INDUSTRIAL FIRE JOURNAL

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

Autumn 2014 issue no. 97

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LESSONS LEARNED IN FUKUSHIMA

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IWMA International Water Mist Association

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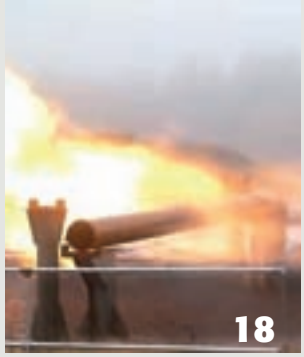

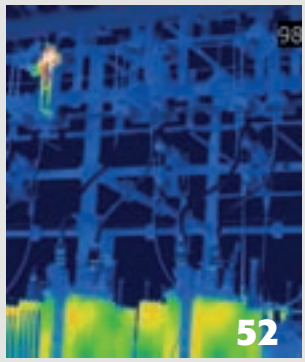

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Darren Small: www.smallphoto.co.uk

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Editor's comment

It is three years and six months since the Fukushima nuclear disaster and the effects are still being felt. It is estimated that in Japan there are over 120,000 people still living in a 'nuclear limbo' of temporary accommodation, with many away from their family members. Nevertheless, this month Japan has approved the restarting of two nuclear reactors at Kyushu Electric Power's Sendai plant, following a mothballing period for Japanese nuclear power. Understandably, many people in Japan have safety concerns around nuclear power plants and, as it turns out, they are not alone, as Robert Lewin, Fire Chief, CAL FIRE/San Luis Obispo County, made clear during his presentation at the annual NFPA 2015 Expo. Seeing Tokyo's firefighters pouring water on nuclear reactors had a profound impact on Chief Lewin, who started wondering how US firefighters would cope in a similar situation. Not very well, he realised, conisdering the lack of training and regulation that is in place (and note that not all nuclear power facilities actually even have in-house emergency response teams). As a result, Chief Lewin is today urging everyone to learn the lessons from Fukushima – and when he says everyone, he means everyone. Industry, local, state, and federal fire fighting services, all need to start working together (and train together) to protect themselves as well as this precious – and yet potentially devastating – resource.

Jose Maria Sanchez de Muniain, Editor.

EURALARM WHITE PAPER

The association of European manufacturers of the electronic fire safety and security industry (Euralarm) has published a white paper calling for an international standard to be developed that would enable fire detection and alarm systems to be used for transmitting public alert messages and calls.

The white paper was initiated due to the increasing challenges governments across Europe are facing when it comes to mastering crisis situations caused by natural catastrophes, man-made disasters or criminal and terrorist attacks. According to the Paper, the question on how to alert the population in affected areas quickly, reliably and effectively has gained importance and new methods of alarming the population are necessary.

The European Union and several member states have started testing new methods above the most common methods used such as cell broadcast messages to mobile phones. The problem with cell broadcast is that, according to a study by the UK government, only 30-40% of people actually read the messages directly.

Euralarm is proposing the following actions:

- Integrate as many channels as possible.
- Integrate existing systems, including domestic systems connected to monitoring stations.
- Use standardisation to make cross-border systems compatible.

To download a copy of the White Paper, visit: https://www.euralarm.org/media/press/publications/White_paper-PEARS.pdf

GUEST COMMENT: CSB'S MOST WANTED SAFETY IMPROVEMENT

CSB Chairperson Rafael Moure-Eraso urges OSHA to issue a comprehensive combustible dust standard for general industry following an explosion in China on August 1.

'Friday's reported metal dust explosion in Jiangsu, China, is another reminder of the tragic and deadly consequences of combustible dust accidents, a hazard with which the US Chemical Safety Board is all too familiar. Just last month the CSB (US Chemical Safety Board) released its final report and safety video on the 2010 metal dust explosion View of metal dust fire and explosions at Hayes Lemmerz facility in 2003 and fire at the AL Solutions metal recycling facility in New Cumberland, West Virginia. This incident killed three workers and injured a fourth.

'The AL Solutions incident is one of nine serious combustible dust incidents investigated by the CSB since 2003, including the Imperial Sugar disaster near Savannah, Georgia, in 2008 as well as three combustible dust incidents over a six month period in 2011 at the Hoeganaes facility located in Gallatin, TN. These nine explosions and fires caused a total of 36 deaths and 128 injuries. These tragedies include a 2003 incident at the Hayes Lemmerz manufacturing plant in Huntington, Indiana, which cast and machined aluminum automotive wheels. The series of explosions was fueled by accumulated aluminum dust, a flammable byproduct of the wheel production process. An explosion inside the plant's dust collection system propagated back into the facility, where it ignited dust that had settled on horizontal surfaces. Plant mechanic Shawn Boone, 33, was killed in the explosion, and two others were injured.

'I would like to take this opportunity to emphasize the CSB's longstanding recommendation resulting from its 2006 Combustible Dust Hazard Study to the Occupational Safety and Health Administration to address this deadly hazard in the United States. Preventable combustible dust explosions continue to occur, causing worker deaths and injuries. From 2008 until 2013, the CSB documented 50 combustible dust incidents resulting in 29 fatalities and 161 injuries. In 2013 the Board designated the issuance of a general industry dust standard as the CSB's first "Most Wanted Safety Improvement." The CSB believes it is imperative for OSHA to issue a comprehensive combustible dust standard for general industry with clear requirements for preventing dust fires and explosions.'

A NEW DATA-DRIVEN TOOL FROM FM GLOBAL RANKS 130 COUNTRIES IN TERMS OF THEIR OVERALL RESILIENCE TO SUPPLY CHAIN LOSSES

The 2014 FM Global Resilience Index (fmglobal.com/index) aims to help executives prioritise where to focus risk management and investment efforts. The overall score is defined by three different drivers: Economic Factor; Risk Quality Factor; and Supply Chain Factor.

