

INDUSTRIAL **FIRE** JOURNAL

THE WORLD'S LEADING VOICE FOR THE INDUSTRIAL HIGH-RISK FIRE INDUSTRY

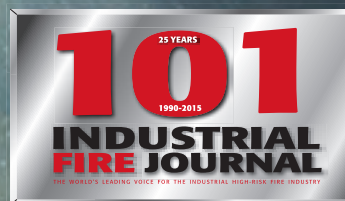
Third quarter 2015 issue no.101

www.hemmingfire.com



Thermal runaway

The problem with lithium battery fires on aircraft

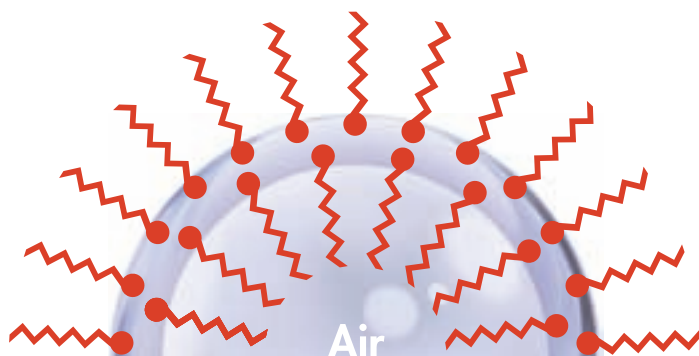


 **THE EMERGENCY
SERVICES SHOW**

NEC | BIRMINGHAM | 23-24 SEPTEMBER 2015



Fatal Attraction



Fluorine-free foam bubble

F3 Foam **attracts** hydrocarbon fuels

 **Hydrocarbon surfactant**
(Hydrocarbon tails are fuel-loving)

FORCEFUL F3 APPLICATION:

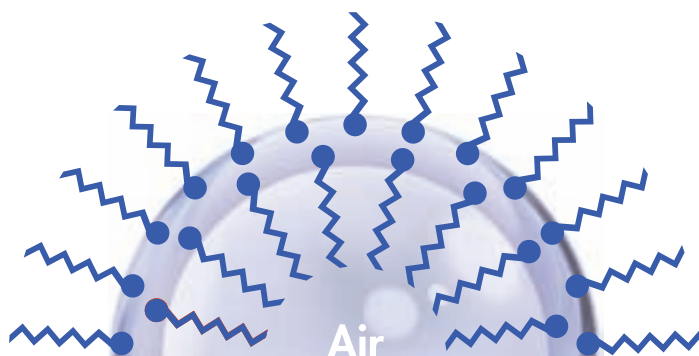
- Foam attracts fuel
- Foam becomes flammable
- Foam has reduced performance
- Foam use is increased

Need proof? See F3 foams on fire:



FORCEFUL AFFF APPLICATION:

- Foam repels fuel
- Foam is NOT flammable
- Foam has superior performance
- Foam use is reduced



Fluorinated foam bubble

AFFF Foam **repels** hydrocarbon fuels

 **Fluorosurfactant**
(Fluorocarbon tails are fuel-hating)

One year ahead of the US EPA 2010 / 2015 PFOA Stewardship Program deadline, Dynax only manufactures high purity C6 Fluorosurfactants, Foam Stabilizers and optimized High Performance Blends meeting the toughest fire performance specifications (including Mil F) at traditional / reduced Fluorine Levels.

DYNAX CORPORATION

PO Box 285, Pound Ridge, NY 10576 USA

T 914 764 0202 techinfo@dynaxcorp.com

F 914 764 0553 www.dynaxcorp.com

dynax
FLUOROchemicals



INVESTOR IN PEOPLE

Published Quarterly by



A division of Hemming Group Ltd,
32, Vauxhall Bridge Road,
London, SW1V 2SS, England
Tel: + 44 (0) 20 7973 6694
Fax: + 44 (0) 20 7973 4686
E-mail: m.spillane@hgluk.com
Website: www.hemmingfire.com

Editor

Jose Maria Sanchez de Muniain
j.sanchez@hgluk.com
+44 (0)1935 37 4011

Deputy Editor

Ann-Marie Knegt
am.knegt@hgluk.com
+44 (0)1935 37 4001

International Sales Manager

Mike Coward
m.coward@hgluk.com
+44 (0)1935 37 4003

International Sales Manager

Kelly Francis
k.francis@hgluk.com
+44 (0)207 973 4666

Production – Tim Malone

t.malone@hgluk.com
+44 (0)1935 37 4014

Managing Director

Graham Bond

TAKE OUT A SUBSCRIPTION AT:

<http://www.hemmingfire.com/subscription.php>

Annual Subscription:

Europe £40.00 or €60 (incl. p&p);
rest of world £50.00 or
US\$80.00 (incl. p&p).

Send all subscriptions, changes of address
and correspondence to address above.

Industrial Fire Journal, ISSN 0964 - 9719
(USPS 021-884), is published quarterly March, May,
September, December, by Hemming Information
Services, a division of Hemming Group Ltd,
8 The Old Yarn Mills, Sherborne, Dorset DT9 3RQ, UK.
The US annual subscription price is \$80.

Airfreight and mailing in the USA by agent named
Worldnet Shipping Inc., 156-15, 146th Avenue, 2nd
Floor, Jamaica, NY 11434, USA.

Periodicals postage paid at Jamaica NY 11431.

US Postmaster: Send address changes to Industrial Fire
Journal, Worldnet Shipping Inc., 156-15, 146th Avenue,
2nd Floor, Jamaica, NY 11434, USA.

Subscription records are maintained at Hemming
Information Services, a division of Hemming Group Ltd,
32 Vauxhall Bridge Road, London, SW1V 2SS, UK.
Air Business Ltd is acting as our mailing agent.

Design & Artwork by

Graphic Examples, Sherborne.

Printed in England by

Latimer Trend & Co Ltd, Plymouth, UK.

DISCLAIMER: The views and opinions expressed in
INDUSTRIAL FIRE JOURNAL are not necessarily those
of Hemming Information Services. IFJ is in no way
responsible or legally liable for any statements, picture
captions, reports or technical anomalies made by
authors in their commissioned articles.

© 2015 All Rights Reserved

Industrial Fire Journal (ISSN 0964-9719)



CONTENTS

4 News, events & comment

7 Happy 25 Year Anniversary

IFJ celebrates 25 years of
developments in industrial
response and protection.

10 Interschutz highlights

14 ARFF

How do you deal with the
lithium fire threat on an
aircraft? Plus Rosenbauer's
Panther in focus.

18 Protective clothing

New PPE programme
reduces exposure to
invisible risks; are you clear
of your legal responsibilities
regarding PPE?

22 Lighting

How photometry software
can help during the
procurement of the most
appropriate and efficient
light tower.

26 Pumps

IFJ looks at a new generation
of fixed and portable fire
pumps for different scenarios.

30 Oil and gas, protection and response

Rim seal protection for
storage tanks; training for
industrial fire fighting; new
technology that suffers
near-zero pressure loss;
how solid-state trumps
mechanical for warning;
composite shelters find
niche in high-hazard
environments.

40 Hazmat

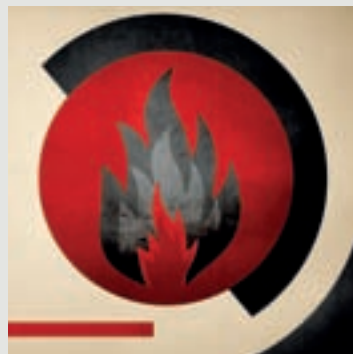
Steering a clear course
through the minefield of
hazmat responsibilities.

42 Detection & suppression

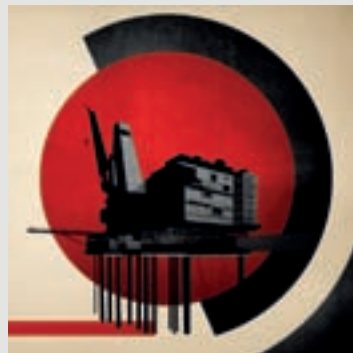
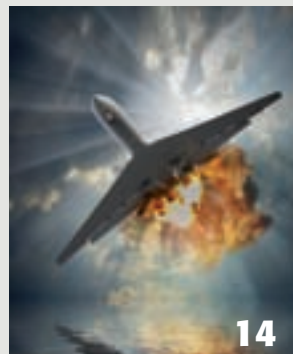
EPA's SNAP and FM-200/
FE-25; detection for
warehouses explained;
military technology for
high-hazard detection;
water mist and data
centres; IWMA prepares for
its annual conference.

Front cover

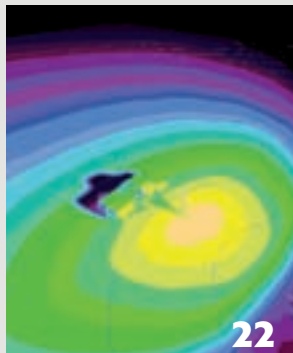
Darren Small: www.smallphoto.co.uk



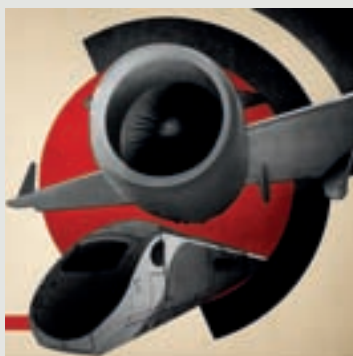
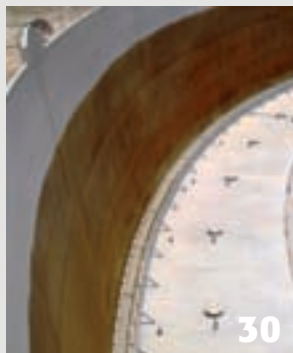
14



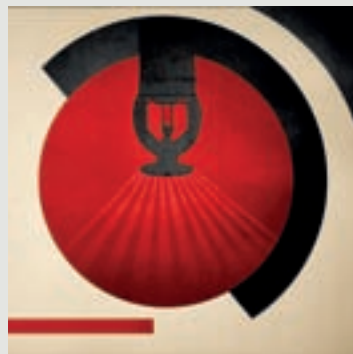
22



30



40



42



INDUSTRIAL FIRE JOURNAL FIRE & RESCUE FIRETRADE FIRETRADE
EUROPE ASIA & MIDDLE EAST



Editor's comment

It is the 25th year anniversary of Industrial Fire Journal and, as we can see from Kevin Westwood's review of the many changes he's seen in that time, by all accounts

firefighters have never been more protected and more prepared for industrial incidents. And yet the incidents keep coming and firefighters keep dying, sometimes as a result of lack of training, sometimes as a result of lack of information about the hazards they are dealing with and sometimes – as we are now finding out – as a result of invisible contaminants or seemingly harmless chemicals whose cancerous effects don't make themselves known for many years. While preparing for fires and explosions is relatively straightforward, requiring a willingness to fight for budget and to implement tried-and-tested learning methods, how do we prepare for hazards that are either invisible or little-known about? It is for this reason that IFJ and our sister publication Fire & Rescue magazine are organising the PPE & Duty of Care Forum, an opportunity to find out about the latest medical research; learn about how PPE is changing as a result of new legislation; and see at first hand how fire services around the world are changing their day-to-day practices to ensure that exposure to hazards is kept to a minimum. I urge you to read the list of distinguished speakers in the agenda at www.firerescueforum.com and consider attending.

Jose Maria Sanchez de Muniain, Editor.

SAVINGS FOR WAREHOUSES



After three years of research FM Global has released new fire protection guidelines for warehouse owners that it claims could reduce fire-related costs by millions of dollars.

The new engineering-driven design standard for in-rack sprinklers offers warehouses more protection at less cost, says FM. "Using current fire protection technology, the solution enables facility owners to use fewer sprinklers and lower-capacity water systems," said Ronnie Gibson, vice president and chief engineer at FM.

As an example, FM reports that for a 46,450m² warehouse with an 24m ceiling height, contractor estimates show the cost of installing sprinklers, pumps and water tanks could fall from about US\$4.3 million to as little as US\$2.6 million.

As well as cost savings, FM believes the new design is more environmentally friendly and would allow companies to protect their highest-hazard commodities, such as expanded plastic, using less than half the water volume previously needed. Businesses also may see a smaller environmental impact in smoke and water run-off.

The detailed engineering guideline, Data Sheet 8-9, 'Storage of Class 1, 2, 3, 4 and Plastic Commodities', is available for download from FM Global's website.

TOXIC CFA COLLEGE INQUIRY



The Victorian Parliament in Australia has received an interim report on the PFOS-contaminated CFA Training College in Fiskville.

The latest report is part of a parliamentary inquiry launched by the Victorian premier Daniel Andrews earlier this year.

The inquiry was set up to examine pollution and contamination activities at CFA College between 1970 and 1990. At that time it was the training college for members of the Country Fire Authority, the regional fire and emergency service in Victoria.

The facility was closed permanently on 3 March 2015 after tests on two mains water storage tanks found traces of perfluorooctanesulfonic acid (PFOS) from a banned fire fighting foam.

A study by Monash University titled 'Fiskville Firefighters' Health Study', November 2014, linked 16 deaths and a higher incidence in some cancers among CFA firefighters who worked and trained there. The study examined cancer and death rates linked to Fiskville between 1971 and 1999.

The findings showed that out of the 606 people who had been employed or had trained at Fiskville, 69 had cancers leading to 16 deaths. Of the 95 high-risk workers that had been traced, 25 had cancer and six had died from their cancer.

In the interim report the Environment, Natural Resources and Regional Development Committee recommended that the Victorian Government oversee further thorough testing of soil and water; and assess the feasibility of providing voluntary PFOS testing for Fiskville current and former firefighters and their families amongst others.

Tabling the report in Parliament, Committee Chair Bronwyn Halfpenny noted that the next stage of the inquiry – which will take place during the next six months – will involve hearings with government departments and agencies that were involved with the operations at Fiskville.

RESEARCH REVEALS NEW TUNNEL FIRE PROTECTION

A research team at Ruhr-University Bochum in Germany has developed a method for spraying steel fibre-infused shotcrete onto the surface of tunnels, greatly enhancing their ability to withstand high-intensity fires and explosive blasts.

The research team at the university's Institute for Tunnelling and Construction Management studied the security of critical bridges and tunnels with a focus on enhancing their resilience. The team focussed on shotcrete with embedded steel and synthetic fibres for its compressive strength.

After months of work the team found the right wet mixture of concrete, fibre and air that could be applied via a high-pressure nozzle at speeds of 50-80km/h to form layers as much as 35cm thick.

In early testing conducted at the Fraunhofer Ernst-Mach-Institute in Freiburg, Germany, it was found the mixture greatly enhanced blast protection. A coated slab exposed to a blast retained 60% of its bearing capacity, compared to just 20% for an untreated slab. Fire performance also improved. The slab showed no spalling when exposed to fire that reached 1,200°C within 5 minutes, burned freely for 55 minutes, and then endured a long cool down phase.

The team is working on refining the mixture with industrial partner MC-Bauchemie in Bottrop, Germany.



LAUNCH OF INDUSTRY GROUP FOR USERS OF PASSIVE FIRE PROTECTION



Passive fire protection company MMI Engineering is establishing an industry group for users of passive fire protection (PFP).

While conferences can inform on industry events and manufacturers can provide information on the latest system developments, MMI believes there is a need for an organised body dedicated to raising standards in the use of passive fire protection. "PFP has been used extensively

within the hydrocarbon industry for many decades to mitigate the effects of fire, saving lives and assets. But despite this track record it is often the case that the users of PFP do not fully understand key aspects of this important subject, and the hydrocarbon industries have not always taken on board the lessons learned from the past," said MMI President, Simon Thurlbeck.

The Hydrocarbon Passive Protection Network – PFPNet – will focus on serving the needs of the users of hydrocarbon fireproofing materials and systems through a focus on education, training, capturing and retaining existing knowledge, researching key topics, clarifying points of confusion and disseminating this to the membership, and to the industry at large with the aim of improving quality.

The group is expected to be up and running by January 2016. Interested parties should email: info@pfpnet.global.

CE MARKING FOR CABLES AND FIRE DOORS

The countdown to CE marking of cable and fire door products under the requirements of the Construction Products Regulation (CPR) has now begun, following citation of the product standards in the Official Journal (OJ) of the European Union on 10 July 2015.

The product standard EN 50575 for power, control and communication cables was cited in the OJ on 10 July 2015, marking the start of CE marking being possible for these products from 1 December 2015. By 1 December 2016, CE marking will become mandatory for all such products placed on the market in Europe.

The product standard EN 16034 for fire door sets was similarly cited by the OJ on 10 July, with CE marking being possible from 1 December 2015. The standard provides the requirements against which the fire resisting and/or smoke control characteristics of fire doors are tested, and includes the measurement of performance against the following characteristics: fire resistance, smoke control, self-closing and the operation of hold open devices (ability to release). By 1 December 2018, CE marking will become mandatory.

BRE Global has said that it is already accepting both cables and fire doorsets for testing in accordance with EN 50575 and EN 16034 respectively, in support of manufacturers aiming to CE mark their products and demonstrate regulatory compliance.

INSTALLATION NEWS



Bosch Security Systems has supplied integrated fire detection and voice evacuation system for both the domestic and the international terminals at Antalya Airport in southern Turkey. Served by 108 airlines, Antalya caters for over 25 million passengers each year.

Across the terminals, Bosch's local partner Ateksis installed 3,500 automatic fire detectors 420 Series which are connected to six networked modular fire panels 5000 Series. These can be configured and operated via two remote keypads. The fire detection system is interfaced with the fully digital Praesidio public address and emergency sound system. With more than 1,800 horns and ceiling loudspeakers as well as 300 sound projectors, this system covers multiple independent zones within the terminal buildings to allow for precise and targeted evacuation instructions in case of emergency. The Praesidio comprises two network controllers, 48 distributed power amplifiers and 25 call stations.



Spectrex's Sharpeye and Safeye detectors are to protect a world-class project developing gas and condensate field approximately 200km off the northwest coast of Australia. The Ichthys Project is due to start production in 2016 and is

operated by INPEX with major partner Total and various Japanese and Taiwanese gas companies. The project, which is the first of its size to be operated by a Japanese company, has installed over 500 Sharpeye IR3 flame detectors, accompanied by over 200 Safeye open path gas detectors.

One of the most famous historical documents in the western world is being protected by extinguishing and fire alarm panels from Advanced with installation by Reflex Systems. Sealed by King John

at Runnymede in 1215, the Magna Carta is currently celebrating its 800th anniversary. It is the first example of an absolute monarch surrendering some of his powers, the beginning of a process that became the prototype for democratic governments around the world. The version protected by Advanced is one of only four surviving original 1215 Magna Cartas sealed by King John and kept in a special vault at 11th century building Lincoln Castle. The open protocol fire and suppression systems incorporate two Mxpro 5 panels in the main heritage centre and Advanced's ultra-dependable Exgo extinguishant release system in the Magna Carta vault.



Promat's Durasteel non-combustible protective panels have been specified by specialist contractor Dunbar Wallace Fire Protection for the refurbishment of a pair of hot gas release doors on the Heysham 1 nuclear power station operated by EDF in Lancashire, north England. The 4m-high doors had 9.5mm-thick composite construction Durasteel panels installed to give the doors up to 240 minutes fire protection.



Belgian bakery group La Lorraine has commissioned the fire prevention system Oxyreduct from Wagner for its new cold storage warehouse in Nowy Dwór Mazowiecki, east-central Poland. With 2,700 employees La Lorraine serves the whole of Europe with deep-frozen bakery products out of 11 production sites.

This is the second Oxyreduct system that the company has installed in its new warehouses. In August 2013 an identical fire prevention system was installed in a new high-bay cold storage building in the Czech town of Kladno. Oxyreduct works by producing nitrogen to ensure that there is insufficient oxygen in a protected area to support fire.



Safety Technology's Euro Stopper is now available with a unique substance that glows in the dark. The Glow Guide pigment releases light for up to eight hours in darkness or dimly lit areas and charges up after only 30 minutes exposure to natural or artificial light, making it ideal for use in emergency situations.

