from not only the the fire service but industrial fire brigades, engineering firms and consultants as to "how does foam and wetting agents compare to one another." There certainly is an argument that both are firefighting agents in much the same way that apples and pears are both fruits, but that's where it ends. Ultimately selection of any firefighting tool should be governed by product(s) being "fit for purpose" and having the appropriate third party certifications for the intended application.

In conclusion, the use of Class A foam just makes smart sense. It enhances a fire brigade's ability to suppress fires more rapidly – improves water's wetting capability thereby providing faster penetration and greater fire control, increases protection of personnel and maximizes operational efficiency through the use of variable proportioning rates thus minimizing post fire clean up time, and conserving valuable water resources.

For more information, go to www.solbergfoam.com

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New State of the art Fire Behaviour training centre

The Devon & Somerset Fire & Rescue Service (DSFRS) Academy's Fire Behaviour School is based at Exeter International Airport, UK and in summer 2013 a new state of the art Fire Behaviour training facility was constructed.

Jessica King

The Fire Behaviour School is a BTEC accredited live fire training provider, that specialises in delivering breathing apparatus (BA), compartment firefighting and positive pressure ventilation training. The school trains in excess of 2,000 operational staff within the service as well as instructors from 43 UK and international fire authorities.

The £3.35 million training site provides facilities for fire behaviour, hot fire and foam training. The building includes mock-up houses and an aeroplane to practice specialist firefighting techniques using life-like scenarios.

The Fire Behaviour School was established in 1997 and already had a base at the airport. Due to the practical nature of the training, the space needed and the generation of smoke on a daily basis, the airport site was the ideal location. The new building houses everything that is expected from a modern fire and rescue training establishment including lecture rooms, an incident command suite, dining rooms, changing and shower rooms, drying rooms, BA servicing areas and storage areas. In addition to the main building, the site includes a three storey multi compartment structure for hot fire training, a large concrete training pad with various diverter valves for different classes of foam training, a cold BA training complex, attack containers and fire behaviour demo containers. The site is also a base for Academy office staff as well as the Fire Behaviour School instructors.

The addition of the hot multi compartment structure has resulted in a more versatile training facility. It is built over three floors and has rising main. The protected stairwell at one end can be used to simulate high rise incidents. There are 14 positions to burn crib fires, spread over all three levels. There are two stair cases and each level has access to fresh air virtually all round. The building

© Images courtesy of DSFRS

Jessica King is Academy Commercial Support Manager at Devon and Somerset Fire and Rescue Service.

is fitted with an extraction system and temperature monitoring is throughout. The new structure provides the Academy with a number of options to have realistic live fire training, ranging from domestic property to industrial high rise. The Fire Behaviour School worked closely with the supplier Kenex Engineering throughout the building project and Kenex was able to respond to the specific requirements of the school to ensure that the building had a multi-functional use. Ian Bartlett, Station Manager at the Fire Behaviour School said: "Kenex Engineering were very responsive to our needs and involved us from the design stage right through to the commissioning of the building. They have provided us with a fantastic building that fits our needs perfectly. They also provide a very professional aftercare service that ensures that the multi-compartment structure is inspected and maintained regularly to ensure it operates safely and within tightening budgets".

The Academy also worked closely with Exeter International Airport to develop a training centre that accommodates everyone's needs. A large (5525 sq m) training slab was included in the build and in the near future this will include an aircraft simulator with the possibility of a similar helicopter version. Like many other services, DSFRS have struggled to find ways to practice and train with foam. The Academy is now able to contain the foam and with the use of diverter valves can keep different classes separate so that the waste product can be safely disposed of when the training is over.

The site position is very favourable for commercial customers; there is easy access from the M5, A30 and A38. Exeter Airport is a growing regional airport with regular flights to many UK destinations as well as most of Europe. Plenty of accommodation is available close to the site, which makes it very convenient for national and international customers to attend courses.

In July this year, the Fire Behaviour School was visited by His Royal Highness the Prince of Wales and the Duchess of Cornwall to officially thank all those involved for the excellent work carried out by Devon & Somerset Fire & Rescue Service, as well as other emergency services organisations during the winter weather response. Andy Newland is the Academy Manager, he said: "It was an honour to host the visit by their Royal Highnesses to our Academy site here at Exeter Airport on behalf of the local Blue Light services and Local Resilience Forum, we were blessed with great weather which was at the opposite scale to the winter storms, the reason why we were gathered together. Their Royal Highnesses met with representatives from responders and those supporting operations during the operationally challenging times from last winter and early spring. Their thanks to crews were appreciated by all present and we were grateful for them taking the time out with us while visiting the West Country. Before leaving us, the Royal couple observed a realistic joint agency response exercise using our training facilities on site and I know they were impressed with both the facilities and those taking part."