Within the Risk Quality Factor, one of the key components is Quality of Fire Risk Management, and it is possible to rank all 130 countries by this driver. The result for Fire Risk Management, for example, is:

1. Costa Rica - 2. Israel - 3. US - 4. Malaysia - 5. Canada.

FM Global commissioned research analytics firm oxford Metrica to develop the Resilience Index, with data sourced from a wide range of sources ranging from the International Monetary Fund, US Energy Information Administration, World Bank, and World Economic Forum, as well as FM Global's own benchmarking algorithm, which calculates risk quality at over 100,000 commercial properties insured by the company.

Monnex Powder production plant

Following a major investment in the Monnex Powder production plant, newly independent fire company Angus Fire International formally opened its enhanced facility on April 17, 2014.

Peter Holland CBE, Government Chief Fire and Rescue Adviser, agreed to undertake the opening ceremony. In addition, Barry Dodd CBE, Chairman of York and North Yorkshire with East Riding LEP was present to support this regional initiative.

Monnex, originally developed by ICI Chemicals, is a BC powder available on the global market, suitable for extinguishing flammable liquid fires, with 75% of production being exported outside of the UK.

The Monnex project forms part of the ongoing investment programme at the Angus Fire facility in High Bentham, North Yorkshire following the change in status of Angus Fire to an independent UK firefighting company in 2013.

Following a presentation on the recent changes at Angus Fire, CEO Paul Williams accompanied the visitors on a tour of the factory, before the formal opening of the Monnex Plant by Peter Holland.

Fire Service College 40th anniversary

HRH The Princess Royal, Patron of the Firefighters Memorial Trust, marked the 40th anniversary of the Fire Service College by officially opening its new accommodation at a ceremony in Moreton-in-Marsh. The new block, named Braidwood House, is in honour of James Braidwood, the founder of the world's first municipal fire service in1824. Over 400,000 students have graduated from the Fire Service College since its doors opened 1974. In the past year, the College has invested around £12m ($18m) to enhance facilities and deliver e-learning courses allowing anytime, anywhere training for firefighters. It has also recently launched its brand new immersive training simulator, designed by G2G3, which delivers a realistic, immersive experience which most 'gamers' would recognise.

FOAM SYSTEM UPGRADE FROM SOLBERG

Foam manufacturer Solberg has introduced a foam system upgrade programme to replace fluorine-based foam concentrates in foam/water sprinkler systems with a high-performance environmentally sustainable firefighting foam concentrate for Class B fuel fires, while maintaining the critical product certification on the existing system.

The foam/water sprinkler system upgrade programme utilises Re-Healing foam, the world's first UL Listed and FM Approved fluorine-free foam concentrate, which contains no fluorine or other organohalogens, whether surfactant or polymer based.

Customers that currently have foam/water sprinkler systems that contain fluorine-based foam concentrates, that would like to replace this old technology with the latest advancements in firefighting foam agents, can now do so under this program without losing the product certification (UL listing or FM approval) on the existing installation.

YOKOGAWA & GASSECURE SIGN AGREEMENT

Yokogawa Electric Corporation has signed an agreement with GasSecure AS on the distribution of GasSecure's ISA100 Wireless-based gas detectors through Yokogawa's global sales network. Yokogawa has a wide variety of ISA100 Wireless compliant technologies and devices such as wireless adapters that allow conventional wired devices to access wireless networks. GasSecure specializes in the development, manufacture, and sale of low power, high reliability wireless gas detectors that are used to monitor for hydrocarbon leaks at offshore platforms, tank farms, and industrial plants. GasSecure's clients include major oil companies.

GLOBAL DEAL FOR ANALOX

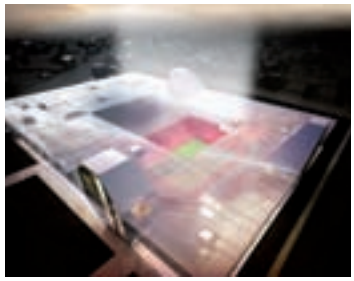
Gas sensors and alarms manufacturer Analox is celebrating after signing a global deal with the biggest gas supplier in the world, The Linde Group. The deal will see three of Analox's products being used by The Linde Group. The first is the O2NE+, an oxygen depletion monitor ideal for use where there is threat of a potential leak or build-up of an inert gas. The O2NE+ provides two audio visual alarms to warn personnel of a potentially dangerous depletion of oxygen in the workplace. The O2NE+ will be used within labs alongside the Safe-Ox+, an oxygen enrichment and depletion monitor ideal for use where there is either a threat of a potential leak or build-up of enriched oxygen. The third product is Analox's Ax 50 Carbon Dioxide alarm for use in the beverage industry, a tool that has proved invaluable for those monitoring small/medium sized leaks.

DOHA EXPANSION FOR EXOVA WARRINGTONFIRE

Exova Warringtonfire, the specialist fire engineering, testing and certification provider, has announced its latest expansion in Doha, the capital city of Qatar.

The move further establishes the company as one of the region's leading providers of fire safety expertise. With established operations in Dubai and Abu Dhabi, Exova Warringtonfire has opened its new Qatar fire consultancy business, creating an initial five new skilled roles. The Qatar consultancy, the first independent global fire engineering specialist to establish in the city, will offer fire safety engineering and inspection.

Stuart Kerr, Exova Warringtonfire's General Manager in the Middle East, said: 'Motivated by customer demand, this expansion will allow us to service a growing number of customers in Qatar that require technically demanding fire engineering services, and to support the Qatar Civil Defence Department.'

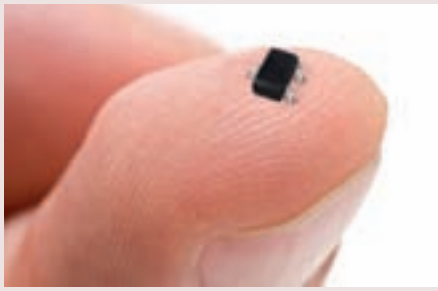


With extensive infrastructure investment in the country, including developments for the football World Cup in 2022, Exova Warringtonfire is already working on buildings, stadia and metro systems to implement and engineer fire safety strategies.