The Glow Guide is not the only new feature to the Euro Stopper. The polycarbonate call-point protector is now supplied in a kit form for additional flexibility to the final application, with the choice of red or green housing shell, language, mounting option, sounder and break-seal facility.

Apollo Fire Detectors has unveiled the new addressable detectors that form the initial line-up in the Soteria detection range. Soteria is the beginning of a two-year project by Apollo which will see the introduction of a new range of heat, optical and CO detectors. Soteria incorporates exclusive technology called Purelight which encompasses an innovative 'serpentine' smoke entry path and a newly designed Cone sensing chamber, which

together lower the possibilities of false alarms and enhance the reliability of smoke detection, said the company. The initial launch covers an optical smoke detector, heat detector and multi (optical/heat) detector, with a CO/heat, tri sensor and an optical detector joining the family later this year.

Klaxon's Sonos Pulse range of EN54-23-compliant fire beacons has been awarded Fire Safety Product of the Year 2015 at the PSI Premier Awards. The Sonos Pulse range is designed to ensure that all personnel are notified of fire emergencies, including people with sensory impairments and those working in sensory depriving conditions. The PSI Premier Awards campaign drew over 10,000 votes from across the industry across eight awards categories.



Texecom's Jim Ludwig collects the Fire Safety Product of the Year trophy from hosts Andy Clutton (left) and Brian Moore (right).

Procom has launched 25 different Atex antennas that have been designed, tested and approved in compliance with European 94/9EC Atex directive. The new range is certified to Atex Class: II 3G Ex nA IIA IIC T6 for use in potentially explosive atmospheres such as the oil and petrochem industry where wireless onboard communication, paging systems, ground-to-air communication, maritime VHF communication and Wi-Fi data transmission systems are in use.

Power company Eaton has introduced a new fire alarm system that it claims can reduce cabling by up to 50%. Unlike with standard conventional systems, the detectors, call points and notification devices on the BiWire Ultra fire alarm system all share the same zone wiring thus reducing cabling requirements. The system, which comprises a central panel alongside compatible detectors, sounders and EN54-23 approved beacons, is ideally suited to small hotels, offices, primary schools, restaurants and retail stores. Available in two-, four- or eight-zone variants, the system can support up to 52 devices per zone, wiring faults are easily spotted and indicated by flashing the detector LED nearest the fault.



COMPANY NEWS

Fire protection company Victaulic has formed a joint business venture with Bermad, a producer of hydraulic water and air valve technologies. The new business partnership Victaulic Bermad Technologies will be based in Houston, Texas and will focus on select markets and applications including commercial fire protection – expanding the Victaulic valve and device offering, in the US and Canadian regions.



Independent fire detection manufacturer **Apollo Fire Detectors** has appointed Steve Brown as its new managing director with regional responsibility for Europe, the Middle East and Africa (EMEA). Brown joins Apollo from ITW, where he was group president of the international catering equipment division.

PPE manufacturer Ballyclare Limited has moved to brand new premises in Stockport, north England as a result of business growth. The company recently announced it had been awarded a Royal Warrant as a result of supplying fire fighting suits to the Windsor Castle Fire Service. Royal Warrants are a mark of recognition and are granted to people or companies who regularly supply goods or services to the households of The Queen, The Duke of Edinburgh or The Prince of Wales.

During their general assembly the members of trade association **Euralarm** chose **Enzo Peduzzi** (left) as their new president, succeeding Marc Chabaud (right). Peduzzi was chairman of the services section of Euralarm and is currently director for industry affairs with Siemens Building Technologies Switzerland.



The testing and calibration services company Exova has acquired BM Trada, an international provider of certification schemes and building products testing services, for approximately US\$33 million. The acquisition adds around 340 personnel operating in 16 countries, bringing Exova's network of specialists worldwide to over 4,400.

Oshkosh Fire & Emergency Group is expanding its presence in the Middle East to better serve Oshkosh Airport Products and Pierce Manufacturing customers in the region. Bassam Munem, Oshkosh senior regional manager for Middle East, now leads the Oshkosh Arabia regional office for fire and emergency from Jebel Ali, Dubai. As well as adding a new regional spare parts distribution centre in Abu Dhabi, the company is expanding its aftermarket department to enhance customer service.

Vector Command and Iamtech have signed an agreement which will see Iamtech share its knowledge of industrial emergency response with Vector Command to expand the capability of the operational incident management system CSS. CSS provides a common operational picture to incident commanders in the emergency services and in the nuclear, oil and gas industries.

To celebrate *IFJ*'s 25th year anniversary Kevin D Westwood, BP Group Fire Advisor & Executive Director of JOIFF looks back at how industrial fire fighting has evolved in the last quarter of a century.



Changing times

The opportunity to reflect with *IFJ* the changes that a 25th year anniversary brings is daunting, mostly because my memory is not what it used to be, my once-brown hair is gone and my once-brown beard is grey. With 35 years working in high-hazard industry, seven years in operations and 28 of those in fire-related roles, I think I can shed some insights on the old vs. the new and what those years have brought to this sector.

My earliest memories are recruit training. Back then for our company ICI it was at Washington Hall in Lancashire, which had one of the best industrial props at the time. Nobody ever thought to venture overseas in the 1980s for such skills.

Issued with my fire kit I was off to learn the ropes. Oh yes, that fire kit. Back then a Teled fire tunic made of some form of pseudo leather/plastic (apparently good for shedding chemicals) but pretty awful when exposed to flame; and a pair of bright yellow PVC leggings, not the best for thermal load. All topped off with a Bristol helmet, rubber Wellingtons and leather gloves.

Contrast that with modern fire kit. Improved blending and fabric technology coupled with multi-layer protection built into ergonomically-tested apparel mean that firefighters have extremely high levels of protection. The peripheral items are no less advanced, with space-age full wrap-around helmets with built-in SCBA connections, lights and communications. Footwear technology comes with improved safety features and comfort, and cut-resistant gloves are thinner allowing more dexterity without thermal protection loss.

I see this evolution continuing and – if used appropriately with procedural changes that take into consideration these developments – then all will be good. The caution here is, if we cocoon our firefighters with ever-better layers of protection, is there a danger of sending them deeper and closer to the hazards in the illusion that we have reduced the risk? That's a debate for another day.

How about fire trucks, branches, monitors, foam concentrates and all the other equipment and media we use? My first fire truck driving experience involved an old foam pumper made by HCB Angus, with stick shift, split gearbox and double de-clutch through every gear. It was a wonder we ever got to the fire on a 'shout'. The delivery performance wasn't great at 4,500lpm, yet it was simple to operate with a round-the-pump proportioner and manual valve controls for everything.

The dissimilarity with modern fire trucks is vast. ICI was the first to move to North American-made fire trucks with large volume outputs. This transition was unheard of back in the mid-90s in UK industrial fire arenas. It all led to a better driver and pump operator experience and a significantly improved performance that is now matched by most major pump manufacturers. However, it was complex, with electric over hydraulic or pneumatic valves, computer chip-based foam

metering and remote control technology. In the old days if something failed there was a 'work around', so you could bypass and wrap a wrench around a valve and make foam. In the modern world there isn't much redundancy when modern technology fails.

We have moved from small volumes to large volumes. While tank fire fighting over 40m was thought impossible then, now 100m+ is thought possible with the right equipment, logistics and know-how. With that comes big hose. The largest hose I handled in the first 10 years of my career was 70mm. We then moved to 125, then 150, 250 and now 300mm is becoming a standard large-volume requirement for major tank fires.

Foam usage was becoming a significant logistical problem and consequently manufacturers reformulated. I started with 6% foam in 1987 and then this moved to 3%, followed by 1% for large volume deployments. Some manufacturers today have 0.5% in development.

Manufacturers created synthetic and fluoropolymer-based foams alongside the protein staples, and then came PFOS and the environmental impact. Fluorine-free foams have now been developed due to increased environmental and regulatory pressures, which (ironically) are reversing the percentage application rates back to 3% to achieve performance analogous with fluoro-based foams.

The final area I want to touch on is competence as a function of skills, knowledge and experience. Back in the day we had many incidents where the skills and knowledge passed on from our old hands paired with the attendance of multifarious incidents provided great (if at times risky) real-life schooling. I'm not sure that is the case today. We operate facilities that do not have the number of calls we took back then. It's imperative – and we owe it to the younger generation – to provide real fire training opportunities to hone skills, improve knowledge and gain experience through 'doing'. All too often the training budgets are the first to get hit on a downturn and to all the fire chiefs and managers out there I say, stand your ground and fight for the right to have your staff provided with the tools to do their jobs safely and well. One organisation stands out more than any globally in this respect and that's JOIFF – look them up and consider joining.

Ending on a poignant note I send my heartfelt condolences to the families of all the firefighters who lost their lives in the recent Tianjin incident – a reflective lesson for us all on situational awareness, size-up and pre-planning.

There is a long history of firefighters going too deep and too early without full knowledge of what it is that they are dealing with going all the way back to Grandcamp and, also in Texas, to West Fertilizer's ammonium nitrate incident.

Keep safe,

Kevin D Westwood,

BP Group Fire Advisor & Executive Director of JOIFF





EMERGENCY SERVICES SHOW, 23-24 SEPTEMBER, NEC, BIRMINGHAM, UK



Whether you require safe working at height training (SWAH), protective equipment for high-risk environments or fire safety products, a visit to this year's ESS will prove invaluable. Free to attend for all those working in fire and rescue (including industrial brigades and overseas visitors), the ESS enables visitors to see and handle the latest fire fighting equipment and speak to leading training providers.

On the Crofton Engineering stand a specialist team of experienced firefighters will demonstrate SWAH and rope rescue techniques.

Meanwhile Red One will be sharing details of its own facilities which include a confined space training complex and work-at-height towers which can also be used for wind-turbine training.

Tanker fires have been making headlines across the UK recently with a Calor Gas tanker catching fire on the M56, followed a few days later by a tanker of jet fuel going up in flames on the M25. Training for such incidents is provided by a number of exhibitors including CFB Risk Management and Fire Training Group.

New products on the Scott Safety stand will include a range of portable gas detection products while Versar PPS will be exhibiting the latest decontamination equipment and PPE for high-risk hazchem incidents. Visitors to the Wolf Safety stand can see a self-contained high visibility LED visual warning indicator to clearly highlight hazards in explosive atmospheres.

Bennett Safetywear will be introducing the latest additions to its structural fire fighting gloves and Bollé Safety will be launching a new heat resistant goggle. New products on the Bristol Uniforms stand will include a layered PPE solution, while on show for the first time on the Vimpey stand will be new fire fighting helmets.

Among the many innovations in footwear, The Boot Repair Company stand will exhibit the latest sole technology from Vibram.

To register for free entry visit www.emergencyuk.com

FIRE FIGHTING FOAM WORKSHOP, 27-29 OCTOBER, CENTRO JOVELLANOS, ASTURIAS, SPAIN

The ICL Group is organising a three-day workshop that aims to help end users choose the right protection for their facility. A number of case studies will be



highlighted such as tank fires and aviation disasters, with key speakers presenting on environmental regulations. Practical demonstrations will also take place on the Jovellanos Fire Training Centre's fire ground, making full use of some of the best industrial fire fighting training facilities in Europe.

Areas covered during the three-day workshop include evolution of foam concentrates; foam-related terminology; foam properties; matching the foam to the system, regulations; and the difference between a sales demonstration and a test.

The agenda also includes a visit to Auxquimia's foam manufacturing plant where visitors will be able to see how fire testing to international standards takes place.

Delegates will receive a total of 19.5 CPD hours, granted by The Institution of Fire Engineers in the UK.

For more information contact alberto.menendez@icl-group.com

THE AIRPORT FIRE OFFICERS ASSOCIATION ANNUAL CONFERENCE, 20-21 JANUARY 2016, HILTON HOTEL, GATWICK AIRPORT, LONDON, UK

Supported by media partners *Industrial Fire Journal* and *Fire and Rescue* magazine and sponsored by Terberg DTS, the AFOA committee has announced the speaker programme for its annual conference

Chief Fire Officer of Surrey Fire and Rescue Service Russell Pearson will kick off the conference with his keynote address in which he will highlight the ongoing partnership between Surrey FRS and AFOA, while emphasising strategies to increase efficient cooperation between municipal and airport emergency services agencies.

Deputy Chief Daniel Buscher from Dusseldorf Airport Fire Service will recount his experiences of being in charge of crisis centre operations during the German Wings A320 incident in March 2015, during which 150 people were tragically killed after the pilot crashed the plane in the Alps. Other highlights on the day will include two speakers from the United States who were directly involved in the immediate response to 9/11.

During the conference, attendees can meet representatives from main sponsor Terberg DTS, Simulation, the Fire Training Group, the International Fire Training Centre, Emergency Response Driver Training, Bristol Uniforms, Spectrum Healthcare and Geagrid.

The evening of the first conference day will see the annual AFOA gala dinner with defence solicitor advocate Mark Scoggins.

For more information visit: www.foa.co.uk/futurevents

INTERNATIONAL WATER MIST CONFERENCE, 28-29 OCTOBER, MERCURE HOTEL AMSTERDAM, THE NETHERLANDS

Over 100 delegates from 20 countries are expected to come and hear about the latest developments in the field of fire protection with water mist at the IWMC, the annual conference organised by the International Water Mist Association.



The first day of the conference is devoted to applications and can be booked separately. Presentations on the day include the design and development of the WB Firepack high-pressure water mist pump set; water mist and data centres; mobile water mist units; and protecting machinery spaces and gas turbines with water mist.

Research and testing presentations on day two of the conference include large scale fire suppression tests in a power transformer building; overview of the Chinese standard for water mist; and a study on the use of water mist for fires caused by flammable gases and solids.

For additional information visit www.iwma.net or contact Bettina McDowell on mcdowell@iwma.net



“The independent alternative”

Foam Concentrates and Foam Systems



Follow us
Twitter **@fomtec**
Facebook **Dafo Fomtec AB**
www.fomtec.com



fomtec
Fire Fighting Foams & Equipment

Dafo Fomtec AB P.O. Box 683 SE-135 26 Tyresö Sweden
Phone: +46 8 506 405 66 Fax: +46 8 506 405 29
E-mail: info@fomtec.com Web: www.fomtec.com



157,000 VISITORS ATTENDED THE WORLD'S BIGGEST FIRE FIGHTING EXHIBITION TO DRINK IN THE LARGE QUANTITIES OF INNOVATION FREELY AVAILABLE FROM AROUND 1,500 EXHIBITORS. *INDUSTRIAL FIRE JOURNAL* REPORTS ON SOME OF THE HIGHLIGHTS FROM HANOVER, GERMANY, ON WHAT TURNED OUT TO BE THE LARGEST INTERSCHUTZ EVER HELD.

Exhibition review – safety in large numbers

Interschutz in Hanover was a great success for foam manufacturer 3F who introduced to the world its new fluoro-free and solvent-free foam for extinguishers.

Freedex SF is the first of its kind in the world to have achieved both Class A and B rating in EN3 and approved with two German extinguisher manufacturers at MPA Dresden.

3F owner Gary McDowel explained why this technology was so ground breaking and why it is attracting so much interest from Europe's extinguisher manufacturers: "Firstly, it clearly proves beyond any doubt that it is possible to eventually replace aqueous film-forming foams commonly used in the vast majority of hand held portable extinguishers. In effect, we have delivered an answer to the question of the over-use of PFCs in foam products and provided both government and their legislators with the opportunity to demand that the industry clean up its act and eliminate PFCs where they are not required.

"The Madrid Statement published in October 2014 by some of the world's leading scientists and academics specifically urged foam manufacturers to put more resource and emphasis on R&D to find an answer to the increasing impact of PFCs in our day-to-day lives. This momentous step forward in foam technology has not come quickly for 3F as it has taken more than three years of in-depth study and testing to remove both fluoro-surfactants and solvents from foam used in an extinguisher.

"Secondly, this is ground-breaking technology because no other manufacturers have considered solvent-free technology as a way to improve the environmental profile of foam concentrates in general. The new 3F 'Smart Foams' are smart because they are designed on the premise that all chemicals used in formulations have some environmental impact. Other

than fluoro-surfactants, the worst of these chemicals are the glycols and, by removing them, our Smart Foam range achieves a 50% overall reduction in COD and BOD.

"There is another very important reason why the introduction of Freedex SF1 into the marketplace will be seen in years ahead as a pivotal turning point in the industry. This fluoro-free and solvent-free foam has been approved to an EN standard designed for film-forming foams on Class B fuels. This fact in itself is ground breaking given that a foam solution without fluoro-surfactants has extinguished a heptane fire by means other than film formation on the surface of the fuel.

"But the Freedex SF1 story does not end here. This product has achieved a rating for 6 litres of 21A-113B but it is also alcohol resistant and has a rating of 34B on Acetone with a 6-litre extinguisher.

"In conclusion, we are confident that Smart Foam is the beginning of a new chapter in the history of foam development. Our confidence comes from the reaction and overwhelming interest at Interschutz in Hanover and as a company we will look back at this moment knowing we have made a significant difference not just for the industry in which we work but for the environment in which we live."

Bio Ex shows off its fluorine-free foam

Bio Ex was exhibiting its new fluorine-free F3 HC foam at Interschutz. Jeremy Delerue explained that this is the first ecological foam concentrate specifically designed for hydrocarbon risks: "It is a fluorine-free foam but it has A1A-certified extinguishing performance, according to EN 1568-3 standard.

"I can honestly confirm that this is the first fluorine-free 3%

EFFECTIVE & FRIENDLY. IT'S NOT AN OXYMORON.



Solberg RE-HEALING™ Foam not only provides the performance you are accustomed to with current firefighting foams, and rely on, it's also safe for your firefighters and the environment. RE-HEALING Foam has superior vapor suppression and longer drain time for better burn-back resistance. The first true fluorosurfactant and fluoropolymer-free foam, there are no environmental concerns for persistence, bioaccumulation, or toxic breakdown.

Learn more about RE-HEALING Foam and 1%, 3%, 6%, 3x3% and 3x6% ATC™ concentrates available at solbergfoam.com

UL, ULC, FM, EN, ICAO

Product certifications vary dependent upon concentration type.



THE SOLBERG COMPANY
1520 Brookfield Avenue
Green Bay, WI 54313
USA
Tel: +1 920 593 9445

SOLBERG SCANDINAVIAN AS
Radøyvegen 721 - Ølsvollstranda
N-5938 Sæbøvågen
Norway
Tel: +47 56 34 97 00

SOLBERG ASIA PACIFIC PTY LTD
3 Charles Street
St. Marys NSW 2760
Australia
Tel: +61 2 9673 5300



foam concentrate for hydrocarbon fires that performs better than the best AFFFs. So the use of Ecopol F3 HC is the alternative agent that combines respect for the environment with highly effective fire-extinguishing capability."

Scott Safety's tour de force

From the latest thermal imaging cameras and portable gas detectors to SCBA equipped with Bluetooth radios, Scott Safety's strong presence at Interschutz was a veritable tour de force in how to improve the safety and situational awareness of the world's firefighters.

According to the company, record numbers of fire buyers came to each of its three show locations for live demonstrations of new products designed to reduce user burden and incorporate real-time telemetry, situational intelligence and communications in hazardous environments.

Keen to cement its reputation as an innovator, Scott even organised the invite-only 'Firefighter of the Future' booth for a spot of 'future gazing' where invitees were shown the latest innovations.

Scott Safety also sponsored the world's most coveted fire fighting award, the Toughest Firefighter Alive (TFA). The TFA 2015 competition was won by Lukas Novak from the Czech team, who beat 327 competitors from across the world.

Among the many products on display was the newly launched NFPA18011-certified X-380 thermal imaging camera, a TIC that enables firefighters to track both hot and cold spots. Users can therefore instantly identify safe paths through cooler spots and thereby avoid the higher-risk areas. With the cold spot tracker first responders can also locate and pin point thread or valve gas leaks, which are generally cooler than the surrounding environment. "ISG's advanced

thermal imaging cameras provide a level of situational awareness which is simply unparalleled," said Andrew Chrostowski, president, Scott Safety. "The X380N will allow firefighters to fully interpret a fire scene and make better, safer, tactical decisions. In bringing our two world-class companies together, and with the launch of our new camera, Scott and ISG customers now have a new exciting range of thermal imagers from which to choose."