The Academy's Command School is also based at the airport site and recently RescueSim simulators have been installed for Incident Command training. The simulators were delivered and installed at the Academy by developer VSTEP. The addition of RescueSim will allow incident command trainers to produce fully immersive scenarios based on their operational requirements. Joe Hassell, Station Manager at the Academy said: "Being a large, rural fire and rescue service has presented our training staff with real challenges when it comes to providing our Incident Commanders with challenging and realistic training. Firefighter and public safety is Devon & Somerset Fire & Rescue Service's number one priority, and we believe RescueSim will assist us in achieving this aim. We are delighted to have signed a contract with VSTEP and have found their staff and trainers to be highly skilled, professional and attentive to our needs. We have started piloting RescueSim with our staff, with excellent feedback and look forward to developing our ICS training for all levels of command in the future". The Academy are using the UK version of the RescueSim Simulator, which includes realistic UK Police, Ambulance and Highways Agency vehicles, appliances and personnel for realistic training of incidents.

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Rotterdam-Rijnmond Fire Brigade chooses TEXPORT

At the end of 2013, the product quality that TEXPORT® delivers won over yet another prestigious client in Europe: the Rotterdam-Rijnmond Fire Brigade (Rotterdam urban region).

The toughest challenges in the tendering phase were seeing whether the suits could survive the extreme tests and vast range of mission specifications they would need to satisfy in practice.

In 2013, the Fire Brigades in the urban region around Rotterdam invited tenders for new personal protective clothing. Decisions within the tender process were based on strict criteria defined as mandatory, Jan Bosch, Executive Member of the Tender Committee confirms: "Essentially we based the tender on what active deployment had taught us. The criteria were defined in close cooperation with active members of the Rotterdam Fire Brigade." The PPE would be called on in a variety of different mission situations. So the specified criteria were equally diverse, which proved particularly challenging: active-duty fire fighters wanted a suit that would offer comfort during technical missions yet still provide sufficient protection in extreme flashover situations (and above all afterwards). But the purse strings were a little tight to equip approximately 500 professional and 900 voluntary fire fighters with two suits each. So the defined tender criteria called for a suit that ensures comfort and breathability in passive and active, outside deployment without cutting corners in the need for maximum protection. Put technically, this means high HTI and RHTI values, combined with a low RET value. Protection in flashover situations and the longest possible retreat windows were defined as particularly crucial safety factors (HTI24-12, i.e. RHTI24-12).

The way the city is laid out necessitates long retreat windows

The range of missions that fire brigades are asked to handle is very broad. But the Rotterdam Fire Brigade is faced with geographical and cultural factors that make things even more complicated. Glancing at a map of the Netherlands is sufficient to show that the Fire Brigades will be confronted with a lot of water, both along the coast and inland. The urban structures are additional factors: strung-out, rural settlements further inland, with urban conurbations and large corporate complexes, ports and chemical or industrial companies hugging the coastline. There is another important factor in Rotterdam. And here we see why the retreat window is so important. The old town of Rotterdam was razed during the Second World War. Afterwards the city centre was modernized – the only Dutch city to experience this kind of redevelopment – and reconstructed almost exclusively using high-rise blocks. For fire fighters, this means that teams on the ground are forced to penetrate further and further into the buildings whenever a fire breaks out inside. So the retreat window must also factor in this time. Substances and chemicals used in the building and its furnishings are further aggravating aspects, thus heightening the risk of flashover. The committee planned to counter this hazard by using an extremely high insulation coefficient, i.e. an extended heat transfer time (high HTI, i.e. RHTI).

Defining specifications based on mission purposes

So the people in charge in Rotterdam set about moving from a very practical vision to a set of specifications, defined on paper. Aspects were added to EN469 to accommodate empirical values and the results of individualised tests and ultimately to produce the relevant standards in the invitation to tender. "We wanted practical necessity to define the clothing specifications. We were particularly concerned to specify values transferred to paper from practical experience, and not the other way round. The standards we produced in this way exceeded the scope of EN469, or added criteria we felt were important", says Jan Bosch. Product durability was another important criterion in the tender of the new PPE. The standards defined a service life of ten years, also a review of operational fitness of all suits after four to five years. The committee also stated that the strip markings, as the "most exposed elements" on the clothing, would be authoritative in terms of durability. Therefore, this aspect (beyond 'visibility' as defined in the standard) became an important element of the overall requirements. The committee decided on PBI® Matrix® as outer material, thanks to its break-open properties and enhanced durability. The jacket was also required to include an integral system for third-party rescue.