Folding spineboard

Louisville-based (KY) Junkin Safety Appliance Company has launched a new rugged bright yellow polyethylene folding spineboard. Featuring 12 large hand holes for easy handling, the JSA-366 includes other patient-friendly handling features such as built-in runners, a low profile, and four patient straps. The spineboard is also X-ray transluscent and has a load capacity of 375 lbs.

Nanopower technology



Honeywell has introduced a new device that allows manufacturers of fire and security detection technologies to design smaller, less obtrusive wireless-based products without sacrificing reliability or performance. According to Honeywell, the new Anisotropic Magnetoresistive (AMR) Sensor ICs, Nanopower Series have higher sensitivity and more reliability than traditional sensors, yet consume less energy. Nicholas Roche, product leader at Honeywell Sensing and Control, says that the new nanopower technology is a game changer. 'It is highly sensitive and more reliable than traditional switches that can break and tend to be less stable over time.'

Emergency voice communication

Baldwin Boxall has added a new outstation to its popular Omnicare EVC emergency voice communication system. The new Advance disabled refuge remote unit has a stylish stainless steel finish and it includes the same features as an existing green version – raised, luminescent text, Braille and induction loop. Commenting, Nick Baldwin (Marketing Director for Baldwin Boxall) said, 'The unit has taken a while to develop because we wanted to get to look exactly right. It has been a complex process but we are very pleased with the final result.'

New portable pump

Albert Ziegler GmbH is introducing a new portable pump at the end of 2014. The new generation Ultra Power 4 will have a flow rate of 1900 l/min at 10 bar and, according to the German manufacturer it will be the most powerful pump according to European norms. Ease-of-use is central to the new pump via a new automatic centrifugal clutch; the Ziegler Tourmat automatic constant pressure controller; and the Z-Control panel. The interface layout is designed to give fire fighters quick control via the use of four buttons, throttle grip and a simple multi-functional display.

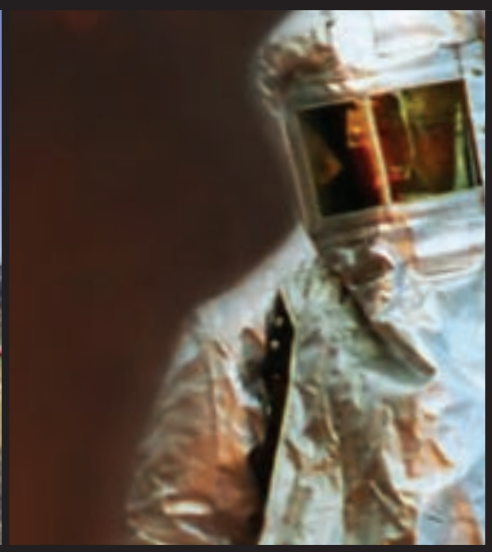
INSTALLATION NEWS

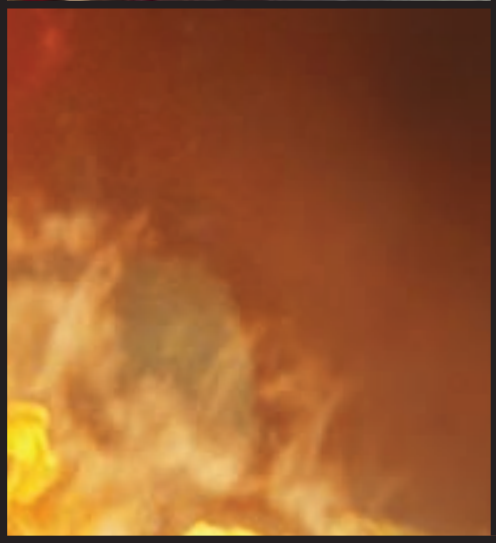
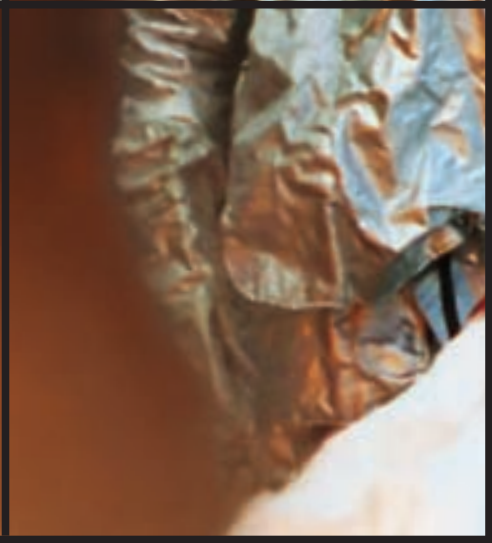
A Hytrans high-volume mobile pump has been put to work in the Port of Mackay in Queensland (Australia) in order to protect assets and berths during the unloading of fuel. The mobile hydraulically-driven submersible pump was chosen as it could be used elsewhere when non-fuel loading activities were taking place, as the berth is shared between multiple users. The Hytrans HS150 easily pumps sea water 12.5m from low tide to the top of the berth and then to the monitor, supplying over 5,000 litres of seawater at 7 bar, with a throw of 30 metres to cover all the critical fuel unloading areas. The all-in-one unit Hytrans pump was supplied by Fire Fighting Technologies to Puma Energy. The Port of Mackay comprises an artificial harbour formed by rock breakwaters. Land areas behind the port accommodate over 100 industrial and commercial businesses with substantial areas of vacant land suitable for further development.