The latest portable gas detection technologies were also on show including the BM25 transportable multi gas detector from Oldham, which bridges the gap between Scott's portable and fixed gas detection range, packing many of the benefits of a fixed system area monitor into a rugged and transportable instrument.

The lightweight Protégé and Protégé ZM portable multi gas detectors completed Scott's portable gas detection offering at this year's show. Features that include piercing audible and vibrating tactile alarm indicators and a large LCD screen with a backlight for easy viewing make this product suitable for a wide array of applications including confined spaces in petrochemical and industrial locations.

With most of Interschutz's visitors interested in SCBA it was not surprising to see many embracing the opportunity to try on Scott's Propak-f and Propak-fx SCBA and experience for themselves how comfortable they are to wear. The Propak-fx features an adjustable backplate on a rigid backframe construction for durability and performance. Both models can be specified in a number of configurations including split demand valve coupling and Y-piece.

Following the theme of 'technology transformation' was a demonstration of Scott's work with Northamptonshire Fire and Rescue Service which has led to the development of the ROV1 robot. The robot, which has lead a parallel life as a bomb disposal robot, has now been upgraded with a gas detection unit, a thermal imaging camera and a Cobra Cold Cutting extinguisher. It can be deployed to act as the eyes of first responders when operational conditions are too hazardous for humans, providing imagery and data that would otherwise be unattainable. Using the X380 thermal imager, firefighters can pinpoint the centre of the fire and essentially 'see' through the smoke to plan their extinguish plan.

A SCBA system that meets all standards

"This is the first time MSA has developed a single top-of-the-line SCBA to meet and exceed all high-level international quality and safety standards such as NFPA and EN," said Anne Ruedrich, Media and Exhibition Manager, MSA, referring to the newly-developed G1 SCBA system.

"The NFPA-approved version of the G1 is already extremely popular with the North American fire service organisations," explained Ruedrich, adding that the G1 fire service SCBA has been designed to integrate all modern SCBA features in a compact and easy-to-operate system.

"The single power supply drives alarm system and user interface, the telemetry radio module, the head-up-display and the voice amplifier, which maximises the system's reliability. The intuitive control module provides full benefit without distraction by always displaying exclusive information which is relevant in the given situation."

All G1 versions include swivelling and adjustable hip belt, electronic control unit, telemetry module, lung-governed demand valve and a buddy-breather second connection. Optional features, such as HUD, voice projection speaker, Alphaclick high-pressure quick connect complete the streamlined system.

Firedos launched the M12, a behemoth of a monitor with a maximum flow rate of 60,000l/m and a reach of 180m. Other features include seamless transition between hollow and spray jet and optional remote control operation.





Launching pad

Rosenbauer traditionally uses Interschutz as its launch board for its new products and this year was no different.

In addition to the new Panther (see page 16) the company introduced a whole plethora of hardware, including the completely redeveloped Fox S portable pump with a new engine, new operating concept, and optimized priming solution.

The new two-cylinder portable pump has an output of 1,000 litres at 10 bar, fitting into the Rosenbauer TS series between the existing Beaver and Fox models. It is 17kg lighter and 10cm smaller than the Fox with a similar performance. Another difference is that it features a water-cooled engine as opposed to the Fox's air-cooled engine, resulting in a stronger enclosure and less noise during operations.

Also newly introduced to much fanfare was the brand new Heros-Titan fire service helmet, the successor to the Heros-Xtreme. Uniquely, the Titan meets the highest safety classes in the majority of standards and specification certificates worldwide, including EN 433:2008, EN 16471:2014, EN 16473:2014, NFPA 1971, AS/NZS 4067, ISO 16073.

The helmet weighs 1.3kg which Rosenbauer claims is 200-250gm lighter than comparable full-shell B/3b Type helmets, making it more comfortable to wear. Indeed, the company says that the helmet has been designed from the inside out in order to improve wearer comfort. Internal fittings attach to the outer shell at two points whilst all the weight is distributed evenly via a headband that follows the contours of the wearer's head. In addition, extra padding divided into front and rear areas ensures that no pressure points are created during extended operations.

Other features include additional flexibility for adjustment to individuals' heads through a rotary dial. Interior fittings can also be changed in order to align the helmet to the axis of the wearer's centre of gravity when additional equipment is fitted onto the helmet, such as headlamps.

An optional integrated thermal imaging camera can be added to the helmet, fitting neatly into the helmet lamp space and linking to a display that is located in front of the firefighter's eyes.

The Titan will be available for purchase from the end of 2015.



The Heros-Titan fire service helmet from Rosenbauer only weighs 1.3kg.

 **Dr. STHAMER** HAMBURG

FOAM FIGHTS FIRE

MOUSSOL®-FF - ICAO Level B Certified

Used by London Heathrow, London Stansted,
London Gatwick Airports

**We offer a full range of Internationally
Approved, High Performance, Environ-
mentally Compatible Fire Fighting Foams.**

**24/7 EMERGENCY
SUPPLIES** PLEASE CALL
+ 49 40 7361680

Liebigstraße 5 · 22113 Hamburg · Germany
Phone +49 40 73 61 68-0 · Fax +49 40 73 61 68-60
E-mail: info@sthamer.com

 www.facebook.com/Dr.Sthamer



www.sthamer.com

Lithium battery fires

The many challenges of shaping an effective ARFF suppression strategy for lithium battery fires means that the aviation industry's concerns are unlikely to go away for some time yet, writes Ronald M Butler, CEO of Energy Storage Safety Products International, Detroit, USA.

The reality is that lithium and lithium ion batteries are very different. Lithium batteries, or primary batteries, are single use and incapable of recharge. They contain lithium metal which is highly combustible and represents a Class D fire hazard.

The real value in lithium lies in the fact that it delivers extremely high energy densities in small configurations. Lithium batteries are used where recharge isn't necessary or feasible but long-term energy output is required. Common applications include military use, medical applications and certain consumer electronics to name a few.

Lithium-ion (Li-ion) batteries, or secondary batteries, are rechargeable and used on an increasingly massive scale

worldwide. Li-ion is used for applications that require recharge capability. These batteries provide high energy density and can be recharged time after time. They contain no free lithium metal but do contain highly flammable electrolyte. Common applications that incorporate Li-ion technology include laptops, cell phones, electric vehicles, aircraft, hospital equipment, and stationary energy storage systems to name a few.

The battery fire concern

The aviation community is increasingly concerned about batteries. The major aviation safety authorities including the US FAA and ICAO have already demonstrated their strong concerns regarding the battery fire issue. Each group has tested batteries relative to burn characteristics and baseline suppressant effectiveness and have issued strong language tempering the shipment and use of lithium batteries in aircraft. They are highly aware of the potential threats posed by lithium battery technology and that concern is shared by cargo and passenger aircraft. Real-world examples of battery fires in aviation include those ranging from laptop fires in aircraft cabins and e-cigarette fires in underbelly cargo holds to large-scale fires in cargo planes. To these organisations, the threat is real, so much so that recently the Air Line Pilots Association called for a ban on the bulk shipment of lithium batteries, not only in passenger craft, but on freighters as well.

ARFF fire fighting strategy and tactics

When designing strategies and tactics for lithium battery fires one must have a clear understanding of battery chemistry and configuration.

A fire response strategy for the lithium family of batteries

The Air Line Pilots Association has called for a ban on the bulk shipment of lithium batteries on passenger craft and freighters. Photo credit, right and opposite: Shutterstock.





should consist of two distinct branches. A strategy for managing Li-ion battery fires is different from that chosen for lithium metal battery fires. The reason for the different approaches lies mostly in the fact that Li-ion and lithium each demands a distinct type of suppression agent and action.

The two battery groups have different burn characteristics and thus require different suppression methodology. However, it may be the case that a suppressant strategy that is considered an 'all hazards' approach, or one that employs a suppressant and suppression methodology that is effective on class ABCD fires, may be an option.

A second group of considerations is focused on how the batteries are configured. For example, ARFF will approach a burning laptop consisting of five to seven lithium ion 18650 cells (about the size of AA batteries) in the relative expanse of an airport terminal far differently than it would multiple pallets of burning cells in an aircraft cargo hold. The fire loads for these distinct examples differ wildly, which affects how the fire is attacked, what suppression tools are employed and what fire suppressants are used.

Suppressant of choice

When developing standard operating procedures for addressing lithium battery fire issues, the suppression agent of choice is the primary consideration. This is the point when a clear understanding of suppressant effectiveness relative to lithium and Li-ion battery fires is crucial.

As mentioned, lithium (primary) batteries contain lithium metal, and as such would generally require fire suppression methods geared toward class D combustible metals. Li-ion, on the other hand, is considered by the NFPA as a common combustible, which generally requires a Class A suppression approach.

A large reservoir of data that would confirm or refute the effectiveness of a wide array of suppressants on lithium and Li-ion batteries does not yet exist. However, an understanding of lithium and Li ion battery fire behaviour, coupled with knowledge of agent suppression mechanisms, may pave the way for a common-sense approach to answer these suppressant choice questions.

In order to reason through the problem, starting with battery chemistry and comparing the potential effectiveness of common, available suppressants, begins to eliminate those that don't fit.

Since lithium (primary) batteries are considered a class D fire suppression hazard, then the appropriate suppressant would be effective on combustible metal fires. Again, the NFPA is clear on this, making suppressant choice decisions much more straightforward. However, questions arise as we begin to compare available class "D" suppressants.

Burning Li-ion, on the other hand, requires a more conventional fire suppression approach, and one that has cooling at its core.

The primary considerations when choosing a suppressant for lithium battery fires focuses on smothering and forming a barrier between the burning fuel and air. Li-ion battery fires on the other hand generally require the ability to cool and penetrate layers of containment (shipping materials, etc.).

When batteries burn, they are subject to a process called

CHEMISTRY (FAMILY)	CONFIGURATIONS	EFFECTIVE SUPPRESSANTS	COMMENTS
Lithium Ion	<ul style="list-style-type: none"> Cargo Aircraft systems Personal electronics On-airport stationary energy storage 	<ul style="list-style-type: none"> Water Water Additives Inert gases 	Water is a great suppressant for Li ion battery fires. A core concern with water is that suppression activities may require a large amount.
Lithium	<ul style="list-style-type: none"> Cargo Some personal electronics Medical devices 	<ul style="list-style-type: none"> Class D Suppressants 	Water should not be used as a suppressant if at all possible

'thermal runaway'. Thermal runaway can simply be viewed as a build-up of heat in a cell that grows exponentially leading to further creation of heat. In other words, the cell creates more heat than it can give away. The cell is rapidly consumed as the fire spreads to adjacent cells or other equipment. As a result, the only practical fire outcomes are the exhaustion of fuel or intervention in the form of suppression.

While as a common (class A) fire hazard, Li-ion battery fires can be suppressed with water, the suppression methodology must take into account load configuration, total fire load, and other considerations. The laptop example given earlier will require far less water for suppression than a load of multiple shipping containers packed into an aircraft cargo hold. The laptop might be managed with a hand-held extinguisher, whereas the cargo will require a separate suppression strategy.

For this application, water may be the most suitable. Inert gases, or those that function in a similar fashion, such as CO₂, halon, nitrogen, etc. will eliminate visible flame, but offer little or no cooling effect. Powders, like gases will remove the flame, but will also fail to cool the batteries. Gases and powders can be used in conjunction with a cooling suppressant, but are probably not best suited as a primary suppression agent.

Any discussion on ARFF fire response should include the strengths and weaknesses of fire fighting foams or the suite of additional suppressants employed by ARFF crews. The reader is asked to excuse the simple nature of the following discussion as it would take far too much space and time to thoroughly discuss the technical aspects of fire fighting foam. It is my goal to give a general overview of the suppressant and its power relative to lithium and Li-ion batteries.

The strength of AFFF (and other foams) is its effectiveness on two-dimensional hydrocarbon fuel fires. Its weakness, at least as it pertains to lithium battery fires, is two-fold. Firstly, foam tends to smother and limit the release of flammable vapours from burning liquids. It is not widely considered a great cooling agent. Li-ion fires, as established earlier, generally require strong cooling capacity. Secondly, foam works well on two-dimensional fires but many battery fires, certainly those in common cargo configurations, are three-dimensional in nature, which provides no environment for the 'blanketing' effect that allows foam to work best. It is for these reasons that fire fighting foams would not be considered excellent battery fire suppressants.

Configuration

How the burning battery is configured is of extreme

They may sound similar but Lithium and Lithium-ion batteries require different fire fighting suppressants.





Common applications that incorporate Lithium and Li-ion batteries include consumer electronics, laptops, cell phones, hospital equipment and energy storage devices. Photo: Shutterstock.

importance to the ARFF response protocol. For example, if the batteries are part of air cargo and shipped in commonly-accepted configurations then the fire management strategy should be adjusted accordingly.

There are two general ways of shipping cargo in aircraft. One involves passenger aircraft that use the areas in the belly of the ship, while the other relies on dedicated freight craft to move the product.

The constraints that the ARFF unit will experience while fighting a battery fire in the underbelly areas include limited space and the potential for unstable freight. The space limitations create an often untenable fire fighting environment. This causes access issues for the ARFF teams and changes the suppression tactics, tools employed, and suppressant choice.

For example, in the event of a fire in a palletised battery shipment, the location of the burning material becomes of prime importance. If the material is at the back of the plane or near freight loading doors, the job becomes somewhat easier for the firefighter. The difficult process of having to manoeuvre along the sides of the tightly-spaced cargo pallets and containers is less likely. However, if the burning battery

material is in an area away from loading doors, the fire tactics will change as different tools may need to be employed, such as the ARFF rig-piercing nozzle.

The tight spaces will limit the ability of some suppressants to reach the fire. This is where water and water-based suppressants will prove preferable because of their ability to not only cool but also reach longer distances and penetrate container material.

Summary

The points outlined in this article only scratch the surface relative to ARFF suppression strategies for lithium battery fires. Additionally, much research is yet to be done that addresses concerns relative to suppressant effectiveness, fire fighting tactics and other issues. However, the industry would do well to continue the discussions about lithium batteries and aircraft fire safety as well as those centred around the strategies and tactics employed by ARFF teams in response to these fires.

Ronald M Butler is CEO of Energy Storage Safety Products International (ESSPI) of Detroit, MI USA. He is a retired fire officer of the Detroit Fire Department with experience in fire suppression systems and training systems design. ESSPI is involved in the design and development of unique fire suppression and containment systems for the transport and storage of batteries as well as the design and development of fire management systems for stationary energy storage applications. ESSPI is also deeply involved in the design and delivery of state-of-the-art training that addresses fire response issues for both the fire service and private industry. Ron can be reached at ron@esspi.com.

Did you see the new Panther at Interschutz?

Whirling street dancers, flashing lights and loud fanfare welcomed the fourth generation of one of the world's most successful ARFF vehicles.

The introduction ceremony for Rosenbauer's new Panther had been hotly anticipated, especially as two Panthers remained stubbornly covered up by sheets right until the evening of the day before Interschutz kicked off.

The wait was worth it however as the many features of the first ARFF to meet the environment-friendly Euro VI standard finally came to light. Three areas have been focussed on – occupant safety, extinguishing power and operating comfort.

Rosenbauer say that crew safety was their number one priority during the design of their latest offering, and it shows. A new X frame forms a solid brace around the driver's cab, while visibility has been increased by slimming down the A column and removing the C column. The experience is not unlike sitting in a helicopter cockpit.

LED technology has been used throughout the vehicle and especially at the cabin entrance to help prevent accidents when the pressure is on. Daylight driving lights have also been added to enhance visibility in bad weather. There are driver-assistance systems aplenty, covering tyre-pressure monitoring, electronic roll stability control and even anti-collision radar system warning.

The next area for improvement has been the vehicle's extinguishing technology. Extinguishing media are controlled from a central display in the middle of the cockpit which also features a new backlit joystick and handles for the monitors.

Two new, integrated pumps with an automatic around-the-pump foam proportioning system (Fixmix 2) have been developed that perform at



8,000 l/min (10 bar) and 6,500 l/min (10 bar) along with two matching new roof turrets, one flowing at 9,500 l/min (the RM80) and meeting ICAO cat 10 airports and the other at 4,750 l/min (the RM35) for ICAO cat 9 airports.

For such a premium vehicle one would expect top-of-the-range comfort and Rosenbauer has risen to this challenge, with electrically operated windows and folding displays, an automatic rain sensor, automatic air conditioning, an electrically darkened roof window, as well as storage for cup holders and documents.

The company has clearly made a concerted effort to style the Panther along the lines of its feline namesake. Aside from the fact that the Interschutz demo vehicle was black as night, the Panthers' daytime driving lights make them resemble the eyes of a big cat. In an imaginative flight of fancy, Rosenbauer's promotional material said that the forward thrust of the Panther's silhouette and the lowered cab made it look like a real panther ready to pounce.

Some airports have already pounced on the new Panthers, with a 6x6 version destined for Singapore and a 4x4 to Qatar. Those airports wanting to jump on the 8x8 version will have to wait until 2017.

TEXAS A&M ENGINEERING



EXTENSION SERVICE

Choose from over 130 courses including:

- Firefighting
- Emergency Medical Services
- Fire Investigator
- Fire Officer / Instructor
- Hazardous Materials Response
- Rescue / Urban Search & Rescue
- Industrial Emergency Response
- Marine / Oil Spill Response
- LNG Emergency Response
- NIMS / ICS
- Annual Spanish School
- Latin American Emergency Response
- Leadership

The International Fire & Emergency Training Leader

TEEX trains emergency response personnel from more than 45 countries each year!



Each course can be tailored to meet your exact needs in a variety of areas



Schedule your classes and Experience the HEAT!

C13.6602.02

1-866-878-8900

www.teex.org/fire



HFS



Hytrans Fire System

mobile water supply

**High Capacity Mobile Water Supply
Over Thousands Of Meters,
Operational In Only 15 Minutes**



- Mobile Pump Units
- Hydraulically driven submersible pumps
- HoseLayers
- Hoses
- Hose Recovery Units
- Hose ramps
- PWSE
- Foam Injection
- Monitors



Capacities up to 42.000 lpm @ 12 bar

Hytrans Systems

E-Mail: sales.hfs@hytrans.com
Web: www.hytransfiresystem.com
The Netherlands
Tel: +31 514 608 996





Ditch the dirty kit

A pioneering new movement that provides practical steps to reduce exposure to contaminants and incidences of cancer has begun in Sweden, reports Jose Maria Sanchez de Muniain.



That firefighters are at a higher risk of contracting cancers is now becoming widely established. As mentioned in the paper 'Firefighters and cancer: Where are we and where to now?'* two separate long-term studies on cancer risk in firefighters in three US cities and five Nordic countries showed statistically significant increases for all cancers. Worryingly, a new finding emerged from both studies showing an increase in mesothelioma, likely to be because of the asbestos exposure occurring when buildings burn, during clean up and also perhaps a result of the asbestos protective gear which used to be widely worn by firefighters.

An increasing awareness worldwide of higher cancer incidences in firefighters has in Sweden resulted in concerted efforts to lower exposure to potential contaminants, and is leading to changes in policy and behaviour as regards protective clothing and other equipment such as fire hose and vehicles.

In Sweden this has resulted in the so-called Skellefteå Model – Better Health for Firefighters.

As described in the free-to-download document Friska Brandmän published by the Swedish Civil Contingencies Agency (www.healthyfirefighters.com) the Skellefteå Model is a points system that exemplifies and describes how firefighters can avoid hidden dangers in their working day with the use of simple routines and logical flows.

The goal of the model is for the firefighters to avoid serious illness as a result of long-term and repeated contact with foreign substances.

The model is based on the premise that firefighters' perception of their safety does not always correspond with a real situation that could involve invisible dangers.