Chronology in the decision-making process

A three-stage decision-making process was conducted once the general specifications had been defined and sent to all bidders. The idea according to Jan Bosch was to keep the procedure as comprehensible as possible: "The three phases in the decision-making process were intended to guarantee transparent and objective management, in which each phase could mean the end of the road for a bidder. The initial situation had been clearly communicated to all bidders. Now it was important to identify the best possible product – on paper and in practice." The first stage involved comparing the written concepts for correspondence with the required criteria. The overall concept, including price, design, and methods for

solving the required criteria, was crucial here, and not just the technical stats. Afterwards, a second stage involved putting the best entries through their paces in rigorous practical tests. The test phase consisted of two practical blocks: a 'cold test' and a 'hot test'. In both blocks, several active duty fire fighters were kitted out with the suits. They were asked to complete a series of mission situations, which each participant completed in a different sequence to improve comparability. The simulations in the cold test involved technical mission scenarios (active and passive), while the warm test consisted of active and passive fire fighting deployments inside and outside. Additionally, the clothing was tested for extreme resilience in a wet and dry state and in fire containers, exposing each of the clothing elements to a maximum temperature of 600 °C.

The final stage involved another review of the overall concept under consideration of the real test results; in this, the 'total cost of operation' (procurement costs, maintenance costs, repair, durability, etc.) represented an important criterion. Across the board, TEXPORT® proved convincing: TEXPORT® edged in front with its patented X-TREME® compound in the specifications relating to breathability, wearing comfort, and thermal protection (in terms of direct flame exposure and radiant heat). The Triple Fabric® reflective strip by TEXPORT® was just as faultless in satisfying the requirements defined for the strip materials. This quickly prompted the committee members to shortlist the suit for container and practical tests. Here again, the model scored full marks: "We decided to use Texport because the product was unreservedly convincing in terms of its concept, the quality of workmanship, and its test performance. The assessment of total operating costs, itself hardly inconsequential, actually made it an obvious choice", says Jan Bosch.

Contract awarded to TEXPORT® thanks to its overall concept

The TEXPORT® bid involved an adapted version of the Fire Drag Rescue jacket. An outer, eye-catching grab strap guarantees quick and easy access to the rescue system, even in tricky circumstances and poor visibility. The rescue strap is fully integrated in the upper-body part of the jacket. Running from the back and around the chest and arms, the system ensures comfortable use during rescues. The system's special design prevents the material from cutting in the armpit region when dragging or carrying the injured person out of the danger zone. PBI® Matrix® was used as outer fabric in both the jacket and the trousers. As material compound, the patented X-TREME® satisfied all requirements placed in the suit. Highest insulation coefficients and extended retreat window while retaining the best possible breathability matched the precise criteria that the executive committee felt were crucial. The Fire Action Matrix model was adapted to suit the specific needs of the trousers. They also use X-TREME® and therefore provide the ideal material compound. TEXPORT® highlights such as the textile Triple Fabric® reflective strips or the HPX-System® for fast and easy zipper repair were additional criteria in the decision, especially with regard to the total cost of operation and durability.

"It wasn't the committee that chose Texport as the winner; it was the decision-making process in itself." The objective and transparent design of the tender invitation effectively prevented any personal preferences encroaching on the decision-making process," says Jan Bosch. The speed with which the decision was made plainly indicates the structure and clarity of the specifications, as well as how well TEXPORT® succeeded in satisfying the requirements: "Once we had received all test results, overall concepts, and final reports, it didn't even take half an hour to choose Texport as the winner," said Jan Bosch, looking back. "The differences in product quality were simply so striking that it didn't call for a lot of thought. Particularly the initial practical experience and the positive feedback from the people using the clothing day to day in active service confirm that we made the right decision, of course."

The first 1,900 sets were delivered to the Rotterdam Fire Brigade at the end of last year. The other 700 sets will be delivered by the middle of this year, fulfilling the total order volume.

For more information, go to www.texport.at

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The Stealth Killer of First Responders: Part 2

In the previous issue we discussed the definition for situational awareness and shared some examples for how situational awareness can be impacted. In this installment you will be provided with ten situational awareness best practices.

Dr. Richard B. Gasaway
Fire Chief (ret.)

Dr Richard B. Gasaway joined the fire service in 1979 and has worked for six emergency services agencies including serving as a career fire chief for 20 years. Chief Gasaway's doctoral research is focused on the neuroscience of decision making under stress and the barriers that impact situational awareness. He has delivered more than 2,000 presentations on safety and leadership topics throughout the United States, Canada, England, Hong Kong and Australia.

This list was developed based on research I conducted with expert-level fireground commanders. This list is not a prescription for success. Rather, the recommendations are designed to help you over come some of the more pervasive situational awareness barriers.