BP has selected Spectrex SafEye 700 Series Open Path Gas Detectors to protect its hydrocarbon storage GDH facility at Fronting, near Montpelier in France. This storage area is the largest area in France for the storage of fuel oils and propane. SafEye 700 Series Open Path Gas Detectors detect C2 to C8 and include heated optics to withstand severe environmental conditions such as icing, snow and condensation. The SafEye Flash Source systems offer well-proven technology for fast detection of combustible gases and vapours over a line of sight up to 460 ft (140 m) long and are built for reliability and continued operation under extreme environmental conditions.

After an extensive tender process, Tyco Fire & Integrated Solutions has been awarded a contract by BAE Systems to design the fixed fire fighting solutions for the UK Ministry of Defence's new Type 26 Global Combat Ship Programme. The team at Tyco Fire & Integrated Solutions developed a bespoke design package consisting of a variety of systems including water, mist, foam and gaseous solutions. The completed designs are due to be issued to BAE Systems and Lloyds Register in June of 2014. Graham Linney, Engineering Manager – Marine, at Tyco Fire & Integrated Solutions, commented: 'Although our experience working on earlier naval vessels was valuable, it was important that for a new generation of naval ships, we were innovative in our approach. I believe we have achieved this and have excelled in the bespoke solutions developed.'

One of Copenhagen's leading hospitals has been fitted with four Fire Fighting Enterprises Fireray 5000 advanced infra-red beam smoke detectors as part of its fire protection system. Hvidovre Hospital is one of Denmark's largest with more than 40,000 patients admitted each year. It has 35 departments, including Denmark's largest delivery ward with more than 5,500 deliveries a year. The Fireray 5000 detectors were selected as the ideal choice to protect the building in the most efficient way. As with other beam detectors, the Fireray 5000 excels at detecting smoke over large areas in wide indoor spaces: the infra-red beam of a single detector spans up to 100m and does not suffer in high-ceilinged environments. It features automatic motorised alignment and a low level controller for easy commissioning and maintenance.



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OCTOBER 22-23, INTERNATIONAL WATER MIST CONFERENCE, ISTANBUL, TURKEY

This year's venue will be the Lütfi Kirdar ICEC in the heart of the city. The Turkish capital was chosen as the interest in fire protection with water mist is continually growing in this region.

This was proven by two seminars which the IWMA organised during Intersec in Dubai in 2013 and 2014. In 2013 about 50 delegates came to attend the first seminar. One year later this number increased to about 80 people who wanted to learn more about water mist technology.

'By going to Istanbul, which is easy to reach for people from the aforementioned regions, the IWMA is trying to accommodate that interest,' said Ragnar Wighus, president of the IWMA.

As far as the programme for 2014 is concerned the IWMA board of directors have decided to go for some exciting developments.

The first day of the conference – October 22 – will be solely dedicated to applications, exploring the types of environments where water mist systems can be installed. This day will also include a panel discussion, and attendance for this day can be booked separately.

On October 23 the programme will contain science and research. Experts from universities and institutes will talk about developments and findings, including a presentation on the IWMA research project. The complete programme can be viewed on the IWMA homepage.

During both days there will be an exhibition and on the end of the first day, the IWMA is inviting all delegates to an evening reception.

Further information on the conference can be retrieved from the conference webpage which can also be reached via the IWMA homepage, www.iwma.net

Hot off the press! The IWMA is to organise two further educational events in November 2014.

One of these seminars will take place in Munich, Germany, on November 4, 2014, at the Best Western Hotel Cristal (to be held in German). The other one will be held on November 20, 2014 in Lund, Sweden, at the University of Lund (to be held in Swedish). To find out more, email Bettina McDowell on info@iwma.net

NOVEMBER 3-4, INTERNATIONAL RISK MANAGEMENT AND FIRE SAFETY CONFERENCE, ISTANBUL, TURKEY

VdS Loss Prevention (Cologne) and Risk Experts (Vienna) have organised a conference that will cover a variety of topics such as risk management, loss prevention, and fire protection, all with a focus on the regional challenges in Turkey.

The main topics of the conference will be the handling of natural hazards and their legal consequences (liability issues) as well as the challenges of supply chain management and the trade-specific business continuity management. Representatives of international companies with headquarters in Turkey will also be presenting their experiences with a focus on practical orientation.

An exhibition will run in parallel with German, Austrian and Turkish companies. Costs per delegate are 390 Euro (plus VAT). The conference language will be in English with simultaneous interpretation into Turkish.

For more details contact m.schreiner@riskexperts.at (German/English) or nurtenaltintas@riskekspert.com.tr (Turkish/English) or visit www.vds.de/istanbul for conference topics and further information.

JANUARY 18-20, INTERSEC, DUBAI INTERNATIONAL CONVENTION AND EXHIBITION CENTRE, DUBAI, UAE

Intersec is the leading international meeting platform for the security and safety industry in the MENA region and beyond.

Intersec 2015, which is organised under the patronage of HH Sheikh Mansoor bin Mohammed bin Rashid Al Maktoum, will be the 17th edition at the Dubai International Convention and Exhibition Centre. The 2014 exhibition featured 1,213 exhibitors and welcomed 24,766 visitors from 131 countries, which made it the largest Intersec to date.

New for 2015:

- Aerial Surveillance Pavilion: the dedicated Police Aviation Pavilion includes a focus on aerial surveillance, unmanned aerial systems, search and rescue and EMS Services.
- GPEC Pavilion: GPEC General Police Equipment Exhibition & Conference is Europe's leading closed specialised trade fair for members of authorities and other public safety organisations. The focus is on police and special equipment, safety and rescue technology and respective services.
- Techtextil Pavilion: for the second time the Techtextil Middle East Symposium and the associated Techtextil Pavilion will be held concurrently with Intersec. The Techtextil product groups represent the entire spectrum of technical textiles and nonwovens.