It is a team approach that requires firefighters to take individual responsibility for their routine to the extent that any deviation could expose themselves and their colleagues to invisible hazards. In summary, the model requires a degree of change in both daily routine and in the care and maintenance of contaminated clothing. Its authors admit that it is highly unlikely that firefighters will ever work in an environment completely free from hazardous substances; but they point out that no firefighter should have to risk unnecessary ill health or suffering in their attempts to save human lives, property and the environment due to a neglected working environment.

A new generation of fire suits

Gothenburg Fire Brigade in Sweden is one of the first fire brigades in the world that has attempted to put in practice a

programme to reduce the risk to its firefighters.

Katarina Appelqvist, Head of Procurement at Gothenburg Fire Brigade, says that the Skellefteå model and the Nordic study into firefighter cancer incidence have both led to lengthy discussions in the Swedish fire service regarding the risk of contamination that firefighters are exposed to. "There is still no clear answer how big that risk is, and we feel we need to know more to identify how to eliminate or reduce the risks."

Gothenburg therefore began its own project, building on the Skellefteå principles that had shown that although PPE was important, so was the way firefighters worked and how they maintained and cared for the equipment before, during and after a fire. "Our goal was – and is – to make the environment cleaner for firefighters and all personnel that handle the materials."

As a result, when the time came to begin the procurement process for new fire kit Gothenburg's tender clearly outlined a fire fighting protective suit with a difference. It had to include a detachable outer shell that after an incident could easily be removed by the firefighter without any assistance.

Viking, an international supplier of fire fighting clothing, had some experience of detachable layers. In some countries such as the US, it is mandatory to supply detachable liners, explains Viking sales director Keld Valentin. "We already knew about the technology, and we just had to turn it around so instead of a detachable liner we had a detachable shell."

"Gothenburg set out the parameters for a development project: they wanted a suit that would allow the firefighter to remove the outer shells of the jacket and trousers and put them in a dissolvable laundry bag. And the remaining inner layers had to be fully weather-protective suit for the way home." The fact that the waterproof/breathable membrane is contained in the inner garments means the firefighter is protected from the weather as well as other potential contaminants such as petroleum products and bodily fluids.

Appelqvist explains that there are some significant benefits to having such a suit. If the outer layer gets damaged then it can be more easily and more economically replaced compared to purchasing an entire new fire suit. Laundry costs are higher as a result of the new regime, admits Appelqvist. "But it makes repairs and visual inspection much easier. And also a good

*Lin Fritschi, School of Public Health, Curtin University, Bentley, Western Australia, Australia and Deborah C Glass, Monash Centre for Occupational and Environmental Health, SPHPM, Monash University, Melbourne, Victoria, Australia.



Hear more about the Skellefteå Model at the PPE & Duty of Care Forum taking place 2 February 2016 at the Macdonald Burlington Hotel, Birmingham, UK. Visit www.firerescueforum.com for more information.



Gothenburg Fire Brigade set out the parameters for a development project. They wanted a suit that would allow the firefighter to remove the outer shells of the jacket and trousers without any help.

thing is that when it comes to the chemical finish on the outer shell, we are now able to reimpregnate the outer layer only, preventing the chemicals reaching inside of the inner lining and the membrane. We also wanted to avoid this chemical finish coming into contact with the skin of the firefighter."

Viking recommends that chemical reimpregnation takes place after 20 to 30 washes, and Valentin adds that with the new suit it is possible to use a separate machine for chemical reimpregnation, which minimises the chance of cross contamination. This avoids the scenario of accidentally impregnating the inner layer containing the thermal and membrane with the chemical.

Although the new suit is still to be distributed to every single one of the firefighters in Gothenburg Fire Brigade, Appelqvist reports that the firefighters are satisfied with the suit. "We are all very happy and proud to be in an organisation that is willing to try new ideas. But we are not

done yet, and we will keep improving the suit together with Viking.

"It is us, the buyers, that have to ask for innovative solutions otherwise the market will not come up with them. We have to take full advantage of these opportunities when making a tender, even if development costs are high in this business."

The future looks bright for the concept of the detachable liner. Valentin says that Viking has received a lot of interest from Scandinavian fire departments and training centres. For many firefighters wearing dirty fire fighting kit has become emblematic of the heroic nature of the job. This, believes Valentin, has to change. "Particularly in the USA it is a badge of honour to wear dirty kit – and it shouldn't be." As word spreads about the invisible risks that firefighters are exposed to and the positive steps that fire brigades can take to minimise exposure, dirty kit could indeed become a thing of the past.



Katarina Appelqvist,
Head of
Procurement,
Gothenburg Fire
Brigade, Sweden:
"It is us, the buyers,
that have to ask for
innovative solutions
otherwise the
market will not come
up with them."

DEVOLD OF NORWAY

Protecting people since 1853

Devold® Protection develops soft and comfortable garments, designed to protect the users against cold, heat and flame. We do research, testing and trials to give the customers what they want: security for their employees. Our products have been tested and approved in accordance to European standards. Flame retardant underwear from Devold® Protection was as the first in Europe approved according with European standard – EN 531 (replaced by EN 11612) and the Swedish standard – EBR (the electric arc test). We were also the first that got the ENV 50354 (replaced by EN 61482-1-2) approval on natural fibre. Devold® Protection focuses on maintaining a high environmental profile throughout the production, and many of our products are Oeko Tex certified. For more information: www.devold.com/protection



Devold® Safe



EN 11612



EN 1149-5



EN 61482-1-2



ZIRPRO treated

DEVOLD®
PROTECTION

www.devold.com



Shortcuts and firefighters' clothing don't mix

If you are clear about your legal responsibilities in providing protective clothing for your firefighters then you could be in the minority, writes Philip Johnson of UK firefighters' clothing supplier Flamepro.



There seems to be a certain degree of confusion in the market around two rather important issues. Firstly, around who ultimately has the responsibility for ensuring that firefighters' protective clothing meets the needs of the wearer and secondly, how fire fighting clothing tender documents should be written.

This second point is no less worrying than the first because it demonstrates that shortcuts are increasingly being taken when specifying PPE that should be correct for the wearers' needs. Tender documents often appear to have endured 'cut-and-paste jobs' and even include product brand names instead of generic names for the types of materials required ie 'meta-aramid' (or similar), fire-resistant touch close fastenings etc.

Going back to basics, in the UK the Personal Protective Equipment at Work Regulations clearly state that all employers have a duty of care to their employees: 'Every employer shall ensure that suitable personal protective equipment is provided to his employees who may be exposed to a risk to their health or safety while at work except where and to the extent that such risk has been adequately controlled by other means which are equally or more effective.'

The duty of care can only be satisfied if a full risk assessment has been carried out at the start of a PPE tendering process. That responsibility cannot be undertaken by the producer or the supplier of the products, simply because they are not the employer. It is therefore incumbent upon the employer to define the risks employees face in the course of carrying out the duties that are expected of them. It is also their responsibility to keep up to date with the latest research regarding new risks that may have been unknown during a previous risk assessment.

Such new research into protecting firefighters could, for instance, encompass the latest medical studies into risks to firefighters from carcinogens penetrating the skin. Hemmingfire.com recently published an article concerning how the link between a higher risk of contracting cancers and firefighters was now becoming more established.

Two long terms studies on cancer risk in firefighters (three USA cities and five Nordic countries) showed statistically significant increases for all cancers. Worryingly, a new finding emerged from both studies showing an increase in mesothelioma, likely to be because of the asbestos exposure occurring when buildings burn, during clean up and also perhaps as a result of the asbestos protective gear which used to be widely used by firefighters.*

The findings of the above research add further weight to a growing need for rigorous risk assessments to be carried out by the employers of firefighters at all levels and sites. Clear and unambiguous instructions for maintaining a log of all PPE products, cradle to grave, is an essential step in providing the proper duty of care to all employees and the reasons for doing so.

To repeat, risk assessments cannot be carried out by the manufacturers or the suppliers of fire fighting PPE. Only the fire service can carry out the risk assessments because they have to carry them out in the first place. In these times of straightened financial circumstances the increased cost of implementing a programme of care for PPE items will be difficult to institute. However, it is clear that something along such lines needs to be done. A total care package may be one of the solutions available but this in turn will increase the costs even when spread over a long-term contract. Such packages actually cost a fire service more per annum than a straight purchase PPE from capital expenditure and load future costs on the service.

This article does not pretend to have the answers to the conundrum outlined above, it merely wishes to highlight the known facts and to promote an atmosphere of enquiry and research into how the various points raised can be addressed in everyone's interest to further firefighters health and well being.

Philip Johnson will be presenting on fire fighting PPE procurement tactics at the PPE & Duty of Care Forum taking place on 2 February 2016.

*Lin Fritschi, School of Public Health, Curtin University, Bentley, Western Australia, Australia and Deborah C Glass, Monash Centre for Occupational and Environmental Health, SPHPM, Monash University, Melbourne, Victoria, Australia.

PPE AND DUTY OF CARE FORUM



2nd FEBRUARY 2016
MACDONALD
BURLINGTON HOTEL,
BIRMINGHAM, UK

Convener:

Dave Matthews, Chair of the UK (BSI) Protective Clothing Committee, lead in Europe (CEN) and internationally (ISO) on protective clothing, Managing Director of Fire & Industrial PPE.

Organised by:

FIRE & RESCUE
Events

www.firerescueforum.com

FlamePro®
PROTECTION FOR LIFE

FIT FOR PURPOSE

FLAMEPRO'S
NEW GENERATION

Flame-Protection Garments designed for today's fire fighters; utilising the latest fabric and design technology to provide protection and comfort with style ...*whatever the situation.*



T 01332 341030
F 01332 340673
E info@flame-pro.co.uk

www.flame-pro.com



Figure 1: bird's eye view of a robotic arm illuminating a compact vehicle and a person. Figure 2 (below right): first person's view of the inside of a cab.

The right light

While hands-on demonstrations are standard in the procurement process of much specialist equipment they are not very practical when it comes to choosing the best light tower for the job – until now. Eli Plewka, Head of R&D at Command Light, believes the answer lies in technology.

What firefighter doesn't prefer to get his hands dirty and experience the limitations of a potential new purchase rather than studying spec sheets and marketing material? When it comes to lighting up emergency situations, spec sheets just don't have all the answers, says Eli Plewka: "Questions may include, how much useable light will the system produce? What is the total area illuminated? Will I be able to read that hazmat placard from a safe distance? Will I be able to locate a side curtain airbag in a mangled vehicle?"

"Looking at a spec table that tells us things like lumen output and total height of a tower doesn't make it easy to visualise how that light will actually affect a scene."

Eli Plewka is Head of Research and Development at Command Light, a company that has been manufacturing the Command Light-branded range of vehicle-mounted aluminium-alloy lighting solutions since 1992. It recently moved to a new 15,000m² facility in Fort Collins, Colorado, US, after outgrowing its previous home in Loveland.

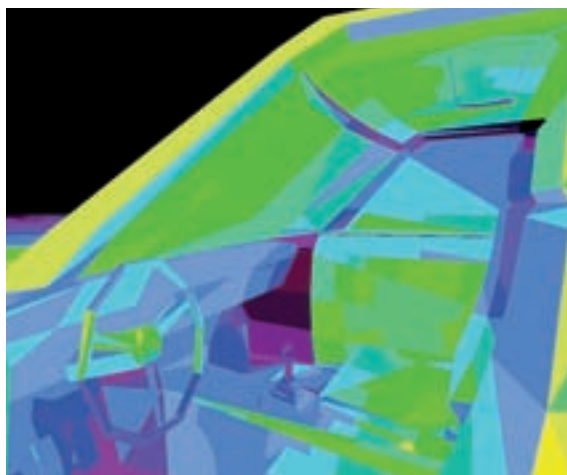
In order to help fire departments choose the best lighting solution, the company started researching whether technology could provide an answer, and came up with a

photometry computer program. "The simulation model can give us not only graphics that actually demonstrate light levels at different distances, but also real-life light simulation on emergency scenes." At the moment Command Light wants to keep the precise details of the simulation software to itself, but the results are quite astonishing.

Figure 1 shows a fire truck with an electrical actuated robotic arm illuminating a compact vehicle and a person. Each arc that is shown on the ground marks six-metre intervals from the truck. The coloured bands are different measurements of lux – actual useable light levels – at those locations. The grey/yellow coloured area at the centre of the graphic is 1,000 lux, or the brightness of a normal operating room. It is also possible to see that an area of about 63 square meters is illuminated to, at a minimum, the brightness of a parking lot – or 75 lux.

"Using programs that give a greater visual simulation of almost any light system we can help maximise lighting effectiveness. Why are we not using these instead of relying solely on specs and words?" asks Plewka.

The software can also be used to answer questions about how defined shadows will appear during a certain situation: "Looking at the shadows being cast by the person or the car we can get a greater understanding of how those shadows would look in real life. Observations like the lux level at the centre of the shadow, and how quickly the shadow reach its darkest point describe the shadow well. We can move around in the three-dimensional model and get more detailed information."



LIGHTING IN EXPLOSIVE LOCATIONS

Witte + Sutor is about to launch two new torches for use in explosive atmospheres. The new Acculux HL 12 Ex (zone 0) is available in different versions: battery, rechargeable and dual use. As well as being lightweight, the new range uses the same charging unit as the HL 25 Ex. Although the battery version is only available at the end of this year, the company says that demand has already been overwhelming. Next is the introduction of a combined powerful hand and helmet torch, the new HL 11 EX which is certified to zone 0 and IP 67.

Over the last few years the German company has developed and manufactured a number of specialist hand held torches and helmet lights. Its safety-certified lights fulfil the strictest classification standards used by utility companies, local government, the oil and gas industry, first responders, safety inspectors and others. They are tested for use in explosion-proof areas of zones 0, 1, 2, 21 and 22, as per ATEX directive II C, T4.



Where **collaboration** meets **innovation**

NEC | Birmingham | 23-24 September 2015 | www.emergencyuk.com | NEC | Birmingham | 23-24 September 2015 | www.emergencyuk.com | NEC | Birmingham | :



THE EMERGENCY SERVICES SHOW

NEC | BIRMINGHAM | 23-24 SEPTEMBER 2015

A unique event for anyone who works in the emergency services

Come along to the Show on 23rd and 24th September at the NEC, Birmingham to:

- See and handle the latest equipment, kit, vehicles and technology
- Receive training in the latest rescue and lifesaving techniques
- Network with other blue light services and rescue organisations
- Gain a deeper understanding of the support available from voluntary sector partners

Free seminars include

- The WMFS R&D Team discuss 'Bluelightthinking' and the future for multi-agency interoperable firefighters
- Peter O'Reilly, Greater Manchester FRS discusses the Community Risk Intervention Team
- Operational teams will present an overview of the multi-agency response to the Alton Towers incident
- Matt Wroughton and his team from WMFS talk about the use of drones in response incidents and body worn video use
- Lincolnshire FRS, EMAS and LIVES present their experiences of the Joint Ambulance Conveyance Project – Fire Ambulances – Is now the time?

Register for free entry today at www.emergencyuk.com

IF YOU HELP OTHERS IN AN EMERGENCY YOU SHOULD BE AT THE EMERGENCY SERVICES SHOW

Thanks to our Show supporters



COMMAND LIGHT

made in the usa .. commandlight.com

- » **more LED options**
 - » options from FRC, Whelen, Akron Brass, and more
- » **perfect balance of mobility and light intensity**
 - » endless positions with the press of a button
 - » maximize light intensity by keeping source near the scene
- » **unmatched reliability**
 - » 100% electric - not affected by wind, ice, or dust
 - » 5-year warranty



Made in Germany

We provide light!

We look for suitable partners to represent our range.

High-quality accumulator and battery torches for all fields of application. Ultra-bright LED flashlights, Halogen spotlights, high-tech industrial and emergency lights with LED as well as explosion-proof lamps. Explosive zones 0, 1, 2, 21 and 22. ATEX directive II C T4.



EX SLE 16 LED

NEW!



HL 10 EX

NEW!



MHL 5 EX

NEW!



HL 12 EX

BRAND NEW in 2015

3 Versions:
- Battery version
- rechargeable version and Dual Used Version
- Same charging unit as HL 25 EX
- Zone 0



HL 25 EX



Visit us in Düsseldorf
in Hall 6, Stand H72.
27 – 30 October 2015

Witte + Sutor GmbH

Steinberger Str. 6

D-71540 Murrhardt

Phone: +49 (0)7192/9292-0

Fax: +49 (0)7192/9292-50

info@acculux.de, www.acculux.de

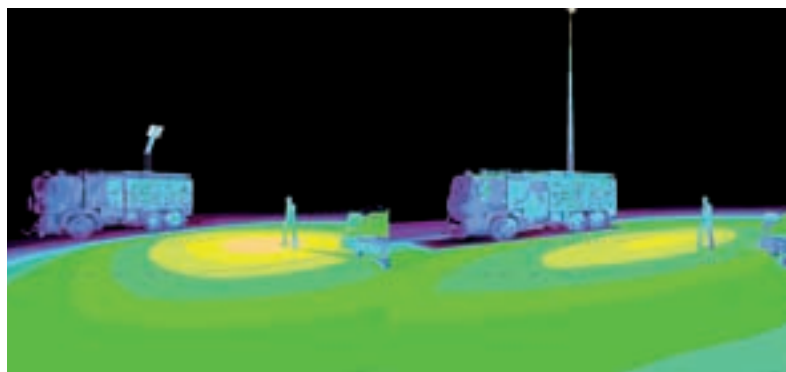


Figure 3a and 3b: light intensity comparison at different heights.

In Figure 2, the scene has now moved on to the door of the car and the inside of the cab. The simulation shows that enough light reaches the other side of the vehicle and illuminates the car door to around 200 lux, which Plewka explains is about the same as a normal office space. "You would be able to see relatively fine detail, such as high power cables in a battery-powered car, or which pedal has the person's leg trapped."

Using this method allows an organisation to illustrate what happens to illumination when identical light heads are placed at different heights. Compare the effect of a 5m-high light system seen in Figure 3a (left), with a 12m-high light system in Figure 3b (right). "Using this system it is easy to see how the light levels change from system to system. One system illuminates a larger total area, while the other system makes the overall scene brighter. The shadows for the five-metre system are brighter but the shadows cast are longer. So, all other things being equal, a taller tower provides a lower level of illumination at the scene."

Plewka adds that technology such as this can help emergency response teams make the best decision for their requirements – something that is not necessarily possible just by looking at a set of numbers. "For example, on paper a 12 m-high, 6000-watt telescoping pole might seem great. However, if we compare it to other systems using this technique we can see taller is not always better. Multiple lamp heads on one system could improve the shadow quality, and having more adjustability in the positioning of the system could get more light to where you need it. Or using a better quality LED can put out more light to start with."

Plewka is not suggesting that fire departments download the program and teach themselves how to run photometric analysis themselves, but rather that they make it part of the product research and procurement process. "If there was a step-by-step approach it may start with figuring out what kind of situations they'll be lighting most often. Will they be lighting cars or buildings? How close can they get to the scene that they are lighting? Is it usually a smoke-filled environment or more clear? Then, we can get them into the right area of optics and light styles. Once there are a few options, a supplier should model those systems and provide a set of screen captures, which should then answer a number of questions, depending on the type of vehicle carrying the lighting system. For instance, do they need a big area close to the vehicle lit for staging equipment? Are they going to be trying to read a hazmat placard that's far away? Then, depending on that, they can get the light system they need for exactly the right task."

With the advancements that have been made in technology over the last years, in Plewka's opinion it makes no sense to continue with the old way of doing things. "You wouldn't use a pry bar and saw where the Jaws of Life would work, because it's the right tool for the job. This is a similar idea. Companies have the ability to give us this information, and organisations should start asking for it whenever they are buying lighting systems simply because it's the right tool for the job."



The user-friendly dosing system for fire-fighting.
- Easy to install, use, maintain and test!





Pumps that pack more punch



Pumps are a key weapon in the arsenal of firefighters worldwide and their use is varied. Steve Banner offers an overview of the latest product developments and how they can be optimally deployed.