1 Responders Must Capture and Process Critical Cues and Clues to Project Future Events

As a responder conducts a size-up (e.g., at a residential dwelling fire) there are dozens, perhaps hundreds, of cues and clues that can indicate what is happening and can help responders make accurate predictions about future events. Based on the findings in the literature and the input from experts who participated in my research, the most pertinent cues and clues at a residential dwelling fire may include:

- **A** An evaluation of smoke and fire conditions
- **B** Consideration for the construction and level of decomposition of the structure
- **C** The speed the incident is moving; and,
- **D** A realistic assessment of savable lives in the IDLH environment.

2 Responders Should Set the Strategy and Tactics Based on Available Resources

Staffing issues were significant factors that cause responders concern and can impacted their SA. The expert responders I interviewed recommended conducting continual assessments of the scene until sufficient staffing (e.g., based on quantity, quality, training and experience) arrives on the scene. The experts cautioned against setting a strategy and committing to tactics until the proper quantity and quality of personnel are present to accomplish the tasks.

© Images courtesy of Fire Chief (ret.) John M. Buckman III

3 Responders Should Develop and Maintain a Big-Picture Focus of the Incident Scene

Repeatedly, the expert responders I interviewed noted they were impacted when their attention was narrowed because they focused their attention to one area of an incident scene or to one task being formed. The experts recommended developing and maintaining a big-picture focus of the incident by developing meta-awareness, a conscious awareness of the larger incident scene and purposeful avoidance of narrowing attention to one task or one area of the scene.

4 The person in-charge (i.e., The Incident Commander) Should Not Perform Hands-on Duties

The expert incident commanders I interviewed frequently noted that among the most insidious ways their awareness is impacted is when they performed hands-on fireground duties and consequently this caused them to overlook critical cues and clues and it caused them to lose track of the speed at which the incident was changing. Expert commanders recommended displaying self-restraint by avoiding the temptation to be drawn into performing non-command tasks (i.e., pulling/advancing hose lines, setting fans or ladders, connecting hose to a fire hydrant, or serving as the pump operator).

5 Responders Cannot Listen to and Comprehend Multiple Conversations Simultaneously

The responders I interviewed described multiple scenarios where their SA had been impacted because they missed important radio messages from commanders or other responders operating on the emergency scene. This was especially problematic when the radio messages were transmitted from crews operating in hazardous environments. Responders noted it was nearly impossible to listen to and comprehend simultaneous messages, be they from multiple radio channels or during face-to-face communications. The experts recommended giving priority attention to the radio messages of responders operating in hazardous environments. This may be facilitated by operating on a single operational channel or by assigning someone to monitor radio traffic of crews operating in hazardous environments.

6 The Incident Commander Should be Far Enough Back From The Incident to See the Big Picture

The expert commanders I interviewed were split in their opinions on the best place to run command. Some noted they preferred to be outside a vehicle, in the front yard or standing on the street where they noted they benefited from being able to use all of their senses to capture cues and clues on the scene. Other incident commanders noted they preferred to be located in a vehicle where they described the environment as calm and free of distractions and interruptions. The one universal recommendation from all the commanders, regardless of where their command location started, was when the incident became complex or they were being overwhelmed they preferred to be remotely located. Every commander interviewed noted they had retreated to the sanctity of a vehicle under extremely stressful conditions. The commanders also stressed the importance of completing a thorough size-up including a three-sixty walk-around prior to assuming a position that is physically out of the action.

7 Responders Should Take Steps to Control Distractions and Interruptions

Responders spoke frequently about how distractions and interruptions impact their SA. Commanders of residential dwelling fires noted that police officers, occupants, neighbors, bystanders, utility company workers and other firefighters offering unsolicited advice were among the culprits that distracted their attention away from the big picture incident. The experts recommend a degree of self-discipline to stay on-task, a willingness to tell those wishing to speak face-to-face to refrain from interrupting the responder who is listening to radio traffic from personnel who may be operating in high hazard environments. For incident commanders, the experts recommended being located out of visible sight of the persons who might distract their attention.

8 Responders (Including Commanders) Should Manage Their Span of Control

The experts noted it was easy to get overwhelmed if they had to perform too many command roles, had to process too much information, had to listen to multiple radio channels, and/or had to complete a size-up while focusing on the safety of the personnel deploying in the firefight. The experts note that assigning subordinate command duties (e.g., safety, staging, and operations) was essential to keep the incident commander from being overloaded. The experts spoke favorable of assigning a person to serve as an aide, noting the aide can free the incident commander's mental capacity to concentrate on the most important aspects of the fireground operations. The presence of a senior advisor to help the incident commander with the delegation of duties was also very beneficial. The use of a unified command, where ranking officers from all agencies involved are physically located together, facilitated an efficient distribution of duties and a sharing of knowledge that enhances commander SA.