For more information visit www.intersecexpo.com, or email Andreas Rex on andreas.rex@uae.messefrankfurt.com

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MSA is turning 100.
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During the damping-down operations two users of breathing protection from the Imst Town Fire Brigade were in action, each secured with an MSA AirGo self-contained breathing apparatus with an integrated alphaFP fall protection harness. The alphaFP harness prevented Manuel Wieser from a dangerous fall from a height of 6 metres and saved his life.

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FIRES OF A MELTDOWN

LESSONS LEARNED FROM FUKUSHIMA, NFPA EXPO 2014 PRESENTATION.

For Robert Lewin, Fire Chief, CAL FIRE/San Luis Obispo County the lessons are clear: protection of nuclear facilities by skilled full-time onsite fire departments and well-trained and equipped offsite fire departments needs to be significantly increased. The US Nuclear Regulatory Commission (NRC) must require that industry, local, state, and federal fire fighting services review and participate in comprehensive improvements to the way nuclear power plants are protected.

Chief Robert Lewin, CAL FIRE/San Luis Obispo County, presented at the 2014 NFPA Conference & Expo. Top and below: Fukushima Dai-ichi nuclear complex.

Having a power plant in his jurisdiction is one (of many) concerns for Chief Lewin, and this concern grew as he watched events in Fukushima unfold, particularly when Tokyo Fire Department firefighters were filmed engaging in the incident. 'What are they doing, what's going on here? Why are firefighters going to a nuclear power plant and putting water on a reactor and in these spent fuel pools?'

It led Lewin to consider what could these firefighters have done to prepare themselves in advance for an event such as this. 'If the firefighters are as confused in the US as they were in Japan, then it's time to prepare us.'

Lewin was particularly concerned with what he termed 'black swan' events. These he explained as the type of events that are outside the realm of accepted possibility. 'People didn't think black swans existed, until they found one. A black swan event is something that radically changes our view because we have no idea it is going to happen.' Chernobyl, 9/11, Fukushima – these are types of black swan events that have had massive follow-on impacts.

In a fire protection context, fire engineers typically create inherently safe designs beyond the required design basis. Fukushima was not designed to be hit by a 45ft wave that would cause multiple unit blackouts, so there were no plans for this type of emergency. Prior to Fukushima, Lewin, his firefighters and the utility had never trained for total blackouts at the Diablo Canyon Power Plant. 'But we do now, we're on that, because we're going beyond design basis.'

If the expectations are that firefighters will attend such incidents, then the fire service must prepare for working in radiological environments, as Tokyo's firefighters had to when they were using fire engines in a way that Lewin had never thought possible – direct water application onto the reactors. Lewin questioned whether these firefighters had been trained in time distance shielding, and whether this type of knowledge was being taught in the US. 'I can tell you; my firefighters have only trained on this in the classroom. They've only been told the standard lecture… we never went through the scenario of, ''There's radiation here, you can spend 15 minutes here and walk away with an acceptable dose.'' We've never trained like that. Should we?'

Fukushima drove Lewin to apply the principle of 'going beyond the design principle' at his local utility, Diablo Canyon Power Plant, a facility that brings enormous benefits to the local community and beyond.

A study led by the Cal Poly Orfalea College of Business calculates the total annual economic impact of Diablo Canyon Power Plant at $2 billion nationwide, $1.1 billion in California, and $920 million in San Luis Obispo and northern Santa Barbara counties.

In his presentation, Lewin ran through examples of possible training scenarios with DC Plant, for instance the laying of hose down a hill from water pool sources down to the plant, or drawing water directly from the ocean. 'If we can do it, why wait? Why not do it on a sunny day?' In fact, Diablo Canyon has invested in 6,000 ft of hose and pumps, as well as two fire appliances staffed by five dedicated firefighters. 'So if they have that hose and those pumps, let's practice with them.'

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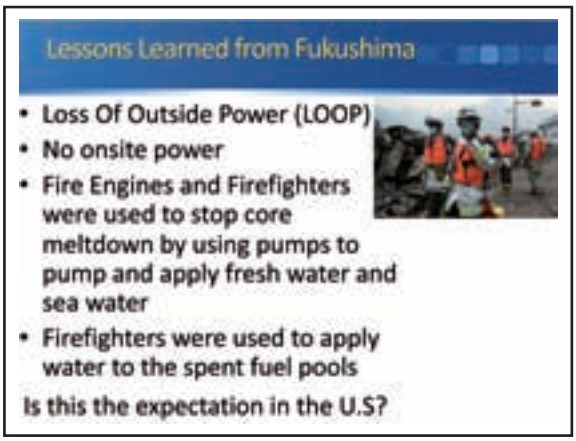
If firefighters are expected to deal with fires inside nuclear reactors then they must be trained to do so.



Chief Lewin recommended that all nuclear power plants should have onsite firefighters, with fire stations located away from reactors.

An MOU has been signed between DC Plant and San Luis Obispo to agree on a number of issues including frequency of training exercises; structure of unified command; acceptable radiation levels for firefighters; as well as procedure for onsite and offsite emergencies.

The initiative has forced both parties to address who is responsible for what, including fighting a fire in the nuclear power plant itself. 'I thought that would be easy to figure out. But it isn't. What we came up with is that outside the power block was County Fire Department's jurisdiction, but the power block itself was the NRC's (Nuclear Regulatory Commission) responsibility. However, how we handle it at Diablo Canyon is that we go to unified command regardless of whose and where that fire is.'

Lewin has responded to four major wildfires around the plant, one of which occurred prior to the facility being licensed, and which took out all the power lines going into the plant. 'There were two transformer explosions, one of which sent shrapnel into an admin building where – had people been at their desks – they would have been injured or killed.' An ensuing oil fire was knocked off by the in-house Diablo Canyon Fire Department. Their action saved an additional transformer, a cost saving which more than paid for the establishment of that same fire department.