Ferrara Fire Apparatus has entered the Guinness Book of World Records for the highest pumping capacity fire engine thanks to some help from US Fire Pump (USFP). Equipped with a USFP high velocity pump (HVP), the Inundator Super Pumper can reach 20,819 lpm rising to 37,854 lpm from a pressurised source. "The water flow distance measured during a recent field test was more than 152m horizontal reach and more than 122m vertical reach," says Gary Handwerk, President of US Fire Pump.

USA-based Ferrara was the first company to install an HVP on its industrial fire trucks. At the time of writing it was offering it as an option under an exclusive agreement.

According to US Fire Pump, such powerful pumps – 22,712 lpm – are perfectly practical given the power output of modern truck engines. They are in demand because industrial fire stations want to be able to fight fires with fewer vehicles and so they not only help firefighters but also save money. Some municipal fire departments could benefit from pumps that pack more punch as well, claims president of US Fire Pump, Gary Handwerk: "In the USA we're seeing fewer and fewer domestic fires – Detroit is a possible exception because of the well-known conditions prevailing there – but we still see major fires at business premises from time to time.

"Quite recently there was a big warehouse fire in New Jersey and the municipal fire trucks that attended it typically had a capacity of 2,000 gpm. But each had quite a battle to put the fire out. Had an HVP been there, then their task would have been somewhat easier."

Having a pump the size of an HVP on permanent stand-by might be viewed as a needless extravagance by some fire departments given the funding pressures so many of them face. However, several departments getting together to jointly purchase an HVP that would then be available to any of them could be an option.

"Remember that no fire department wants to end up being criticised on the local news channels because it had to deal with

a fire that it cannot put out," Handwerk adds.

Tackling blazes is not the only role an HVP can play, which helps explain why these pumps are in demand in countries such as South Africa, Australia and China as well as in North America.

Other potential uses include providing emergency cooling for nuclear reactors, high-pressure water for fracking (where it is permitted) and pumping away flood water, Handwerk points out: "We're talking about something that can throw 6,000-8,000 gpm around 500 feet which should help to sort the problem out."

New high volume pump

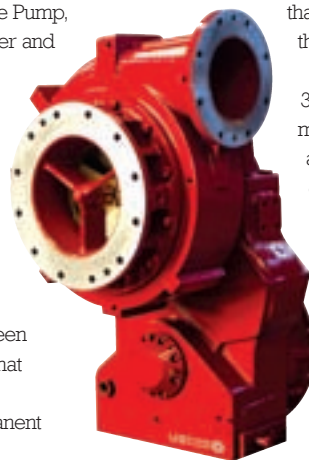
The recent Interschutz exhibition in Germany saw Hytrans officially launch the HydroSub 60 mobile pumping unit. Less expensive than the established HydroSub 150, it can be used to tackle both fires and floods by fire departments and has already been ordered by a customer in Zagreb, Croatia.

Johan Kramer, sales manager at Hytrans Systems, which has its headquarters at Lemmer in the Netherlands, explains that interest has been expressed by other states from the former Yugoslavia region.

The HydroSub 60 comes with a 60kW engine and 30m of hydraulic hose which means that it can be no more than 30m from a water source. "When used as a fire pump it can pump up to 1,500 lpm at 10 bar or up to 4,000 lpm at 2.5 bar if you change the impeller. Switch it to a flood pump and it can handle up to 20,000 litres a minute," explains Kramer.

Other roles include the provision of emergency cooling for nuclear reactors: a task the high velocity pump can tackle too. Hytrans supplies units to fight industrial fires offering multiples of 22,000 lpm for tank firefighting over distances of from 500 m to more than 10 km. They can also be ordered with foam mixing systems.

Kramer appreciates that units tackling industrial fires may wish to switch to fewer, larger pumps in a bid to cut costs but he points out that deploying one large pump rather than two smaller ones can mean sacrificing flexibility. "A pump might be big, but it cannot be everywhere at once."



Top: Ferrara's Inundator Super Pumper can pump a maximum of 37,819 lpm thanks to US Fire Pump's high velocity pump (centre).



AURORA®
AURORA® EDWARDS SERIES
FAIRBANKS NIJHUIS®

**INNOVATIVE
FIRE PROTECTION
SOLUTIONS FOR
INDUSTRIAL FACILITIES**

With PENTAIR you have a versatile partner dedicated to performance-based engineered fire protection solutions.

Our proven skills in manufacturing quality pumps and systems result in a **BETTER** fire system **DESIGN**--
Safer. Code-Compliant. Innovative...BETTER BY DESIGN.



www.AuroraPump.com
www.FairbanksNijhuis.com
WWW.PENTAIR.COM



OIL & GAS * MARINE * POWER * CHEMICAL * MANUFACTURING



Because size does matter

Small and light it may be but the KP is a powerful and versatile pump that is full of features designed to provide performance while lowering maintenance costs and downtime, writes David Burton, Marketing Manager, Godiva.

With the demand for smaller more cost effective fire appliances, Godiva considered users' requirements and set to designing a new pump for the discharge of flows up to 1,500 l/min at 10 bar.

The results are the single pressure discharge KP1-1510 pump and the multi-pressure option, the KP2-1510. Not only do these pumps carry one of the most compact footprints in the industry but the multi-pressure version includes the unique Godiva design carrying two impellers on a single shaft, which significantly reduces space demands further.

The KP single pressure pump is on average 40% smaller in cubic volume than its peers, and the multi-pressure pump is on average 30% smaller in cubic volume than comparable multi-pressure pumps. Their smaller sizes free up valuable space on vehicles for further equipment as well as help reduce the overall vehicle payload.

The KP pumps are significantly lighter too. The KP single-pressure pump is on average 30% lighter and the KP multi-pressure pump is on average 25% lighter than

comparable pumps.

This size and weight advantage makes the KP pump highly suitable for today's compact vehicle designs to the extent that – in effect – it is now possible to install a high performance pump in a vehicle as small as 3.5 tonnes.

The KP has been symmetrically engineered around the centreline, making the location for discharges for clock-wise and counter-clockwise rotation pumps identical, thereby simplifying installation. In addition to being symmetrical, the volute is offered in the standard vertical orientation but can

also be ordered with the discharge to the left or right (single-pressure model only).

The standard inclusion of a gearbox enables the KP to be installed in virtually any commercial chassis in the market. The gearbox can be mounted in the down, left or right position, and three gear box ratios are available to suit most engine and PTO applications.

Maintenance costs and downtime have been reduced through clever design. The piston primer is a true dry-running design with no requirement for forced mechanical maintenance. What's more, an electronic clutch is included with the primer for fully automatic or manual priming; and an electronic safety interlock is an integral part of the piston primer design ensuring it is not activated at high speeds, which increases its life expectancy and reliability.

The gearbox design incorporates elements that reduce oil changes to only once every five years. A sight tube enables oil levels to be quickly assessed without disturbing plumbing. The mechanical seal can even be changed without removing the pump from the vehicle. The primer has been designed so that with the removal of two bolts the assembly containing the seals can be removed and maintained on a workbench rather than in the rear locker.

The Godiva KP pump made its debut at Interschutz, Hanover, Germany last June, but for those that missed it, it will also be at the UK Emergency Services Show at the NEC, Birmingham, 23-24 September.

Key features of the KP

- Small size (allows more room for additional equipment)
- Light weight (can be fitted to smaller chassis)
- Output options (single-pressure pump performance to EN1028 rated 1,500 lpm at 10 bar; multi-pressure pump performance to EN1028 rated 1,500 lpm at 10 bar and 250 lpm at 40 bar)
- Five-year maintenance interval (reduces downtime and maintenance costs)
- Single piston primer (simple construction for low cost of ownership, with fewer parts)
- Fail safe electric primer shutoff (ensures primer not activated at higher speeds, greatly increasing the life of the primer)
- Easily removable primer seal assembly (seal assembly removed by two bolts so assembly can be maintained at a work bench)
- Symmetrical design (identical plumbing can be used on engine and opposite engine rotation pumps)
- Three gearbox orientations (left, right, and down orientations for installation flexibility)
- Three volute orientations on single-pressure pump (left, right, and vertical orientations for plumbing flexibility)
- Three gear ratios (1.90:1, 2.33:1, 2.91:1 ratios to suit most engine and PTO applications)
- Light alloy and gunmetal options (to suit pumped water type).

Godiva's new KP pump will be on display at the Emergency Services Show, NEC, Birmingham, UK, 23-24 September.

DARLEY'S NEW REMOTE CONTROL FOR BRIGGS & STRATTON ENGINES

Pump manufacturer WS Darley has expanded its Smart Start wireless remote portable pump control to include Briggs & Stratton engines. Designed to allow wireless remote controlled start/stop, choke, throttle up and down, and an auxiliary control circuit, the latest development gives the user flexibility when it comes to pump control.

With a transmitter range of over 91 metres, users now have the ability to easily control the pump from inside the cab without bulky control panels and excessive wiring. Standard on-board controls are included with the option.



intersec

The world's leading trade fair for
Security, Safety & Fire Protection



January 17 – 19, 2016
Dubai, UAE

Fire & Rescue Solutions

Explore every relevant
facet of fire protection
and safety for your
organisation

Register for your visit today

www.intersecexpo.com/R/

www.intersecexpo.com

 messe frankfurt

The name in Safety, Rescue and Survival.

Stretchers

Stretcher Kits &
Accessories

Evacuation Chairs

Backboards

First Aid

Fire Blankets



3121 Millers Lane
Louisville, KY 40216
Tel: 502-775-8303
Fax: 502-772-0548
Toll Free: 888-458-6546

JUNKIN
SAFETY APPLIANCE COMPANY
www.junkinsafety.com



**Metron
Eledyne**

FIRE PUMP CONTROLLERS

Diesel Engine Controllers

In a wide range of applications including Fire Pump, Industrial Pump and Gen-set.

Electric Motor Controllers

For all applications using direct on line, star delta, auto transformer and variable frequency drive starting methods. Up to 20kV.

Hazardous Area Controllers

All fire pump controllers can be designed and built for use in hazardous areas zones 1 and 2 (class 1 divisions 1 and 2).

After Sales Service

Spare part available for all controllers, regardless of age
Service and commissioning of controllers on site, on shore and off shore etc
Repair and Calibration service for all controller modules

**Metron Eledyne
A Division of Hubbell Ltd**

18 Autumn Park, Dysart Road
Grantham, Lincs NG31 7DD United Kingdom
t +44 (0)1476 516120 f +44 (0) 1476 516121
e info@metroneledyne.co.uk
www.metroneledyne.co.uk



The FARE approach

Storage tank fires are every operator's nightmare but what are the main threats and how can escalation into full surface fires be avoided? Valeriano Barrilà, Branch Manager, SA Fire Protection, introduces the FARE design method for rim seal fire protection.



Valeriano Barrilà,
Branch Manager,
SA Fire Protection,
Pisa, Italy.

A rim seal fire on a floating roof tank is one of the most dangerous threats for chemical and petrochemical storage farms and over the years the world has experienced several instances that have developed into large-scale disasters

These sorts of fires are normally caused either by lightning strike or by human error related to maintenance work or operational activities. Less common are fires caused by sparks occurring as a result of electrostatic charge, natural disaster or an uncontrolled exothermic chemicals reaction.

Lightning as the result of a thunderstorm or sandstorm is nevertheless the most probable cause of a fire outbreak on floating roof tanks. During such phenomena the ignition of the rim seal zone occurs either through a direct strike or through a secondary effect related to a nearby lightning strike, such as electric charge build up.

Maintenance or operational errors are recorded as the second most probable cause of rim seal fires and are generally related to mechanical friction, overfilling or unsafe engineering practice such as hot works on the tanks. Although very rare, exothermic chemical reactions have also been observed, especially in the case of storage of crude oil with a high concentration of hydrogen sulphide. In the latter case, the combination of the movement of the floating roof with the degradation over time of the seal allows ingress of traces of crude oil into the internal wall of the rusty tank shell. When the hydrogen sulphide comes into contact with air and metal rust, the perfect conditions are created for the development of powdered iron sulphide, which is pyrophoric and therefore ignites spontaneously in air.

This reaction is highly exothermic and can create hot spots capable of igniting the flammable vapours.

Once the rim seal zone has ignited it is imperative that the fire be immediately extinguished to avoid escalation into the worst-case scenario of a full surface fire. It is worth bearing in mind that as long as the floating roof remains stable and buoyant the fire will be limited to the rim seal zone at a scale that can be extinguished by an automatic fire extinguishing system.

In order to suppress a rim seal fire quickly and successfully on a floating roof tank we recommend the use of an automatic fire extinguishing system that has been designed in accordance with the 'FARe' principles ie that it be fast, available and reliable.

Under these principles, the fire is detected instantaneously and the fire extinguishing agent released on the fire from the

very earliest of stages. In addition, no foam system unavailability is allowed at any time during regular storage tank operations.

Fast detection and attack

Rim seal fire extinguishing systems are widely recognised as providing very fast fire detection and a quick attack on rim seal fires. These systems are self-contained units that store a certain amount of fire extinguishing agent (gas or foam) that is normally propelled by nitrogen. Nitrogen is also part of the pneumatic fire detection and activation system which not only detects the fire but also triggers the alarm and activates the discharge of the fire extinguishing agent.

The rim seal unit is installed directly on top of the floating roof (see image above), and it is set to constantly monitor and protect a portion of the rim seal zone.

From an operational point of view, once the fire breaks out it is instantaneously detected by the pneumatic detection system, which at the same time provides an alarm to the main control system and activates the discharge of the fire suppression agent. While the unit is suppressing the fire, the signal sent to the main control system triggers the activation of the NFPA 11 traditional foam system. Although these foam systems typically require some time – approximately 20-60 seconds depending on the system design – before delivering foam towards the rim seal, the rim seal unit covers this delay with its own discharge which lasts approximately 40 seconds.

When confirmation to activate the NFPA 11 foam system is provided, the main control system usually operates deluge valves for releasing the water to the water/foam systems. The role played by the deluge valve is critical to the protection of the storage tank. A failure or even just a temporary unavailability of the deluge system will jeopardise the fire protection of the whole storage farm. As deluge valves with a high level of reliability and availability are so important, they are often specified with an increased functional safety performance level that is commonly measured using Safety Integrity Level (SIL2 or SIL 3). The higher the SIL level of the deluge system the lower the probability of failure on demand (PFD), and therefore the higher the probability that the storage tank will be constantly protected against fires.

Summarising, the most common causes of fires on floating roof tank are localised in the seal area and are mainly related to lightning strikes. The key to minimising the damage to rim seal fires is to extinguish the fire quickly and to react at the very earliest stage possible.



ENVIRONMENTAL ECONOMICS Medio Ambiente Water Environment
 OR Solvent Quality ENVIRONMENTAL ECONOMICS
 Water Environment WITHOUT Solvent Quality
 ENVIRONMENTAL ECONOMICS Medio Ambiente Water
 FLUOR Solvent Quality Intervention environment
 OMICS Medio Ambiente Water Environment
 Solvent Quality ENVIRONMENTAL ECONOMICS


3F

SMART FOAMS SOLVENT FREE FLUORO FREE

A BRITISH COMPANY MANUFACTURING FOR THE WORLD. +44 (0)1536 202919

3F ASIA **3F** AFRICA **3F** AMERICAS **3F**

www.3fff.co.uk



**There is proportional
liaison between
investment and risks.
We know.**

Saval has a worldwide reputation for fire protection for several types of storage tanks for flammable liquids. Each type of tank requires specific protection methods. For tanks with a floating roof, for over 45 years Saval delivers the CFI automatic detection and suppression system. Whatever the risk and whatever the local logistics, we can advise on the recommended system solution to meet your needs.

saval.nl



We know fire.
We know safety.
We know you.

part of



Safe training for effective response

What qualities make an effective training ground? Nico Zorzetto of Italian manufacturer SANCO SpA describes a training facility recently installed in a petrochem facility in Algeria, north Africa.



The control room is on two levels with the control equipment housed on the upper level.

Top: pool fire scenario simulating rupture of a blind flange.

The importance of training is to gain confidence in working with possibly hazardous elements that humans may innately fear. In the peculiar world of fire fighting where the key saying is 'estote parati' - or 'be ready' - the meaning of training takes on a different dimension.

The training of personnel is the cornerstone of the fire service both for acquiring new skills as well as for maintaining proficiencies and keeping skills sharp. In order to survive, firefighters must be able to think critically and clearly and solve problems quickly under extremely stressful conditions. To prepare firefighters for actual fires, training officers use purpose-made facilities to conduct live fire training, offering students the opportunity to develop their skills by learning

appropriate behaviour through repeated experiences.

A dedicated training scenario for each operational capability is vital, and ideally one that can be validated against operational performance to ensure that it continues to meet operational needs. In order to train firefighters for potential incidents in their environment a fire training facility that is tailored to their risks is the best solution and – as we all know – today such facilities exist, ranging from urban search and rescue, wildland fires, offshore and onshore petrochemical fire fighting. At SANCO we created and built such a fire training ground for a company operating a gas treatment facility in Algeria, north Africa.

In order to ensure its training effectiveness (including realism) and to guarantee maximum safety, the fire training ground was based not only on NFPA 1403 (Standard on Live Fire Training Evolutions) and other international norms, but also on the specifications of international oil and gas enterprises such as Shell and BP, not to mention the additional specific demands of the client.

One of the challenges of simulating hazardous conditions for industrial emergency training is how to ensure that exercises can be repeatable. To overcome this problem SANCO adapted the training equipment for the use of LPG as the fuel for gaseous fires and with an option for flammable liquid fires. As LPG is more difficult to extinguish than gasoline the training outcome can be better. To provide the fuel for all fire scenarios a dedicated LPG container was delivered complete with a suitable protective wall made of concrete.

All fire scenarios are entirely and independently controlled by the trainer at the fire training ground control centre. At the command console of a control room the trainer can ignite and





WE GOT THIS.

Introducing top-performing Class B foams from Phos-Chek.

Now, from the global leader in wild land and municipal fire fighting suppression agents, Phos-Chek introduces the most effective and environmentally responsible Class B foams available. Our products meet or exceed some of the most stringent performance standards including UL, ICAO, and Lastfire.

- ✓ Most technologically advanced AR-AFFF products available.
- ✓ Environmentally responsible Class B fire fighting solutions.
- ✓ Every batch fire-tested to ensure performance.
- ✓ Outstanding customer service and tech support.
- ✓ From the 50-year leader in foam fire suppressants.
- ✓ Underwriters Laboratory UL 162 listings.



PHOS-CHEK®
FIRE RETARDANT | FOAM | GEL

To learn more, call 800-682-3626 or visit us online at www.phos-chek.com



LPG vessel for the new fire training ground in Algeria.

stop the fire, as well as increase and decrease the fire's intensity in response to the fire suppression actions of the trainees.

In the case that the operator leaves the control room unattended during an exercise the safety system that continuously monitors the training system will cease feeding LPG to the fire and pilot burners.

This control room building is on two levels: the lower one comprises a valve house for compressed air distribution valves (air is used to actuate LPG proportional valves with maximum safety) and automatic/manual valves for the emergency flushing system that protects the trenches from any LPG leakages. It contains an air compressor and it can also be used to store personal protective equipment (SCBA, flame retardant suits, masks, etc). As the controls are housed on the upper level, the trainer and other supervising personnel can enjoy maximum visibility.

The console affords total remote control and regulation of the parameters of each fire scenario, whilst also providing detailed maps of the facilities. A number of gas detectors installed

TRAINING NEWS

CFB Risk Management and Angus Fire are to set up a dedicated emergency response training programme for tank terminals, petrochemical and other high-hazard sites.

Both organisations are based in northeast England, with CFB providing high-hazard protection services and Angus Fire supplying fire fighting foam and equipment.

The accredited programme will cover the relation between the design and development of credible incidents; fixed and mobile fire protection systems; and incident response. All course material will be built around NFPA codes and standards 11, 15, 16, 25 and 30.