9 The Incident Commander Must Establish and Maintain a Strong Command Presence

The experts noted it was important to establish a strong command presence by displaying confidence and focused leadership at the incident scene. The experts noted that in order to accomplish this, it was essential to display emotional self-control especially during the most stressful periods of an incident. They noted their behavior and demeanor often sets up the incident for success or failure because crews react based on the behavior and demeanor of the commander.

The experts also noted it was very important to control the action of crews, ensuring personnel do not engage in independent goal setting (freelancing) and that commanders know where personnel are operating and what they are doing at all times. The experts noted it is also very important to be clear, concise, articulate and confident when giving orders. They were also strong advocates for the need to be consciously aware of the passage of time, noting the commander may be the only one with access to a watch or clock to mark and keep track of the passage of time.

10 Responders Should Accelerate Their Expertise

The experts spoke openly about a general reduction in the number of residential dwelling fires over the past twenty years. The reduction in actual fires impacts the ability of responders to develop and maintain skills. The experts noted this is why it is so important to conduct realistic training, noting that challenging real-life training scenarios help to develop responder skills and enhance a responder's ability to make good decisions under stress. The experts also strongly recommended the use of simulations, as well as using case studies and watching video clips of fire incidents. The experts were also strong advocates for using near-miss reports to accelerate learning based on the mistakes of others. They also spoke favorably of the valuable lessons that can be learned from line-of-duty death investigation reports. Performing post-incident evaluations after each emergency was another way the experts recommended for identifying potential issues and to reinforce the application of best practices. Finally, the experts recommended that developing supervisors and incident commanders be paired with a mentor who can provide coaching and feedback so the novice supervisor/commander can learn from mistakes, even if the outcome of the error was not a near-miss or casualty incident.

In high stress emergency settings, failing to capture critical incident cues and clues, failing to comprehend those cues and clues in to something meaningful, and failing to use that meaning to project future events is the recipe for near-miss and catastrophic events on the fireground. The foundation to good decision making lies in the ability to develop and maintain strong situational awareness… so you can see the bad things coming in time to change the outcome.

For more information, go to www.SAMatters.com

New Car Technology: Part 1

"The cars we are cutting up in the junk yards aren't the cars that are crashing on the highway"

Doug W. Cincurak

Doug Cincurak is a Captain with the city of Green Fire Department where he has served as a Firefighter/ Paramedic for 29 years. Doug has extensive training experience and knowledge in vehicle extrication and stabilization. He has taught extrication and stabilization classes throughout the USA and Canada.

This is the first of two articles on new car technology. Firefighters in the fire service today have more demands placed on them than ever before. We must know about lightweight truss construction, rapid intervention teams, saving our own and now weapons of mass destruction. While I believe this is very valuable training and certainly important to the fire service, I also believe the knowledge skills and abilities associated with vehicle extrication have not kept pace with the technology of the auto industry.

Back in the 1970's the big buzzword in the fire service was extrication and EMS, in the 1980's it was Haz Mat, in the 1990's it was Technical Rescue, now we have WMD. With the way the auto industry has changed the safety features of cars today, I think it is time we revisit vehicle extrication.

During the past several years I have been teaching auto extrication to fire departments, I have learned a few things, one is most departments have little knowledge of new car technology as it pertains to vehicle extrication and they are using antiquated techniques taught when they first joined the fire service.

Sure everyone knows that cars today have airbags in them, but do you know how to avoid them and still perform an extrication without injuring yourself or the patient? Are you aware of the new types of steel auto makers are using in the cars on the road today? Do you know if your cutters have the capacity to cut a triple rolled high strength low alloy steel A post?

In this article we will take a look at some of the new car technology as it pertains to vehicle extrication. We will talk about some of the different types of steel used by the auto makers today. We will also look at seat belt pretensioners and the different types of airbags we may encounter.

Types of steel used in vehicle construction

In today's autos you will find a wide variety of steel used to construct these vehicles. There are Mild Steel, High Strength-Low Alloy Steel, Ultra High Strength Steel, Cast Magnesium and now we are running into Boron Steel tubes in the A-post.

Auto manufacturers are using more high strength steels in their operation than ever before. The main reason is they can use thinner metals and get greater strengths. High Strength low alloy steels provide greater strength with less mass and that in turn provides as much as a 30% weight reduction as compared to mild steels. High strength steels also absorb more energy per pound than mild steels making them more crash worthy.