After outlining some successful joint projects between Diablo Canyon Fire Department and CAL FIRE (eg prescribed burning of brush around the plant) Lewin emphasised that, nevertheless, on a general level much work remained in the field of nuclear power plant protection. The County Fire Chief, for example, doesn't have the authority to impress change on power plants, which are regulated by the NRC. Lewin emphasised that a public private relationship in emergency response was super-critical. 'I want to assure the nuclear industry that we can work together, we need to be brought into it.'

A number of recommendations were suggested. All nuclear power plants should have onsite firefighters, with fire stations located away from reactors (there are only 10 nuclear plants in the US that have full time fire departments – most plants use operators that volunteer as firefighters). Nuclear firefighters should be trained to industry standards; off site responders should participate in onsite training at the power block; and entry protocols should be addressed: 'The security systems need to be trained on how to get us in really quickly and not hold us up at the gates.'

Time-distance shielding training should take place outside the classroom both for plant workers and offsite responders; and specialist equipment should be stored offsite.

Concluding, Lewin said that although improvements had already occurred in many nuclear power plants, there was still much more to do. The general approach was no different to dealing with other fire hazards. 'The first thing we always try to do is prevent the fire from happening, so we educate people; we try to keep them safe. Second, we design things that don't cause fires… we could put sprinklers in buildings to try and contain them. Third, we can rapidly deploy firefighters and we try to stop the fire becoming really hostile, controlling it quickly so it doesn't continue spreading. That's the same thing we need to do for nuclear plant protection.'

In Japan, the main deployment of firefighters did not occur until seven days after the event. 'What if they had been able to get those firefighters mobilised and working on those kinds of operations on day two? How much radiation would have occurred? Could there have been one less meltdown if that had been in their toolbox as an option? And, finally, fire departments need to be part of the discussion.'

Closing, Lewin pointed out that there was much to learn from Fukushima, but human nature was such that memories faded quickly. 'We have such short memories. How do we keep this one going so that we can prepare?'

ETC Simulation awarded a contract for fire training center at the Jiangsu Fire Brigade

The customised ADMS-Command system will be used to train for petrochemical and industrial emergency response.

The Advanced Disaster Management Simulator (ADMS) suite will include an On-Scene Incident Command Room with a 180-degree immersion theatre screen and eight field unit positions. Within the training facility, an observer theatre will be constructed inside the immersion room for briefings, training observation and evaluation.

The customised system will be a full Chinese version of ADMS-Command including response vehicles and crews, casualties and bystanders, street signs and street names, as well as a Chinese User Interface. In addition to these, new response vehicles will be added including ladder trucks, aerial platforms, high-capacity water pumps, high-capacity foam trucks and an earthquake rescue truck.

The Jiangsu Fire Brigade will utilise ADMS to train for both petrochemical and industrial emergency response, and also with special attention given to large scale structural fires in high-rise buildings. To meet these requirements, ETC Simulation will develop a petrochemical factory.

Marco van Wijngaarden, President of ETC Simulation, commented: 'With ADMS, Jiangsu will be able to train standard operating procedures for petrochemical and high-rise building fire incidents, and use all specialized vehicles as they have available in the field.'

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Aircraft down – are you ready?

An estimated 55% of aircraft incidents happen off airport property. How can we ensure that the appropriate preparedness has taken place? Duane Kann, Fire Chief of Orlando International Airport, Chair of the NFPA ARFF Technical Committee, and Ken Holland, NFPA Staff Liaison, Aircraft Rescue and Fire Fighting Technical Committee, revealed some strategies at the 2014 NFPA Conference and Expo.

This session was not to focus on aircraft rescue and fire fighting at airports, clarified Duane, but rather to discuss what happened with structural fire departments and what happened off the airports once one of these aircraft went down.

One such incident, highlighted with a video, showed an F18 crash that occurred outside Virginia Beach on April 6th 2012. The aircraft experienced engine failures and crashed into an apartment complex (the two pilots ejected safely). The structural fire departments fought the fire for two hours without making much headway. Within five minutes of the ARFF vehicle arriving the fire was almost completely out. 'So if one of these goes down, especially if you have fire involved, you are going to have some pretty significant damage and it's going to be a challenge for you to put out.'

Duane Kann, Fire Chief of Orlando International Airport, and Chair of the NFPA ARFF Technical Committee.

Many structural fire departments believe ARFF units cannot leave the airport. Duane said that that was only partially right, and then went on to explain why it was important to get to know the capabilities of nearby airports.

The Federal Aviation Administration classifies airports depending on the length of aircraft and provides an index rating. 'A' is the smallest scale airport and 'E' is the largest. There are six NFPA documents that address ARFF, and it is important to note some of these are guides and others are standards.

Focussing on NFPA 402 (NFPA 402: Guide for Aircraft Rescue and Fire Fighting Operations), Ken Holland pointed out that this guide discussed planning for aircraft emergencies, encompassing both ARFF and municipal departments, covering responsibilities, access, aircraft materials, extinguishing agents, structural firefighting, and jurisdiction issues. 'It's also critical to have a unified command and a clear understanding of the jurisdiction and responsibilities of the involved responsibilities – be it the structural fire department, fire department and any emergency medical services like the Red Cross and so on. So mutual considerations are also in 402.'

Orlando International Airport is the second busiest airport in the state of Florida, the 13th busiest airport in the United States and the 29th busiest airport in the world by passenger traffic.

Consequently joint live fire training is key, bringing together all agencies to check equipment compatibility; aircraft familiarisation; checking staging locations; sharing skill sets (eg evacuation slide performance, ballistic parachutes) and knowledge (eg using BA when working around composites).

Moving on to NFPA 403, Ken Holland explained that this was the standard covering ARFF services at airports; extinguishing agents; vehicles; communications; PPE; and station locations and response capability. Ken picked out some key areas of 403: namely that mutual aid shall be arranged between on and off aiport agencies; that there is a risk assessment plan developed by the airport to ensure response capabilities are met based on the aircraft; that there be a current airport community emergency plan; as well as mutual aid agreements in place with communities around the airport. 'And that the plan be tested every three years. A full-scale annual table-top exercise is also required by NFPA 403.'