According to a CFB spokesperson, the training has been designed for those who have to deal with or have responsibility for fire protection systems or emergency response involving tank terminals, petrochemical and other high-hazard sites.



throughout the fire training ground provide additional fire and gas detection information to a panel in the control room, enabling an automatic emergency shutdown and the flushing of trenches in case of any LPG leakage. Several additional emergency push buttons have been installed throughout all the various scenarios in order to immediately stop fires in the case of an emergency occurring during the fire extinguishing training.

Low, medium or high-risk scenarios using nine burning systems in seven different scenarios can be managed from the control room:


- Torch fire (simulating a fire erupting from the end of a broken pipe cap).
- Pool fire, 4m² (simulating the rupture of a blind flange on a pipe, the leakage and ignition of fuel spilled from the flange and the fire from the flange).
- T-shaped cross pool (simulating a wide-area liquid fire).
- Inclined plate (simulating fire from fuel that is dripping on an inclined plate).
- Ruptured vessel surface fire.
- Relief valve fire.
- Loose flange fire.
- Exploded pipe fire with pipe interception valve closure simulation.
- 'Christmas tree' fire (simulating a large-volume fire in a complex system of cross pipes).

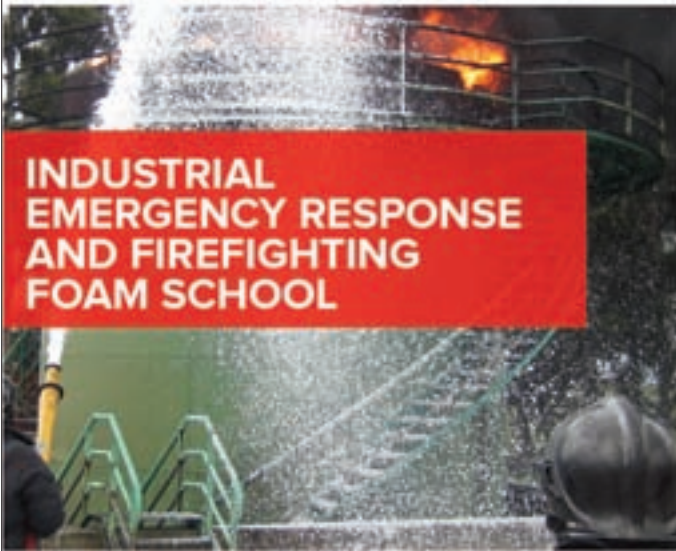
In addition to the aforementioned gas detection unit that is interfaced with the training ground system, SANCO also installed a flushing system for the LPG pipe trenches to prevent explosions caused by LPG leakages.

About SANCO

Established in 1988 in Novara, north-west Italy, SANCO is an international designer, manufacturer, installer and project management company for gas and fire detection systems, fire fighting equipment systems, and fire fighting vehicles.

Listed in the Italian stock exchange, SANCO employs 152 employees and has a presence in over 70 countries. Its 38,000m² manufacturing facilities include a test laboratory, a fire test demonstration area, a tooling/welding department, two manufacturing divisions (mechanical for equipment, systems and vehicles and electronic for fire and gas panels) and a R&D department dedicated to product improvement.





INDUSTRIAL EMERGENCY RESPONSE AND FIREFIGHTING FOAM SCHOOL

Gain an understanding of foam characteristics and application, discuss potential hazardous scenarios, understand firefighting tactics and gain practical experience in extinguishing a range of industrial fires.

18-22 APRIL 2016
CENTRO JOVELLANOS, ASTURIAS, SPAIN

www.cfbriskmanagement.com



Your Safety is what drives us.
Every Single Day.



Gallet F1XF Helmet



EVOLUTION 6000
Thermal Imaging Camera



ALTAIR 5X and ALTAIR 4X
Multigas Detectors



alphaSCOUT
Monitoring System



SCBA System



For further information
visit **our market page**



Smashing power

Pyrosmash is an innovative fixed or mobile foam fire fighting technology that can be used to fight fires with next-to-zero pressure. Fire Safety Engineer Pier Luigi Fornasari of Studio Termotecnico Associato Fornasari, Italy explains the applications and next steps.



Three years ago MAG Antincendio in Vimercate, north Italy commissioned me to research the applications of a new series of fixed, mobile, manual, automatic foam fire fighting devices that work with next-to-zero pressure drop and whose technological innovation is patented.

At the core of Pyrosmash is its ability to operate at a very low pressure. While other foam systems need a pressure of between 5 and 7 bar to work, Pyrosmash can function effectively with a minimum pressure of 2 bar, which means it can be connected to local water mains, thus avoiding the use of booster pumps and water collection tanks.

Its technical characteristics reduce pressure drop to almost zero, and it can also regulate foam concentrate percentage from 1% to 3%. Once the foam has been discharged, the system continues to work by discharging water.

Pyrosmash doesn't have a device for generating extra pressure because it does not use technology that is based on the Venturi effect. Instead, its patent is based on an innovative fluid dynamics principle which leads to a minimal pressure drop. This means that a DN 40 manual fixed system with a low-expansion branch pipe will flow stable foam at a rate of 1.8 m³/m at 2 bar, and 3.4 m³/m of foam at 4 bar. This satisfies the Italian fire code's minimum pressure of 2 bar for any fixed or mobile foam/water device.

Furthermore, with a minimum working pressure of 2 bar and the corresponding pressure drop of 0.18 bar, the operating range is 20 metres of hose plus a 6-metre throw.

The Pyrosmash range encompasses mobile and fixed devices, as well as manual or automatic versions. Choosing between water and foam discharge with the manual system is as easy as switching its selector handle.

Starting with the mobile devices, these are designed for fast manoeuvrability in small spaces or on inclined floors. They can be operated by a single person and their operating range

is 50 metres.

Next are the fixed devices, which are designed to be installed in specific locations. They can be operated by a single person, just like a common indoor fire hose, and their operating range is 20 metres.

The so-called independent unit has a water tank capacity of 1,000 litres and a foam discharge time of 8 minutes at 5 bar at 3%. New versions have 2,000, 3,000, 4,000 litres water tank capacity with foam at 1% and a discharge time of 13, 20, and 26 minutes at 5 bar respectively. It has been designed for fire protection where water pressure or water supply is scarce or difficult. The independent unit can be placed on vehicles as an auxiliary fire protection system for environments such as construction sites and is also suitable for urban areas with difficult vehicle access.

Lastly is the modular fire extinguishing system version, which is available in manual or automatic versions and is ideally suited for the protection of small to medium areas. It can be configured for low, medium, or high-expansion foam.

Due to their quick manoeuvrability and high extinguishing potency I have installed Pyrosmash products in different applications. These have included a recycled paper company that required fire department approval for increasing its stored waste paper load from 200 tons to 3,000 tonnes, and a non-woven abrasive fibres factory that required a solution to control the small fires that frequently broke out in the warehouse. It has also been installed in the warehouses of chemical and pharmaceutical companies.

After compiling a report outlining the different fire fighting and fire code issues that could be solved via the installation of Pyrosmash products in factories and plants, I then designed a series of tests which were carried out on the Pyrosmash devices at the Italian National Fire Corps Research Centre at Le Capannelle, Rome.

As a consequence of this research work a number of private and public organisations were contacted and a network was created. Members include institutions such as the Italian National Fire Corps, Italian Civil Defence, Dutch and Spanish Fire Corps as well as trade associations and certification bodies (for example RINA and UL).

The group charged me with transforming the synergy achieved into an EU-Project framed within Horizon 2020, the financial instrument of the EU aimed at securing European competitiveness.

Over the next few months research on Pyrosmash will continue, oriented towards the preparation of this EU-Project; the Italian, Spanish, Dutch fire fighting corps will carry out the tests on new Pyrosmash prototypes and on existing models.

The modular fire extinguishing version of Pyrosmash is ideally suited for small to medium areas and can be set to discharge low, medium or high expansion foam.





eWarning!

Switching from mechanical to electronic warning systems is the way forward, writes Valerio Del Vecchio, E2S Warning Signals.

Until the development of solid-state electronics the common factor with fire bells, sirens and other emergency warning signals was that these sounds were generated by electro-mechanical transducers.

While widely used for more than 100 years, the reliability, performance, maintenance and running costs of electro-mechanical devices have always caused some concern. Compared with solid-state technology, they suffer from high inrush current on start-up, require higher operating currents when running, are less efficient in terms of converting electrical to acoustic energy and fail far sooner than an electronic alternative.

The primary barriers to the widespread adoption of electronic sounders in place of electro-mechanical ones have been twofold: sound pressure levels from the electronic units could not match those generated by the traditional technology and the electronic tones lacked fidelity when compared with the originals.

However, these issues were overcome when E2S Warning Signals developed the Hootronic family, which electronically creates faithful reproductions of traditional warning sounds. The Hootronic family is available with a number of output levels and mechanical configurations, either as stand-alone audible alarm horns or combined with Xenon strobes or LED beacons to provide an integrated unit.

Hootronic can be powered from a wide 10-30 VDC (volts direct current), nominal 24 VDC or 110 or 230 VAC (volts alternating current). Depending on the version, outputs range from 112 to 121 dB(A) at 1 metre, giving effective coverage from 60 to 300 metres from the source. The A141 wide area sounder, for example generates multiple internationally recognised alarm tones including fire, security, civil defence, alert, COMAH (SEVESO II) toxic gas alarms and disaster warnings for flood, tsunami, tornado and other severe calamities. It has an output level of 141 dB(A) at 1 metre, giving an effective range of 750 metres, making it suitable for wide area signalling across large industrial sites and throughout urban and rural areas.

With performance-related barriers now a thing of the past, the argument for a change to electronic warning devices should sound loud and clear.

BIOex Foam concentrates

*Fight the fire but
protect what's essential !*



In 2002, BIOex was already committed to the protection of our environment by launching the first fluoro-free foam concentrate.

Today, BIOex designs and manufactures fluoro-free foam concentrates tested and approved by our customers worldwide:

- ▶ ECOPOL: all-risks
- ▶ BIOFOR: wetting / foaming agent
- ▶ BIO T: the training concentrate

BIOex also offers a complete range of synthetic and protein based foam concentrates.

Certifications: EN1568, ISO7203, ICAO, IMO, VERITAS, LASTFIRE, GESIP, UL, FM, APSAD R12

▶ www.bio-ex.com





Shelter for your vitals



Large 'walk-in' passive fire shelters can protect vital electronics systems on offshore platforms.

Advances in lightweight fire shelter technology are opening up new opportunities for offshore platform operators, writes Martin Hess, General Manager of Intertec.

Outdoor enclosure specialist Intertec has developed unique glass reinforced polyester-based construction techniques which are able to maintain interior temperatures below 60°C for up to two hours – and which can be provided in the forms of passive protection shelters suitable for housing large quantities of control and communications equipment.

One of the composite variants the company has been making for many years is a 'sandwich' design with an inner layer of mineral wool. This has been used for protecting items such as valves and actuators in emergency shutdown systems. More recently, a unique 'double sandwich' design – which is capable of maintaining interior temperatures below 60°C for up to two hours – was devised to keep critical electronics and electromechanical equipment operational in the event of a fire.

As there is no offshore/processing standard that defines the fire protection for this kind of application, shelters were designed to withstand hydrocarbon fires that can reach 1,103°C within the first five minutes. The design has been verified against the rapid-rise time-temperature curve that is used in the ANSI/UL 1709 standard, but with the additional stringent requirement that internal temperature must also not exceed 60°C during the protection period.

This technology is proving very interesting for offshore platform builders and operators. There are numerous systems that need to be protected in the event of a fire: emergency shutdown, communications, fire detection/suppression, etc. In the past, many of these systems were provided in standalone forms and located in separate areas. More commonly today, the systems all operate on a common network and come in rack forms that can easily be mounted in a single protection shelter.

One of the highest profile examples of this trend was a project in 2014 to provide three passive fire shelters to protect the vital control electronics on offshore gas production platforms in the Arabian Gulf.

The ability to withstand hydrocarbon temperatures fires and the unique 'low temperature' protection period were the key factors behind the project, but the platform operator also selected these shelters because of the particular construction materials. The weight of the GRP materials that Intertec uses is only about 25% that of steel – for a similar strength. The material is also inherently inert and provides exceptional long term resistance to corrosion from salt or other aggressive chemicals that might be present, such as sulphuric acid. Even stainless steel shelters and cabinets – which have been widely used on platforms – can corrode in such harsh environments.

Another feature of the passive fire shelter design is the easy ability to include doors and openings. In the Arabian Gulf application, large outward-opening doors provide unfettered access for routine inspection and maintenance. For air conditioning purposes, special fire-resistant air transfer grilles containing intumescent damper slats were fitted. In normal conditions the grilles allow unrestricted air flow. In the event of a fire, heat activates the intumescent material, which creates a durable and insulating barrier against the ingress of flames and gases.

At the heart of this design is a patented composite GRP construction technique, comprising two layers of fire-resistant mineral wool insulation sandwiched between sheets of special-grade GRP. By varying parameters such as the thickness of the GRP walls and the number and type of embedded insulation layers, the material's composition can be tailored to provide a wide range of fire resistance levels.



Martin Hess studied process engineering at the Technical University of Munich. In 1997 he became president and general manager of Intertec, a company founded in 1965 by his father, Dr J Hess.



15th International Water Mist Conference

28th and 29th October 2015

Amsterdam, Netherlands
Mercure Hotel Amsterdam City

Sponsors



Honorary Sponsors



Official Media Partners



For more information visit:
www.iwma.net



Know your unknowns

How to steer a clear course through hazmat channels, by Roger A Klein, Cambridge UK and Christian Regenhard Center for Emergency Response Studies (RaCERS), John Jay College of Criminal Justice, City University New York (CUNY), USA.

That the polluter pays is a commonly accepted principle in environmental custom and practice. It is embodied in a range of national and international environmental legislation and forms one of the cornerstones of the concept of environmentally or ecologically sustainable development (ESD) [1].

The principle probably first originated in Sweden during the early 1990s and was embodied in the 1992 Rio Declaration on the environment [2]. It includes concepts such as the internalisation of environmental costs – a long-winded and bureaucratic way of saying that if you are responsible for causing pollution then you are also responsible for clearing up the mess – as well as extended product responsibility (EPR) [3]. Its essence has been clearly stated by the US EPA [4]. If you purchase, for example, pesticides or heavy metal compounds and then misuse them resulting in environmental contamination you as end-user are responsible.

Practical implementations of the principle include schemes for the return of packaging to the manufacturer or supplier of goods, for example, printer cartridges, or industry's obligations for dealing with regulated industrial waste.

As an end-user of a product such as fire fighting foam you have an obligation to carry out a suitable and sufficient assessment of environmental risk (SSAER) based on the specific application envisaged. In order to do this you need to have available adequate comprehensive environmental and ecological data on which to base your assessment of the risk of adverse environmental impact.

Where is this information available?

It is commonly assumed that the product Safety Data Sheet (SDS) as prescribed under the REACH Regulations [5] or the Globally Harmonised System (GHS) [6] will provide this information. Unfortunately as pointed out by speakers at the HazMat 2015 conference held in Sydney, Australia, in June this year and organised by FPAA, the relevant section of most Safety Data Sheets (Section 12) falls woefully short of both expectations and needs in providing the necessary information for an SSAER. A previous article in this journal has questioned whether SDSs are environmentally fit for purpose [7].

Partly this is due to the let-out clauses contained in the legislation allowing entries like 'Data not available' to be used, or for minor components <1% w/w not to be listed unless they

are classified as toxic, even though these may be of environmental significance.

There is too much discretion in which test organisms can be used for acute aquatic toxicity with the result that data may be difficult to compare between products, or manufacturers may not use the most sensitive species, for example, rainbow trout *Oncorhynchus mykiss*. This is quite unlike the North Atlantic OSPAR regulations in which testing against a specified suite of organisms is mandatory [8]. There is also no standardisation how BOD data is reported in terms of days – ideally one would wish to see both a BOD5 and a BOD28 to assess both likely acute oxygen stress and biodegradation.

Environmental persistence data is rarely given and soil mobility data almost never given. In particular the environmental impact of potential degradation products which may be extremely persistent as well as possibly bio-accumulative and toxic, such as perfluorocarboxylic acids (PFCAs) from fluorotelomer breakdown, is never considered.

Many SDSs are also often misleading and contain largely irrelevant data from the point of view of doing an environmental risk assessment, listing for example data for individual components in isolation when the product is a complex mixture. Substances when mixed together, particularly if this includes detergents, frequently interact to enhance biological toxicity.

Other statements included in SDSs may be bordering on the dishonest and quite deliberately misleading such as claiming that a substance containing a perfluorinated moiety is biodegradable or even readily biodegradable and not persistent, whereas the truth is that it is only partially degradable, not totally degradable as implied and as would commonly be understood, giving rise to extremely environmentally persistent perfluorinated end-products which may also be toxic and bio-accumulative. Again it all depends on how 'readily biodegradable' is defined in the regulations! It does not mean 100% degradation or mineralisation which is conversion to inorganic end-products, ie H_2O , CO_2 , etc.

There are also examples of where SDSs provided by a supplier or formulator fail to pass on feedstock manufacturers' warnings about not discharging the material to the environment; for example, '...Do not discharge to streams, ponds, lakes or sewers. Avoid subsoil penetration...' in an SDS for a fire fighting foam fluorosurfactant! This failure to pass on

Landscape pollution from an industrial plant in Karabash, Russia. Picture: tankist276, Shutterstock.



such a warning is clearly in breach of the REACH Regulations under Articles 32-36 which require information to be passed up and down the supply chain.

Some SDSs even contain a disclaimer apparently absolving the manufacturer or supplier of all responsibility such as 'neither seller nor manufacturer shall be liable either in tort or in contract for any loss or damage...' [9]. Such disclaimers may have questionable validity or be illegal under many jurisdictions.

Where does all of this leave you, the end user, and what reliance should be placed in the SDS as usually provided?

You are responsible for how the product is used and whether the application results in an unacceptable environmental impact. In conducting a suitable and sufficient assessment of environmental risk (SSAER) you must show due diligence during the procurement process. This means essentially that if vital data in the SDS is missing, ie, 'data not available', it is up to you as the end user to request the missing information from the supplier in writing. Verbal information especially from sales or marketing personnel is not adequate. If the information in writing is not forthcoming you have to decide either not to purchase the product and go to another supplier or to accept the risk.

If in any doubt it is better to invoke the Precautionary Principle and err on the side of safety. The principle can be summarised as follows: a lack of evidence of harm cannot be considered as evidence for a lack of harm. This principle is widely used by environmental regulators at state, national and international levels [10].

What defence might you have if pollution is inadvertently caused after considering all the available information on the SDS and after showing due diligence in the procurement process?

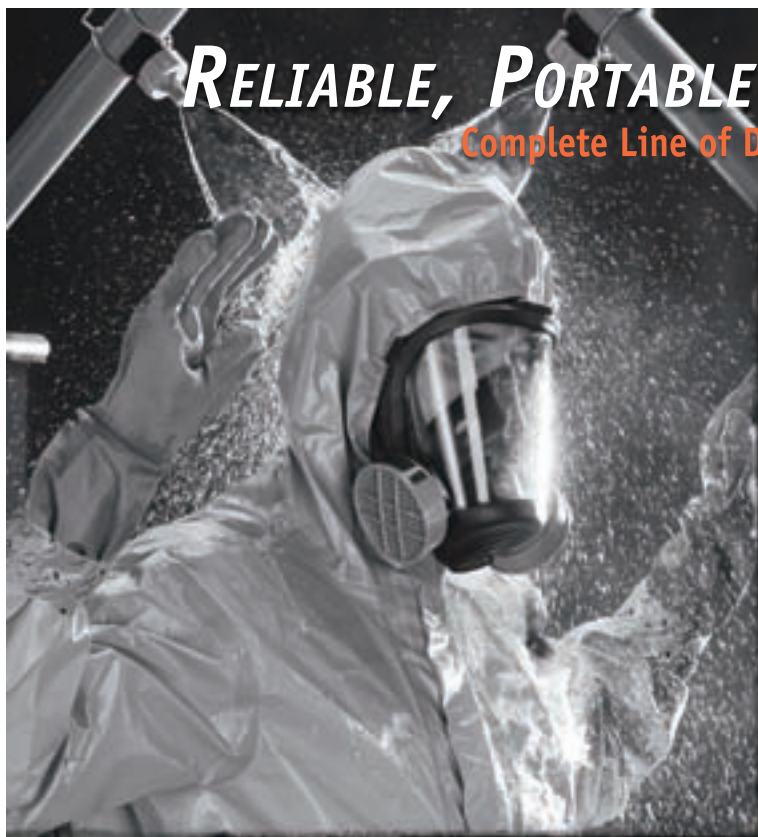
You would probably have a defence in law if any of the information on the Safety Data Sheet was actually incorrect or grossly misleading. In particular manufacturers and suppliers should be very careful about using imprecise marketing phrases such as 'environmentally benign' or 'environmentally friendly', or even worse 'no environmental impact', as there is no fire fighting foam on the market without significant environmental impact when released dispersively. Use of such phrases in SDSs or promotional literature might leave suppliers open to legal action and having to assume some financial/legal responsibility for the pollution caused for having mislead end-users. Failure to pass on feedstock manufacturers warnings would also be liable to challenge in court.