Manufacturers are placing crumple zones into this high strength steel. These body parts are designed to crumple in a predetermined pattern to absorb the energy produced during a collision while maintaining the integrity of the passenger compartment.

One question I want you to ask yourself as you read about the different types of steel is, "Can my extrication equipment do what is needed on these newer cars?" If you don't know, research the data on your existing equipment. Find out what your spreaders, cutters and rams are capable of doing.

We took a good look at this a few years ago on my fire department and found that our equipment would not meet the challenges newer cars present. It had taken us two years to convince the Mayor to allow us to purchase new tools. My point here is, is even though you read this article and go out and get more education on new car technology and extrication, change is slow. Don't get discouraged if your request for

▲ Picture 1. The yellow shaded areas are where the manufacturer has used high strength-low alloy steel.

▶ Picture 2. Ultra high strength steel side impact door beam with a tensile strength of 180,000 psi.

new equipment is denied at first. Keep after it with more and more supporting documentation and hopefully it will happen. Extrication seems to have taken a backseat to all of the other things we need to learn and do as firefighters. The way the auto industry is building cars now, it is forcing us bring auto extrication to the forefront again.

Mild Steel

Mild steels are the softer steels that most of us are familiar with when it comes to vehicle extrication. The most common areas we find this type of steel is in the rocker panels, floor pans, quarter panels and fenders. This type of steel will cut very easily and when we use our spreaders and rams, we don't often have trouble moving this type of steel. Generally most people have problems when they attempt to use mild steel as a hard push point. This steel will move before the object they intended to move and the operator will not achieve the result they desired. These areas should be considered soft push points during your extrication.

High Strength Steel

This type of steel has relatively the same qualities of the mild steel. Some of the uses are in the hoods, door skins and quarter panels.

High Strength – Low Alloy Steel

This type of steel is used in the construction of the pillar posts, side members, front and upper rails and the shock tower supports. These types of steel have high tensile strengths and are used to give the auto support. When used in the A,B and C pillar posts, it gives the car better rollover protection and helps keep the roof from collapsing in on the occupants.

High Strength – Low alloy steel will be harder to move with our spreader and ram (see picture 1 above). These areas will work well as hard push points during your extrication. Older cutters may not have the capacity to cut a triple rolled high strength low alloy steel A or B post.

Ultra High Strength Steel

Ultra high strength steels have incredibly high tensile strengths, some have upwards of 180,000 psi tensile strength. You will find this type of steel in the side impact door beams, reinforcement bars under the dash and bumper reinforcements. Only attempt to cut this type of steel if it is absolutely necessary it may fragment (see picture 2 above).

Look at the size and shape of the older style side impact protection system in the photo above right. There have been cases during off center front end collisions where the side impact beam will pierce the door and lodge itself into the B-post. This acts just like the deadbolt on your door at home. You will not be able to open the door with your spreaders if this happens. Your best bet to get this door open is to start on the hinge side, cut the hinges and attempt to remove the door from there.

New Style Side Impact Protection

Picture 3 below reflects a newer designed side impact protection system. This newer design protects the occupants with three separate protection systems.

▲ Picture 3. New side impact protection system.

▲ Picture 4. Boron tube inside the A-post.

The first is an ultra high strength beam running through the middle of the door. The second is a boron steel insert at the top of the door and the third is a honeycomb section at the bottom of the door.

Boron Steel

Car manufacturers are now using boron tubes in the A-posts of some vehicles. These boron tubes can have tensile strengths as high as 150,000 psi. There have been cases where fire departments attempted to cut the A-post with older style cutters and were unsuccessful.

What they found after researching this further was a boron tube placed inside the A-post to give the A-post added strength during a rollover type accident (see picture 4 above).

▲ Picture 5. The Hurst MOC cutter cutting the boron steel A-post.

With all of the new techniques that are being taught today, the cutter is most used tool you will carry. When I first started in the fire service years ago, we were taught to spread everything and cutting was something you rarely did. Today you will use your cutter 60% – 70 % of the time. You need to have a large capacity cutter in your arsenal that will do the work necessary on today's vehicles.

Picture 5 below shows the Hurst MOC cutter cutting the boron steel A-post. Notice in the photo that the Hurst cutter is able to cut this boron tube in the center of the blade. This is very important, other manufacturers say they are able to cut a boron tube but it has to be cut at the notch located at the rear of the blades. With the larger diameter of this boron tube and the triple rolled steel surrounding the tube, you may not be able to make your cut at the notch. Be wary of claims made by any manufacturer and test this equipment yourself before you purchase it. There are tests that NFPA has established for cutters, educate yourself on these tests and require your equipment manufacturer to perform these tests at their demonstration. There are different levels of criteria for cutters, require the cutter you choose to pass the highest levels established by NFPA. Remember, your cutters are going to be doing the majority of the work on newer cars. Demand the best equipment available for your fire department.