Duane explained that the true ARFF capabilities of local airports may not be reflected by their actual index rating. For example, Orlando International's index rating requires three vehicles and 6,000 gallons of agent at the ready. However, the layout of the airport means that to fulfil its response requirements the airport actually needs a minimum of four. And in reality, it has six to compensate for maintenance and other issues. 'Which means if I get a phone call that says we need mutual aid from one of your ARFF units, probably I would say ''yes'' 95% of the time, without having to change the index of the airport.'

Index A airports on the other hand could have problems lending their assets off airport, as they are only required to have one ARFF vehicle. Non-indexed airports are not required to have any response vehicles but nevertheless may have assets to lend out – and in fact they may be more open to a request for help.

Almost every airport in a municipal fire department's area will have enough ARFF resources to send a truck to help 'most of the time', said Duane, who then played a video of a training exercise carried out by Chicago International Airport and involving an apartment complex that they were able to burn for this purpose. 'They were actually able to respond their ARFF units and this gives you an idea of how quickly having an ARFF

unit discharge onto a fully engulfed fire can knock it down and get it under control.'

The trucks in the video were carrying 3,000 gallons of water each, as well as 400 gallons of foam concentrate. 'Most of this is switched over to 3% ratio, which means we can re-supply our water tanks four times before we have to re-supply the concentrate,' adding that such resources could also provide tremendous support for hazmat- type situations occurring outside airport premises.

On the subject of NFPA 424 Guide to Airport Community Emergency Planning, Ken Holland explained that at its basic level it ensured everyone was 'on the same page' with their emergency plan should an accident occur. Are resources available, for example? 'If not, what are the other mutual aid groups you have?'

Every three years Duane has to carry a full-scale exercise to test all the relevant areas in the airport emergency plans, and he encourages municipal fire departments to engage with these exercises. 'If they are indexed airports they are already doing it, but many don't reach out and pull the community in.'

Orlando does its full-scale exercise every two years, in addition to live fire training on an annual basis. 'We also reach out to our surrounding Orlando and Orange County. We schedule some of their crews to come in and participate every year. Keeping them in the mix and letting them interact with our crews so that when we are in need, we are prepared.' Duane then showed a video of the largest full scale exercise ever conducted in Florida, involving over 600 victims and 1,200 responders from 50 different agencies. The aim was to test the surge capacity of 16 local hospitals following an off-airport A320 crash into a motel a mile from the airport, in the city of Orlando: Operation Crash and Surge.

VIDEO VOICEOVER: OPERATION CRASH AND SURGE

The scenario is an A320 aircraft that just departed Orlando International Airport, experiencing a complete hydraulic failure. The pilot declares an alert two and begins the process to return to the airport. But shortly after, the airliner disappears completely off the aircraft control radar. 911 calls begin pouring in and reporting that an airplane has crashed into a motel one mile away from the airport.

Upon arrival at the scene, fire department crews find a large hotel on fire with major damage from the aircraft impact. The airliner and several cars are on fire in the hotel parking lot. There is a large debris field and hundreds of victims throughout the crash site. Quick decisions have to be made beginning with, who is in charge?

The incident is in the city of Orlando. So Orlando Fire Department takes the lead. A unified command system is established following the National Incident Management System framework. The operations chief assigns the Orlando Fire Department crews to manage the fire incident, calling that a 'building group'. Search teams go through each floor. There is debris surrounding the building and damages done to the internal stairwells. The aerial apparatus cannot be used because of the accessibility issues. So ground platters must be raised to gain access to the upper floors.

The Orlando International Fire Rescue assets are assigned to the aircraft rooms due to their specialised expertise. Gaining access to an aircraft is challenging. Stepping through the ladder onto the main surface is a dangerous point, since the wing is naturally sloped for flight purposes and is often slippery from the foam extinguishing agent.

Personnel must know how to gain entry through the doors and hatches, which are all different in numerous types for aircraft.

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Operation Crash and Surge in March 2013 was the largest full scale exercise ever conducted in Florida, involving over 600 victims and 1,200 responders from 50 different agencies.

Getting inside the hatches with full gear on is another challenge and once inside, this base is confined and the environment is often dark or possibly smoke filled. Firefighters must know their way around inside an aircraft in these conditions or they can become disoriented very quickly.

Rescuing a victim is another difficult task due to the elevation of the aircrafts. Slides are a part of the aircraft's built-in evacuation system. They can be an effective way to quickly egress the aircraft, but this avenue also leads to many injuries. Approximately 20% of uninjured passengers that use the slide evacuation system will sustain injuries during this process. An airstair unit, which is a specialised vehicle designed to access aircraft, is a great way to control an evacuation. Passengers can walk down the stairs or can safely be carried down backwards.

Orange County Fire Rescue is also responding in force. They are assigned to be the EMS group. It requires a tremendous amount of personnel to triage, backboard, and carry a large number of victims to treatment areas. The EMS group must establish an entry point to funnel everyone into treatment.

In an aircraft incident, there is always a potential for field contamination. So using a decontamination system at the entry point is a good way to control the proceeding process. To determine which victims were on the aircraft and which ones were on the ground is critical for accountability purposes.

The movement of the wounded from treatment to the transport units requires organisational coordination. Medical helicopters provide a means to take the critically ill to local trauma centers. But, often overlooked, these helicopters can also take victims to hospitals that are further distance away, increasing the amount of possibility they will be able to assist.

Having an adequate supply of transfer units may also be an issue during a mass casualty incident and will usually require resources from multiple agencies. Tracking these various assets has been done, including blood patients who were transported to various hospitals.