What is it going to cost you, if you do cause pollution?

The simple answer is a very great deal.

There are many costs that have to be considered which far exceed the cost of the original fire fighting foam. These include financial, analytical, remediation and legal costs as well as possible prosecution, potential loss of operating license and reputational damage to the organisation's brand image. Many real life pollution scenarios exist of where prevention would have been far cheaper than cure, including for example: the Gulf of Mexico oil rig disaster; former fire service training grounds at Jersey Airport, the Channel Islands; Oakey Australian Army helicopter base in North Queensland; CFA

RELIABLE, PORTABLE DECONTAMINATION Complete Line of Decon Showers, Pools, and Accessories



DQE offers a complete selection of decon equipment and supplies that will fit any budget. The unique design of our decon systems ensures that you will always receive decontamination that is highly portable and effective.

For over 20 years, DQE has been providing our line of practical decontamination products throughout the world. Our products are built to last, so they will be ready during HazMat training and response events.



DQE

Visit www.Dqeready.com/Decon to view our full decon product selection

www.dqeready.com | 800-355-4628

FIRE DETECTORS

RK90 - RK100 - RK200

Optical Beam Smoke Detectors
EN54-12 CPD and VDS certified



FL50

IR - UV Flame Detectors
Ex-d execution - ATEX certified



FL50

IR - UV Tester

EDS also manufactures
Gas and Spark Detectors



EDS srl

V. Ca Nova Zamperli 6
37057 - S. G. Lupatoto - Verona - ITALY
tel. +39 045 547529
fax. +39 045 8750065
email: eds@eds.eu web: www.eds.eu
ISO9001:2008 certified by TUV-NORD

Fiskville Training College in Victoria, Australia; Gardemoen Airport, Norway; Tyndall Air Force Base and others in the US; or situations where accidental discharge of deluge systems has occurred such as Toronto Pearson Airport, Canada or the refinery site at Trinity Inlet Cairns, Queensland, Australia.

What should you do to prevent exposure to the very high costs of polluting the environment?

Above all else show due diligence in the procurement process. This includes applying the Precautionary Principle [10] when dealing with unknowns. Be aware of the 'known unknowns' (Donald Rumsfeld [11]). Under the precautionary principle, much used by environmental regulatory authorities, lack of evidence of harm is not considered to be evidence of lack of harm.

Make sure you have all the information required to carry out a suitable and sufficient assessment of environmental risk (SSAER), do a comprehensive cost-benefit analysis, and estimate how much long-term financial, legal and reputational risk you are prepared to carry. Then there remain those unforeseen circumstances which are difficult to plan for – Donald Rumsfeld's 'unknown unknowns'!

[1] Australia's National Strategy for Ecologically Sustainable Development (1992) defines ecologically sustainable development as: 'using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'.

[2] Rio Declaration on Environment and Development. The United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992. Principle 16: National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

[3] (i) Extended Producer Responsibility. A Guidance Manual for Governments. Organisation for Economic and Cooperative Development (OECD) 20 March 2001, ISBN : 9789264189867 (PDF) ; 9789264186002 (print); DOI :10.1787/9789264189867-en; (ii) Analytical Framework for Evaluating the Costs and Benefits of Extended Producer Responsibility Programmes. Organisation for Economic and Cooperative Development (OECD), 3 March 2005, ENV/EPOC/WGMPR(2005)5/FINAL.

[4] United States Environmental Protection Agency Superfund Today "Focus On Cleanup Costs – The Buck Stops Here" June 1996. EPA 540-K-96/004.

[5] Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulations, EC1907/2006, 18 Dec 2006.

[6] Globally Harmonised System of Classification and Labelling of Chemicals (GHS) 5th revised edition; United Nations, New York and Geneva, 2013.

[7] Klein, R.A. (2015) "Safety Data Sheets – Are They Environmentally Fit-for-Purpose?" Industrial Fire Journal Spring 2015 pp. 12-16.

[8] OSPAR Guidelines for Completing the Harmonised Offshore Chemical Notification Format (HOCNF). OSPAR Commission 2010-05, Oslo and Paris.

[9] Holmes, N.J.C. (2015) Presentation given at FPA HazMat 2015 Conference, Eveleigh, Sydney, 16-17 June.

[10] The Precautionary Principle. In the absence of scientific consensus the burden of proof that harm will not be caused falls on the end-user. See for example "Precautionary Principle: Origins, definitions, and interpretations." Treasury Publication, Government of New Zealand, 2006.

<http://www.treasury.govt.nz/publications/research-policy/ppp/2006/06-06/05.htm>

[11] Rumsfeld, D. (12 February 2002) "Defense.gov News Transcript: DoD News Briefing – Secretary Rumsfeld and Gen. Myers, United States Department of Defense (defense.gov)". Rumsfeld said "...Reports that say that something hasn't happened are always interesting to me, because as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – the ones we don't know we don't know..."



EPA'S SNAP CHANGE OF STATUS

Hydrofluorocarbon fire extinguishants such as FM-200 and FE-25 are not impacted by the US EPA's SNAP change of status rule, writes Alfred Thornton, Global Market Manager, Chemours Fire Extinguishants.

On July 20 the US Environmental Protection Agency published its Final Rule Change of Listing Status for Certain Substitutes under the Significant New Alternatives Policy (SNAP) Program. In this rule, the approval status of several hydrofluorocarbons (HFCs) in specified applications was changed to 'unacceptable' or their use was narrowed. HFCs used in fire protection applications – such as FM-200, FE-25, FE-36 and FE-13 – were not affected by this rule. HFCs remain approved, safe, effective fire suppression solutions.

Why did the US EPA make changes to the approval status of HFCs in certain applications?

The Final Rule indicates that the EPA made these changes "based on information showing that other substitutes are available for the same uses that pose lower risk overall to human health and the environment." The Final Rule changed the status of HFC-227ea and HFC-125 to 'unacceptable' in select applications, while leaving both as acceptable products for fire suppression.

What's the difference between global warming potential and environmental impact? The GWP value of a greenhouse gas is a measure of how much a given mass of the gas contributes to global warming relative to the same mass of CO₂. The GWP of CO₂ is set to 1.0 by convention. The impact to global warming of a gases release is a function of both the GWP and the mass of gas released or: Impact = GWP x Mass emitted. The GWP value alone is not an indication of the impact a greenhouse gas will have on global warming.

Greenhouse gases, such as CO₂, HFCs, and methane, all have an impact on global warming. HFCs, across all applications, represent 2% of the total impact from all greenhouse gases. HFCs in fire protection account for less than 0.02% of the total greenhouse gas impact.

Let's put that another way. If 5,000 coins represented the impact of all greenhouse gases on global warming, HFCs in fire protection would represent only one of those coins. Eliminating all HFCs in fire protection – one coin – would have a minimal influence on global warming. Use and application of the gas plays an important role in the regulatory conversation. The EPA's Final Rule has no effect on the use and application of the HFC-based clean agent fire extinguishants; they remain approved and effective fire protection solutions for mission critical and valuable assets.





Stock protectors

When it comes to protecting warehouses from fire, the choice of detection systems can seem daunting. Charles Smith, Head of Product Management at Apollo Fire Detectors outlines the challenges and explains the possible solutions.

The repercussions of a fire in a warehouse environment can be severe – notwithstanding the obvious risk to human life, the sheer volume of potential property loss can be huge. Here in the UK, perhaps the most famous warehouse fire was the 2004 fire at the East London warehouse of art storage firm Momart, where millions of pounds of artworks from clients including the National Gallery, Tate Modern, Tate Britain and Buckingham Palace were destroyed. These included over 100 artworks from Charles Saatchi's famous collection, including Tracey Emin's tent and works by Damien Hirst, Sarah Lucas and Gary Hume.

More recently, fashion retailer, ASOS' warehouse fire in Barnsley in June last year saw the company suffer up to US\$45 million in lost sales. The online store was forced to suspend orders after a fire at its five-storey, 49,238m² warehouse damaged 20% of its stock.

The challenges presented by warehouses are often a result of their size and layout. The fact that warehouses are large buildings means they contain large volumes of air making smoke easily diluted and difficult to detect. This problem is exacerbated by the fact that warehouses often have a number of doors, which are usually open to allow for the loading and unloading of goods, giving further potential for smoke dilution. Tall ceiling heights can also lead to smoke stratifying into layers, only reaching smoke detectors when the fire has enough thermal energy. Storage areas, such as rack shelving, can trap smoke, meaning that a smouldering fire can go undetected until it is large enough for smoke to make it to a ceiling detector.

Another challenge can be seen in the fact that warehouses usually operate 24/7, with large numbers of staff. A diverse range of goods are often stored, from electrical appliances to clothing, and a variety of operating temperatures, can be in place. In terms of fire risks, even if a warehouse isn't storing flammable items, there are often plenty of flammable hazards. Warehouse equipment, such as forklift trucks and wrapping machinery, when coupled with common packing materials, such as cardboard boxes and plastic wrapping, can result in significant fire risks.

There are three main fire detection solutions which we would recommend for warehouse environments; aspirating smoke detectors; beam detectors; and flame detectors.

Aspirating smoke detectors (ASDs) are ideal for overcoming many of the logistical problems presented by warehouse environments as they use a network of pipes to continuously draw samples of air from the protected area back to a detector.

Apollo's EN54-20 approved detector high-powered LED technology which is highly sensitive to identifying any smoke particles in the air, giving early warning of any potential fire hazards. The ASD is designed to operate in a wide range of environments and is often used in secure facilities where anti-ligature and anti-vandal are requirements; in lift shafts where access is difficult; in wet or dusty environments or in clean environments where access is restricted.

Beam detectors offer a cost effective solution for protecting large open spaces. One single unit installed on a wall can detect smoke over an area up to 1,500m² (to BS5839-1:2013) which is beyond that of traditional point detectors. Beams are therefore ideal for protecting areas such as warehouses, theatres and sports centres. There are two types of beam detector, reflective (which includes self-aligning detectors) where a combined transmitter/receiver projects a beam to a prism mounted on an opposite wall and end-to-end, consisting of a separate transmitter, receiver and interface.

Flame detectors are effective in protecting areas where flaming fires may be expected. There is a choice of detection techniques - ultraviolet (UV), infra-red (IR) or a combination of both:

- IR2: high immunity to false sources (indoor areas)
- R3: excellent immunity to false sources (indoor or outdoor areas)
- UV/IR2: highest immunity to false sources (indoor or outdoor areas).

UV flame detectors are generally used in engine rooms, factories and warehouse applications. IR flame detectors are able to tolerate dirtier environments which may block UV radiation and are generally used in applications such as waste handling, colour printing and paper manufacturing.

Conclusion

The consequences of inadequate fire detection systems within warehouse and storage premises can be tremendously damaging to a company's operations. Not only does the potential for vast loss and damage to stock exist, but the repercussions of this in terms of reputation and subsequent negative impact on a company's value can be severe. Whilst there's no doubt that warehouse fire protection can be complex, by careful consideration of the best detection system for the specific application a business can, above all, protect life, but also safeguard its goods and its company status.



Tested on the front line

The protection of some high-hazard industrial processes can be greatly enhanced with technology that has been tried and tested in the military sector, writes Ian Buchanan, European Sales Manager, Spectrex.



Automatic fire extinguishing systems have saved many lives since they were first installed in Field Artillery Ammunition Supply Vehicles in the 1980s.

Every fraction of a second can count during fast-growing fires or fuel explosions in high-hazard areas and the use of high-speed detectors can prevent or minimise any damage to personnel and assets. Such capabilities and technologies are readily available having already been proven in military applications where they are known as automatic fire extinguishing systems (AFES).

AFES systems protect against combat-initiated fuel explosions by detecting penetration and initiation in less than 3 milliseconds and slow-growth fires within 200 milliseconds, extinguishing within 3 seconds. Explosion suppression systems are individually designed, tested and qualified to address the different required performance and configurations for the specific application within a type of military vehicles, from combat and ammunition support to tactical vehicles and even battle tanks.

Although systems are different, they have common components. Modular components that are designed to fit into any type of armoured vehicle incorporate explosion/fire detection and fast suppression technologies. Some are designed for the crew or troop areas and others for the engine compartments. The explosion/fire scenarios of these areas are different and as a result so are the detection means. In the crew compartment for instance the system protects personnel by reducing the pressure build-up that results from fuel explosions, limiting skin damage and minimising the formation of toxic gaseous by-products. In the engine compartment the system can not only detect overheating and fire but also successfully extinguish fuel fires.

Each system features at least one type of detector, controller and suppression agent.

Common detector types are IR3 or UV/IR, depending on the detection type, speed and accuracy required, with the controller and extinguisher type selected to suit the application and its location. The modern AFES system is free of false alarms, with a response of less than 5 milliseconds and the capability to efficiently detect all types of fuel fires.

The extinguishing sub-systems are either pressurised cylinders containing gaseous, liquid or powder extinguishing agent or non-pressurised gas generators (or hybrids) containing the suppressing agent and a minute propellant activator that propels the extinguishing agent. In either case the dispersion pattern of the extinguishing agent is of critical importance to the successful suppression of the fireball and prevention of the flame deflagration to detonation process.

Fire is one of the most dangerous threats to the Field Artillery Ammunition Supply Vehicle (FAASV), which is packed with munitions and propellants, hydraulic system and lubricants that if ignited will result in a fire that could ignite the propellant to form a violent fire that cannot be extinguished by a traditional

AFES. Propellant fire may develop to detonation and cause the vehicle's destruction. To rapidly detect and suppress any type of fuel fire the FAASV was selected as one of the first vehicles for AFES installation in the 1980s.

The AFES system was subsequently introduced to Mine-Resistant Ambush Protected Vehicles, and further improved with detection by either high speed optical flame detectors for crew compartments or spot and linear rate-of-rise heat detectors for the engine compartments.

Industrial applications

The similarity in hazards of several industrial applications has resulted in such detection and suppression systems being considered for protection. In NFPA 69 Standard on Explosion Prevention Systems, the section addressing Deflagration Control by Suppression describes enclosures that can be protected by a deflagration suppression system, including reactor vessels, mixers, blenders, pulverisers, mills, dryers, ovens, filters, screens and dust collectors, storage equipment including pressure tanks and mobile facilities, pneumatic conveyors and bucket elevators and many other enclosures. Applications

include:

- Ammunition manufacturing facilities: the process involves a conveyor and a machine that cuts long propellant rods to small pieces. Although the process takes place under wet conditions, hazards exist related to static electricity along the conveyor or sparks from the cutting machine.
- Propellant mixer: mobile raw material containers moving on rails transport the ingredients to mixers where the chemicals undergo polymerization. Static electricity or abnormal chemical reaction may cause a deflagration to detonation event.
- Reactor vessels: ethanol is produced from corn in two different processes: wet milling or dry milling. Fermentation and distillation tanks pose a major explosion and fire hazard that can be mitigated with fast fire protection means.
- Mechanical pre-processing enclosures: the first step in the production of ethanol from cellulosic biomass is a mechanical process where dirt and debris are removed from incoming biomass. The dust explosion hazard in these mechanical pre-processing enclosures can be mitigated by fast methods of protection.

Conclusion

Installed in over 20,000 vehicles worldwide, Spectrex's automatic fire detection systems have demonstrated their effectiveness and ability to save lives again and again. Adopted and perfected in the field, they are well capable of addressing a variety of hazards and applications involving fuel or gas.



Dynamic safety

John Robb, Commercial Buildings Segment Director at Eaton, outlines the complicated requirements involved in planning for safe evacuations and explains how the latest technology can help equip buildings accordingly.

For many decades, the primary safety risk was fire but the scope is expanding and more modern threats such as industrial disasters, extreme weather, terrorism and social activism should also be borne in mind as evacuation triggers.

However, the solution is not always straightforward in an increasingly urbanised world where so-called super-cities are arising all around us. We're seeing a growth in the density of occupancy in buildings and against this modern backdrop, escape routes are becoming more complicated.

Evacuation within the accepted limit is reliant upon swift and accurate detection of danger, fast and reliable notification of occupants and the orderly use of predetermined exit routes. Technology has a vital role in this.

Conventional and addressable fire systems, combining detection and notification, are a proven technology but the important point is that these are not 'fit and forget' solutions. A regular programme of maintenance and testing is vital to ensure systems are ready for activation.

Traditionally a manually-intensive and costly task, these maintenance regimes are increasingly supported by technology that monitors the health of systems automatically. This applies not only to fire systems but also to emergency lighting. In industrial environments where staff and visitors may be in close proximity to hazardous machinery or substances, the risks relating to a power blackout are significantly amplified, making the installation and maintenance of emergency luminaires an important priority.

In locations that adhere to the requirement of a regular function test on all emergency luminaires, testing is typically carried out manually, which has major implications in terms of staffing, scheduling and costs. All activity must also be logged for compliance purposes and the scope for human error is not insignificant. For all these reasons, there's an increasing move towards adopting automatic testing technology. Frankfurt Airport for example houses some 55,000 individual emergency luminaires and 550 central battery back-up devices. It turned to Eaton to provide the complete emergency lighting solution including an automatic monitoring system that would carry out routine tests, identify faults in real time and log all data. However, it's not only important to ensure emergency lights are working properly but also that they emit a sufficient level of illumination.

Leading lights

Regulators in advanced economies are increasingly prescriptive about light levels in critical areas and along exit routes. Exit routes should be made apparent by illuminated signage and emergency lighting which are designed to help occupants find their way out in the event of power being cut.

Building owners and facilities managers should take into account the regulatory guidance that governs the output of emergency lighting in terms of lux units. For example, BS 5266-1:2011 points out high-risk areas where increased illumination of 15 lux encourages safer movement of people in a power failure. The Industry Committee for Emergency Lighting (ICEL) provides a list of areas that can be considered high-risk, including particular task areas in industrial and medical facilities.

The technical challenge for manufacturers has been to find ways to achieve the necessary output without compromising energy efficiency – a challenge that Eaton has worked hard to overcome with advances in LED technology. In order to keep costs down, it has been possible to reduce the power consumption of emergency luminaires and simultaneously improve their performance so that fewer units are needed in a given space.

Exit signs are also benefitting from LED technology. The advantages include reduced battery sizes with the inherent cost and environmental benefits, and improvements in light distribution.

Research into the behaviour of evacuees in an emergency underlines the importance of exit signs being highly visible, correctly positioned and properly maintained. An emerging area of research is dynamic sign technology that is more responsive to a given hazard and provides evacuation guidance.

Rather than static exit signs that, in some cases, may lead building occupants towards a dangerous area rather than away from it, a dynamic system modifies its response in relation to the particular conditions that have been detected. Such systems are now being integrated with emergency lighting and even security doors to ensure occupants follow the most appropriate evacuation route.

Innovation is supporting safer and faster evacuation responses not only for able-bodied people but also for people with disabilities.



John Robb,
Commercial
Buildings Segment
Director, Eaton.



Visual alarm devices complement an audible alarm. They are ideal solutions for areas of high noise or with occupants with hearing impairments.