Cast Magnesium

Some car manufacturers are using cast magnesium in the transverse dash beams. It runs from one side of the car to the other near the top of the dash area. Auto manufacturers are using these to give the car more lateral stability and they are using them to hang all of the components on the dash. This helps us when we are doing a dash roll up because all of the components move with the beam. One of the drawbacks to this technology is during a car fire. The amount of magnesium used in this technology isn't a lot but we all know what happens when we put water on magnesium as it burns.

For more information, go to www.footagerescue.com

Leadership & Lifelong Learning for Officer Development

The competent fire officer must be guided in their decision-making by a combination of knowledge, skill, and experience. As a means to enhance experience and support professional development, fire service leaders should embrace the concept of Lifelong Learning.

Michael Warmuth
M.S., CFO

The modern fire service continuously faces new and complex challenges. To remain prepared to confront these challenges and increase public awareness about fire prevention, fire officers must continuously adapt to their learning environment. Organizations whose members are not engaged in regular learning often make the same mistakes over and over again, sometimes culminating in tragedy.

Peter Senge, founder of the Society for Organizational Learning, reminds us that "we learn best from our experience, but we never directly experience the consequences of many of our most important decisions." We all learn from our mistakes, when the stakes are high we may never get that second chance.

Lifelong Learning

Lifelong Learning is continuous, deliberate, and self-motivated. Committed fire officers routinely seek information for personal as well as professional reasons. When learning is personally relevant to our interests and goals it enhances skill, improves job performance, and develops a higher level of thinking.

When this happens, the motivation to learn is high and leaders pursue new learning opportunities as a basic human need to develop and grow (Stanford, 1998).

'Leadership and learning are indispensable to each other'

John F. Kennedy

Adapting to new technologies

Numerous learning opportunities are present in a variety of formal and informal training and educational networks. In the digital era, we have amplified access to the conventional forms of learning including college programs, videos, and trade journals. Over the past several years, there has been a rapid expansion of non-formal learning opportunities

Images courtesy of NETC Library Photos
Gail McFarland, Assistant Fire Marshall, Eagle River Fire Protection District

Michael Warmuth is a Battalion Chief with the Eagle River Fire Protection District in Avon, Colorado

Images courtesy of NETC Library Photos

including blogs, podcasts, and video-sharing websites.

The increase of information sharing has had a remarkable impact on our industry. With the advancement of contemporary learning methods, we've seen a new level of engagement from our members outside of the halls of time-honored educational institutions.

Continuing education and learning is no longer held exclusively to traditional training systems. With this technological expansion, we have seen an increase in commitment from all roles and ranks in the industry. Self-motivated and active members of our organizations are no longer restricted to the classroom or peer reviewed journals to share their ideas, techniques, and feedback. Popular firefighter web-blogs have a comparable readership to many industry-based publications. One powerful example is Irons and Ladders, a firefighter-run forcible entry blog that has received as many as 30 thousand views in one day (Royal, 2014).

The committed Lifelong Learner should welcome a combination of traditional and non-traditional learning programs. The key is to appreciate is that maximum learning will occur when fire officers blend the two learning styles and not view them in conflict with each other.

Leverage the Overlapping Resources

Amid the rapid growth of information, it becomes increasingly important for fire officers to develop an ability to navigate through the medley of data and advice to find the most valid and relevant material.

As an institution of learning, the library has been a cornerstone for new ideas and progress. The United States Fire Administration (USFA) Library has continued to adapt to emerging technologies to ensure the endurance of its legacy. Recently, the USFA Library in Emmitsburg, Maryland has worked to provide greater access to fire and emergency services literature and resources outside its library walls.

The USFA Library, commonly known as the Learning Resource Center, contains one of "the most comprehensive collections in the United States of materials relating to the fire service and emergency management" (FEMA, 2008). This exclusive collection focuses on literature specifically related to emergency response, fire prevention, homeland security and a myriad of leadership topics.

The library has recently completed a major project that has made much of their material discoverable in the WorldCat search engine (Metz, 2013). WorldCat is the world's largest database of library materials and is universally available at any library in the world. The materials available through this enhanced cataloging system includes thousands of fire and emergency services books and videos in addition to several hundred professional journals and magazines. All of these materials are available online or through interlibrary loan agreements with your local library through their online catalog, twenty-four hours a day, and all at no cost.

More with Less

During a time when public-sector leaders are being asked to do more with less, the difference between success and failure often depends on how we use our time. The USFA Library has innovative quick access programs that will maximize a leader's time and provide immediate access to recognized fire prevention and life safety programs.