The detector that sees everything

- Detects flames from any fuel source
- Works through glass
- Immune to films of oil, dust, water and ice
- Superior resistance to false alarms
- Suitable for hazardous applications



T +44 (0) 1462 444 740
 E sales@ffeuk.com
 W www.ffeuk.com

One consideration that may be neglected is how any building occupants in areas of high noise or with hearing impairments are notified of a need to evacuate.

This is a concern that is driving increased usage of visual alarm devices (VADs); high performing flashing LED beacons that complement an audible alarm where further re-enforcement is required. There is a set of European standards, listed under EN54-23, governing the necessary light output from a VAD, as well as the recommended spacing between devices and the precise site of installation.

The varied nature of disabilities means a wide range of contingencies must be considered in addition to VADs. Exit routes, for example, are a vital area of concern. Those who are wheelchair-bound will clearly want to avoid stairways but many buildings have a programme in place that deactivates lifts in the event of an alarm being sounded, which can create problems. Appointing members of staff to assist in this scenario is one step that could be taken. However, pre-emptive training on disability escape etiquette is recommended by the UK Government's guide on Means of Escape for Disabled People.

In buildings with many floors it might be necessary to create designated refuge areas with two-way communication systems, whereby trapped occupants on an upper floor can communicate with responders on the ground floor.

Getting the message

For all occupants who need to be evacuated from a large building with many exits, the use of combined public address and voice alarm (PAVA) systems is rising. These allow for the broadcasting of customised pre-recorded messages or live announcements via the speakers within a building. The emergence of PAVA systems is supported by research that shows people respond more quickly and correctly to a voice alarm compared with conventional tonal alarms.

These voice alarms can be integrated with everyday public address systems that play music, for instance. This is a useful demonstration of the way in which safety systems are becoming increasingly integrated to provide building owners and managers with a more unified solution.

Professionals on larger sites are increasingly adopting mass-notification systems. Large manufacturing facilities and university campuses, for example, require managers to consider multiple buildings and outdoor spaces. Here, the flexibility offered by real-time voice alerts is of paramount importance and it is possible for alerts to be distributed directly to the mobile devices of people in the vicinity.

Eaton was appointed to provide an integrated emergency communications solution for MillerCoors' 150-acre brewery in Fort Worth, Texas, which has more than 700 employees. The facility needed to be prepared for a wide range of potential emergencies and the solution includes high-power speaker arrays in outdoor areas and high-fidelity speakers for indoor areas, all of which are designed to broadcast messages that can be understood in MillerCoors' loud industrial environment.

Lone worker protection can also contribute to the infrastructure that supports safer evacuations. Hazardous chemicals handled by scientists could have potentially serious consequences for those individuals in the event of an accident. Eaton's 706r lone worker transmitters, with integral tilt switch, can communicate to a Scantronic i-on160EX alarm panel to identify the accident and locate the worker.

Conclusion

The scale, usage, intensity and complexity of industrial buildings continues to evolve along with the diversity of risks they may face. However, in an emergency, the imperative to evacuate occupants as quickly and safely as possible remains the same. To meet this challenge, technology and equipment are being developed and it is incumbent upon safety officials to work with trusted partners to identify the most suitable and effective solutions for a given facility.

Covering the cloud with mist

Three new water mist test protocols offer up a number of benefits for data centres, explains Jonathan Carpenter, Advanced Engineer for FM Approvals' fire protection group.

FM Approvals, which offers worldwide certification and testing services of industrial and commercial loss prevention products, will soon revise its Standard 5560 – Approval Standard for Water Mist Systems – to incorporate three new test protocols for water mist (WM) fire protection systems. One of these new test protocols will provide a methodology for using scaled-down fire testing of WM systems to simulate full-scale volumes. This new approach is intended to help reduce the time and costs required to develop and test new types of WM fire protection systems.

The revision to Approval Standard 5560 will also incorporate two new test protocols for WM systems intended for the protection of above and below raised floors in data centre server rooms. The new test protocols, based on research conducted in conjunction with industry partners at the FM Global Research Campus in West Glocester, Rhode Island, USA, is intended to address real-world conditions found in modern data centres, including the challenge of delivering fire suppression in the face of active ventilation.

Currently, the scope section of Approval Standard 5560 notes that "FM Approvals has determined that water mist systems shall be FM Approved for the protection of specific applications and specific protected area volumes. Extrapolation beyond the volumes which were tested is not permitted except where explicitly noted."

This stipulation of the standard has meant, for instance, that manufacturers of water mist fire protection systems have had to resubmit their systems for Approval testing each time they wish to use the system for a larger volume. For example, not exceeding 80m³, not exceeding 260m³, etc. The development work to optimise performance for each volume increase can be time consuming and costly. In addition, Approval testing under Standard 5560 requires full-scale fire tests for each volume increment.

Potential benefits as a result of scaled WM testing include reduction in cycle time/cost for FM approval; reduction in manufacturers' R&D time and costs; reduction in required number of reduced-scale tests in the future; and increased number of certified WM systems and applications.

In 2008 FM researchers published a paper detailing experiments showing that WM suppression and extinguishment of enclosure fires could be scaled at a three-to-one ratio,

holding promise for the use of physical modelling in the evaluation of WM fire protection systems. This work continued and a scaling methodology was developed that allowed large-scale fire tests to be reliably scaled down by a half.

Recently, final validation testing was conducted that demonstrated that an existing FM Approved WM system for the protection of a 260m³ machinery enclosure could be replicated in a one-half scale enclosure (see figure 1). Under the new test methodology, manufacturers seeking product certification will be required to provide FM Approvals with samples of full-scale and scaled WM nozzles. The spray from each will be characterized to see if they match. If so, tests will be conducted in a scaled-down enclosure, saving time and money.

The WM scaling methodology will soon be added as a new appendix to Approval Standard 5560. The new test methodology will apply only to total flooding applications, such as machinery and combustion turbines in enclosed volumes. Total flooding applications make up a majority of the FM Approved water mist systems today.

New options for data centre fire protection

While the debate continues over the virtues of raised floors versus slab floors in data centre construction, the fact remains that close to 90% of the world's existing data centres use raised floors, according to the Uptime Institute. Traditionally, raised floors have been favoured in data centres because they provided a convenient path for the air needed to cool hot servers, route bulky network and power cables, provide a grounding grid, and a pathway for plumbing where liquid cooling is required.

Fire detection and suppression in data centres is particularly challenging due to the high volume of air flow needed for cooling, high power density, sensitive electrical equipment, metal shielded fire loads, raised floors, hot/cold aisle



Figure 1: half-scale water mist fire protection test setup. Figure 2 (top): data centre server room mockup for above raised floor fire test of water mist fire protection system.



containment curtains, and other factors.

To minimise the chance of accidental water discharge, fire protection systems for data centres typically feature a double interlock pre-action sprinkler system, sometimes in combination with an alternative suppression system such as clean-agent, inert gas or water mist.

The second and third test protocols to be added to the upcoming revision of Approval Standard 5560 were developed in partnership with two leading suppliers of WM fire protection systems, Marioff Corporation and Tyco, in direct response to the need identified by facility owners. As a result of research conducted at the FM Global Research Campus, fire test protocols were developed to address two specific, yet common, data centre fire scenarios.

Data centres – above raised floor

This fire test protocol can be used to assess WM fire protection systems in open server rooms – and/or within hot and cold aisle containment areas – where there is active forced ventilation, significant amounts of cabling, and interlocked dry pipe/pre-action configurations. The protocol may also be used to test systems as wet systems only, and this stipulation will be noted within the product's listing in the Approval Guide, a web-based database containing information on FM Approved products.

The fire tests for this test protocol will be conducted using a mockup representing a small section of a data hall (see Figure 2, p47) at the FM Global Research Campus. The mockup includes a 1m-high raised floor with perforations for air flow, two rows of server cabinet mockups, and vertical and horizontal cable bundles in metal cable trays. The cables have polyethylene outer jackets and high-density polyethylene insulation on copper wires inside the jacket.

A roll of cotton soaked with gasoline is used as an ignition source at the base of the vertical cable bundle. Blowers and fans are used to simulate server room forced ventilation from the floor and through the server mockups. Protection is deemed adequate if the fire does not spread to either end of the

horizontal cable tray and the fire is extinguished within 30 minutes after first nozzle activation. In addition, a steel angle at the ceiling – simulating a support beam – must not exceed 538°C).

Data centres – below raised floor

This fire test protocol assesses WM systems for fire protection below data centre raised floors where there is active forced ventilation, single or double-tiered cable trays, and an interlocked dry pipe/pre-action configuration. The WM system may also be tested on a wet system only, and this stipulation will be noted along with the product's listing in the Approval Guide.

In this fire test protocol, a mockup of a 1m-high raised floor is used, including ventilated floor grating and one or two metal cable trays, depending on the desired test scenario. Forced ventilation is simulated and the same ignition source as is used in the above raised floor protocol. One gasoline soaked cotton roll is used for the single tray test and two for the double tray test.

Protection is deemed adequate if fire does not spread to the opposite end of the cable tray, the fire is extinguished within 30 minutes from first nozzle activation, and gas temperature does not exceed 538°C. The water mist system manufacturer may choose to select the double-tier cable tray scenario if the single tier test is successful. Single and double-tiered ratings will be noted in the Approval Guide.

Summary

The inclusion within Approval Standard 5560 of a new test protocol for the scaled-down fire testing of WM fire protection systems is intended to help reduce the time and costs in developing and certifying new types of WM fire protection systems and thereby increase the availability of these systems. The two new test protocols for testing WM systems for above and below raised floors in data centres are intended to ultimately provide an expanded range of FM Approved WM systems for data centre protection.

PROTECTION ABOVE THE REST

Tyco Fire Protection Products takes restaurant fire suppression systems to new heights with the new Ansul Piranha.

Tyco Fire Protection Products (TFPP), a global leader in total fire suppression solutions, recently introduced increased nozzle heights for its Ansul Piranha Restaurant Fire Suppression Systems. Featuring a UL 300 certified design, this new enhancement enables agent discharge nozzles to be installed at increased heights up to 84 inches (2,133mm) from the top of the hazard zone while providing the reliable protection commercial kitchens need in today's environment.

With nozzles installed out of view, restaurant owners and managers eliminate the need for visible drop piping. Along with enhancing kitchen aesthetics, increased heights reduce the potential for grease accumulation around the nozzle and simplify hood cleaning and service, minimizing downtime and cost. Nozzle redirection is a reality in today's kitchens and can be potentially hazardous to staff. It is important to reduce the potential for intentional or inadvertent nozzle redirection and obstruction.

"Customer and employee safety is always our number one goal," said Mark Neumann, Director Pre-Engineered Systems, Tyco Fire Protection Products. "With that said, we constantly look for ways to improve aesthetics without sacrificing fire protection effectiveness for restaurant owners looking to create a unique dining experience. The trend of exhibition kitchens is on the rise,



The new UL-listed nozzle design allows appliance protection nozzles to be installed up to 84 inches (2,133mm) above the cooking hazard.



making the appearance of a commercial kitchen more important than ever. By keeping nozzles out of view, restaurant management can create a better dining experience for customers.

"It's not as easy as just increasing the nozzle heights — you also have to test them," said Neumann. "We have been diligent with performance testing nozzles to help ensure spray patterns have been adjusted for maximum effectiveness at increased heights."

Piranha systems are designed to cool up to 15 times faster than conventional single-agent systems and use 60% less agent. This superior system offers flexible overlapping nozzle coverage, maintaining rapid flame knockdown and securement.

For more information about Ansul Piranha Restaurant Fire Suppression System increased nozzle heights, visit: www.ansul.com/increasedheights.



New option for data centres

A low-pressure water mist system has for the first time received FM approval for the protection of server halls and cables below raised floors in data centres. Jose Sanchez de Muniain talks about the potential repercussions with Dr Tim Nichols, Sales Director, Water Mist EMEA, Tyco Fire Protection Products.

The concept of using sprinklers to extinguish fires in data centres is not new and for a number of years FM Global's Property Loss Prevention Data Sheet 5-32 has provided guidance for the protection of these facilities, using both sprinklers and gaseous extinguishing systems.

What is new, however, is the recent development of a new fire test protocol by FM Global for the use of Water Mist (WM) systems in data processing server halls and below raised floors in server halls – a technology, whose performance in these environments has been previously widely regarded as unproven.

The scope of the project* included defining the fire load in a data hall, evaluating the forced ventilation and evaluating the water delivery time delay. After defining the fire load of the cables and packaging, FM set up a server hall test mock-up and devised a number of fire scenarios and acceptance criteria for them.

The project conclusively proved the performance of both high and low pressure WM systems for the protection of server halls, as well as proving the performance of low pressure WM for the protection of cables below raised floors.

In a packaging fire scenario that used corrugated cardboard cartons containing expanded polystyrene as the fuel, neither sprinklers nor high/low pressure WM passed the criteria of extinguishment with less than 50% damage. As a result, this class of storage protection has been excluded from the test protocol.

The new test protocol and the now proven performance of WM systems in these environments may gain the attention of large data centre owners for a number of reasons, believes Nichols: "Infrastructure protection rather than zero damage to racks and cabinets is one of the main drivers for some of the big centre providers that serve companies like Google and Microsoft. For these bigger companies gaseous systems can be expensive. And with false discharges it becomes a calculation of risk versus cost, as the premises are unprotected until cylinders are refilled."

Nichols points to an installation he is currently working on,

as a good example of how low-pressure WM infrastructure can prove its worth in data centres: "The nature of the data centre meant it had to have different types of protection. So for the data halls and offices we have water mist protection as per FM protocols, and for the generators we have foam deluge protection due to the high levels of ventilation, with sprinklers on gantries. Interestingly, because it is a low-pressure system we can use the same infrastructure for all these areas, except the battery and electrical switch rooms, which have gas. Originally, the installation was going to be sprinklered throughout, but it's now changed to predominantly low-pressure water mist." The benefit is that the installation only requires a 30kW pump, as opposed to the original 70kW pump for an all-sprinklered site. "Plus there was the question of the size of the water tank for the sprinkler system, which would also have required a 10-inch main plus a 6-inch main – our low-pressure water mist system only requires a single 4-inch main."

The strongest selling point for this client, however, was the future-proof flexibility that the WM design offered over the sprinkler design. "Our design was different to the traditional sprinkler layout, which has a maximum area of assumed

For many large data centre providers the main driver is infrastructure protection rather than zero damage to racks and cabinets – which is where water mist comes in.





operation. It makes a huge difference in terms of hydraulic calculations if you have 22 nozzles or 50 going off. With ours the calculations are based on a pre-set amount of nozzles, which means that if the data centre wants to change the arrangement of cold and hot aisles, they don't have to change the arrangement of the WM nozzle layout." And of course, adds Nichols, "as WM uses 80% less water than conventional sprinklers, there is considerably less damage after discharge."

For smaller data centres and for organisations that require zero damage to their server cabinets and cable trays it is likely that gaseous systems will remain the preferred option, explains Nichols. Gas is more cost effective for smaller installations, because WM requires a pump system, a water tank and power supply. And, as a gas can penetrate inside cabinets, it can control suppress and extinguish fires quicker than WM.

Although the new FM protocol also allows for the use of high-pressure WM systems in data halls, Nichols is unconvinced that it will prove as attractive as low-pressure WM. He estimates installation costs for a low-pressure WM

system are half of those of a high-pressure system. A high-pressure system requires as much as five times more power than a low-pressure system. "In addition, for these types of hazards low-pressure water mist systems use less water than high-pressure systems. This performance does reverse with Class B fires, however, so it all depends on the type of fire," says Nichols.

Ultimately, the best type of protection will be dictated by the risk assessment, concludes Nichols: "Any water-based system is activated by a bulb, so a fire has to happen before it goes off, which means there will be damage, there is no question of that. But when water mist does discharge it controls the fire and extinguishes it in a very localised way."

**The project was presented at the recent NFPA Annual Expo in Chicago by Advanced Engineer Jonathan Carpenter and Advanced Principal Standards Engineer John LeBlanc in the paper 'Water Mist System Fire Protection in Data Processing Equipment Rooms/Halls'.*

Setting goals for the future

On the eve of the 15th International Water Mist Conference in Amsterdam, IWMA Chairman Ragnar Wighus writes about the Association's intentions for the next generation of fire test protocols.

The International Water Mist Association's purpose of combining a scientific approach to the development of standards and regulations with the market demand for safe and efficient systems has led to a number of changes in regulations. In the early days of IWMA for example a workshop in Hamburg led to a common view on IMO regulations for water-based protection of machinery spaces on board ships. A later research project then formed the scientific basis for scaling up the results from the tested volume to double the size of machinery spaces, then implemented by the IMO Fire Protection Sub-committee in IMO 1165 in 2010, (IMO MSC.1/Circ.1385).

Land-based applications differ from marine-based ones in that there are many regulatory bodies and approval authorities, which has led to a number of different standards for similar applications. While the technical differences between them may not be huge, nevertheless water mist system manufacturers have had to comply with all these different national standards and approval bodies with the consequent cost implications.

The IWMA has actively supported standardisation work for a common European standard to the point that today's Technical Specification EN TS 14972 is being proposed as a European standard.

At last year's annual conference the IWMA presented the results of a research project summarising both the variety of test protocols for water mist sprinkler installations and the variation levels between them. As a result of this project a number of approval organisations will be attending a workshop after this year's conference where approaches for reducing the number of test protocols will be discussed, with the aim of opening up further applications for water mist systems.

Some test protocols require that water mist system performance is demonstrated in comparison with water mist sprinkler systems. While the IWMA has always welcomed the demonstration of equivalent performance of the water mist system with alternative systems, is it necessary to repeat these reference tests so many times, as is required to today? The IWMA aims to agree generic acceptance criteria that are based on the most relevant performance measurements of the water mist systems. The workshop in Amsterdam will hopefully be the starting point for a common understanding of these acceptance



criteria as well as set the path for further simplification of the test protocols.

The next generation of test protocols should be based on the basic principles based on the three Rs: repeatability, reproducibility and realism. Repeatability means that the test results should be within acceptable limits when a number of tests are repeated, based on statistical analysis. Reproducibility means that the materials, components and other equipment used in the tests should be available for testers around the world. The most important R is – from IWMA's point of view – that the tests represent a realistic challenge for the water mist system. This means that the tests feature geometrical details and important parameters that influence the effect of the system's performance. For a water mist system, these parameters encompass coverage of the water mist, the extension and ventilation of the protected volume as well as the combustibles present in the tests.

In addition to reducing unnecessary testing, the IWMA seeks new test protocols and more generic acceptance criteria, as well as a fruitful cooperation between water mist system manufacturers, approval bodies, insurance companies, authorities and research institutions.

The 15th International Water Mist Conference takes place at the Mercure Hotel, Amsterdam, 28-29 October 2015. For more information visit www.iwma.net.



Meeting Your Requirements
High Performance Flame Detection

SharpEye™

The Largest Range of Flame Detectors



40/40M

40/40I

40/40L-LB

40/40UFL

40/40L4-L4B

40/40U-UB

40/40R

High Quality & High Performance
Well Proven, Trouble Free Open Path Gas Detection

SafEye™

Open Path Gas Detectors



QUASAR 950/960
for Toxic Gases



QUASAR 900
for Flammable Gases



HEADQUARTERS NJ (USA): +1 (973) 239-8398

HOUSTON OFFICE: +1 (832) 321-5229

EUROPE: +44 141 578-0693

ASIA: +886 2 8626 2893

spectrex@spectrex.net | www.spectrex.net

SPECTREX INC.

Highest level of flexibility.



Customized right down to
the smallest detail.

Industrial vehicles core competency.

Powerful industrial vehicles combine the most modern pump technology, highly precise foam proportioning systems, and proven body technology in a perfectly coordinated system. The efficient firefighting equipment is developed, manufactured, and optimally integrated into the vehicle body by Rosenbauer. Diverse equipment options are customized to meet your individual needs.

Industrial vehicles from Rosenbauer – a reliable partner for challenging operating conditions.

www.rosenbauer.com

 **rosenbauer**