Solutions for Critical Issues

Among the online programs designed to operate as a consolidated clearinghouse to maximize a leader's time and provide immediate access to recognized programs stands a unique component of the USFA Library that sets itself apart from other venues for Lifelong Learners. The library has made the collection of Executive Fire Officer (EFO) Applied Research Project papers available through WorldCat. This body of work that once sat idle among the stacks for on-site users only is now available electronically.

The Executive Fire Officer Program is delivered by the United States Fire Administration's National Fire Academy. The National Fire Academy provides specialized training courses and advanced management programs for middle and top-level fire officers. The Executive Fire Officer Program provides senior fire officers with a comprehensive curriculum on various aspects of fire and emergency services to develop an officer's leadership and ability to contend with difficult and adaptive problems in their respective jurisdictions (FEMA, 2014).

As a graduate level development program, the Executive Fire Officer Program requires students to complete an Applied Research Project to address a specific challenge within their organization. With focus on applied problem solving to real world leadership challenges, the papers "have led to numerous improvements and changes to communities" throughout the United States (Metz, 2013).

Although most students in the

'Tomorrow's illiterate will not be the man who can't read; he will be the man who has not learned how to learn'

Alvin Toffler

Executive Fire Officer Program are from the United States, the program has students and graduates from Canada, Guam, Brazil, St. Lucia, Germany, China, Australia, and New Zealand in addition to U.S. military personnel from Japan, Turkey, Saudi Arabia, Germany, and Italy.

A recent paper on response delays related to increased railroad activity resulted in millions of dollars in grant money for a particular jurisdiction. Upon submission of the research project, the applied solution was implemented in the student's home community and presented to local and state officials resulting in improved response times for the community and decreased risk to emergency responders (Krantz, 2014).

Currently, over 7,000 papers are available on-line. Each paper is searchable by topic or keyword allowing users to locate and apply a wide variety of solutions from the industry's top leaders. Placing this collection of extensive work on the web and into WorldCat provides tremendous access to an exclusive resource for the entire first responder community.

Conclusion

In order for an organization to maintain the flexibility and adaptability required to confront new and complex challenges, leaders need to discover how to tap into their people's commitment and capacity to learn. Given that all members of our organizations have the aptitude to learn, many lack the tools and guidance to prepare them for the situations they face. Fire officers that are adept to search out new and innovative learning opportunities for themselves and their staff will develop an atmosphere of enduring excellence among their members.

The development of digital content will remain a focus for Life Long Learners. A visit to today's USFA Library continues to avow the iconic images of books in stacks and a peaceful retreat for study. Yet the resources, programs and services that abound outside the building also serve to provide new access to critical information and ideas that will help fire officers make timely and appropriate decisions.

The library's improved approach provides Lifelong Learners with greater access to the best ideas and solutions in leadership, training, and fire prevention.

For fire and emergency services leaders there will always be new ideas and opinions to explore. According to Edward Metz, Head Librarian at the National Fire Academy, the library will continue to serve as a "curator" to help the public make decisions and navigate through the noise and volume of information to find material they can trust and use (Metz, 2014).

Not only does the Untied States Fire Academy Library remain an enduring resource for Lifelong Learning, it continues to provide fire service leaders the greatest opportunity and accessibility to unlock and enhance the talent and best minds of our industry.

'An investment in knowledge pays the best interest'

Benjamin Franklin

National Emergency Training Learning Resource Center

Mission:

- Support the National Fire Academy and Emergency Management Institute's instructional and research programs through ownership of or access to appropriate print and other materials.
- Provide assistance to FEMA and other DHS offices as well as to the general public in their search for useful information.
- Promote the better understanding of effective ways to use these resources by NETC students, faculty and the first responder community across the United States.

Resources:

- www.usfa.fema.gov/data/library
- 6,000 videos
- 7,000+ published papers by NFA students
- 18,000 books
- 120,000+ individual journal articles

Fire Prevention and Public Education Exchange
www.usfa.fema.gov/library/catalog/exchange.shtm

Contact Information:

Address: Learning Resource Center
16825 South Seton Avenue
Emmitsburg, MD 21727
E-mail: netclrc@dhs.com
Phone: 1-800-638-1821
301-447-1030

Images courtesy of NETC Library Photos

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DST-3P4-L*	5.5	14885	18", 4-Blade	85 lbs.	23" X 23" X 21.5"
DST-3P4-6.5	6.5	17000	18", 4-Blade	91 lbs.	23" X 23" X 21.5"
DST-9P4	9	17500	20", 4-Blade	115 lbs.	26" X 23" X 21"
DST-13	13	22000	24", 4-Blade	136 lbs.	30" X 28" X 24"

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