Following the video, Duane concluded by highlighting how Orlando Fire Department had been assigned the Building Group, Orange County the EMS, and Orlando International Airport the aircraft. 'This worked pretty well. We also beep them on the radios, so their comms centre can track everything that is going on. That's been extremely helpful in organising the assets and the communications processes, and it helps with accountability.'

Realistic and robust training

This month marks the official industry launch of a new Incident Command and Crisis Management Training facility in the northeast of England that is open to industrial operators throughout the UK, Europe and Middle East. CFB Risk Management a leading provider of Integrated Emergency Management services in the UK, has invested more than £100,000 ($150,000) in cutting-edge crisis management facilities within its learning and development centre based in Teesside.

The training facility is designed to test, exercise and improve competence in operational, tactical and strategic incident command. It is the result of an exclusive partnership with VectorCommand, a company that is well known for its Tactical Command Trainer artificial intelligence-driven simulator system (used the world over by fire and rescue services to train predominantly Level 1 and 2 incident commanders) and its operational solution, the Command Support System.

CFB Risk Management is introducing what it calls the world's first integrated Training & Exercise System (TES). TES is an automated exercise delivery system stimulating all means of communication to provide effective, repeatable and affordable delivery and evaluation of realistic and robust exercises and crisis simulations.

A high demand to see the new system in place meant that the launch had to be spread over three days in September. 'As part of the launch we gave representatives of key industrial operators a chance to attend a free crisis management introductory session,' explained CFB Risk Management Technical Sales Director Gary Cawley.

To ensure the maximum return on its investment, the centre will also be used for major incident and multi-agency exercises and can even be used to support live incidents.

The facility includes fully-equipped mock sector command rooms, incident command unit, press/media briefing area, as well as a Emergency Control Centre (Silver) and Strategic Coordination Centre (Gold)

The mock incident command unit (with five operator positions) exactly replicates the live unit, delivering a completely realistic training experience not only for incident commanders but also for command support staff.

Operating alongside the existing artificial intelligence-driven 3D simulator will be the ability to embed in-house CGI videos of local site-specific risks. The new 3D engine enables the facilitator to change both the location and the size of the fire, with the resultant effects shown in the building degradation.

Continuously looped videos and simulated 3D graphics can be shown on multiple screens to simulate the sectorisation of an incident. These can be used to stimulate the student to demonstrate his knowledge and understanding for assessment purposes. Adding in-house pictures and videos (including those built on other graphic engines) that include effects like smoke, fire and building collapse will further increase the realism and user experience.

The mobilising emulator element takes information from the scenario and feeds this into the Command Support System, which means that it is now possible to train senior commanders and command support staff at the same time in a mock ICU that is as close to possible to operational reality.

'We are pleased to be able to provide such advanced facilities as we continue to expand and improve our portfolio of services in the high hazard markets. Our investment reflects our capacity to supply innovative and high quality services designed to meet the increasingly challenging logistical and workforce training requirements in the high hazard sectors in the UK and further afield,' concluded Gary Cawley.

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DR JIFENG YUAN, GROUP CHIEF ENGINEER, STRUCTURAL PROTECTION, EXOVA, OUTLINES WHY GENUINE AND APPROPRIATE PRODUCT TESTING, ASSESSMENT AND CERTIFICATION IS OF CRITICAL IMPORTANCE IN THE SELECTION OF PASSIVE FIRE PROTECTION FOR THE PETROCHEM INDUSTRY.

Over the past decades, the hydrocarbon fire protection of structural steel has grown in importance across the worldwide petrochemical industry. The purpose of passive fire protection systems is to protect personnel, production process and flow, as well as equipment, against fire damage. It is therefore critical that the protection is not compromised in anyway throughout the specified protection period to ensure a safe evacuation and a controlled plant shutdown. In petrochemical facilities, a passive fire protection system will offer fire resistive performance, durability in erosive hydrocarbon and jet fire scenarios, as well as anti-corrosive protection.

There are two main fire scenarios to consider for relevant testing and approval:

- Hydrocarbon Pool Fire (common standards EN 1363-2, BS476-20 and UL1709); and
- Hydrocarbon Jet Fire (common standards ISO 22899-1 and 2).

Fire based on hydrocarbon fuels is characterised by very rapid temperature increases and will generate much higher heat and energy than a fire based on a 'standard' building fire (cellulosic fuel). Fires, such as a jet fire which occurs when a leak of pressurised liquid or gaseous hydrocarbons ignites, can be even more ferocious. For this reason International Standard ISO 22899 has been developed. This provides evaluation of fire protective materials on a combination of results from hydrocarbon furnace tests and resistance to jet fire tests. The overall evaluation is on areas of potential weakness during fire, such as flange edges or flat and curved surfaces, and how they function under high pressure flame impact.

Above 400°, steel starts to lose its strength and therefore structural design engineers in the oil/gas and petrochemical industries would normally use this temperature as a critical design point. However, it is common that a passive protection system is used to protect equipment with a lower or higher failure temperature (actuator fails at 110° and valves can fail at around 200°). These industries have recently moved towards using a multi-temperature analysis (MTA) to identify the amount of protection materials require for a specific duration with a variety of design temperatures. Analysis of this kind can be used to inform performance-based design decisions.

A passive fire protection system will serve in both harsh and hazardous offshore and on shore environments. Petrochemical facilities are often operating in challenging environments such as maritime or extreme heat and cold. In order to withstand such harsh environments, the whole structure needs to be strong and stable. This is equally important in terms of the provision of fire protective materials.

Legislation and guidance in many parts of the world impose increasingly strict requirements on products. In order to ensure that a protection system remains relevant to the needs of the industry, a wider range of characteristics for steelwork protection needs to be considered carefully when used in petrochemical type installations. The critical importance of passive fire protection in engineering or safety specification requires genuine and appropriate product testing, assessment and certification, to ensure it is fit for purpose when installed correctly.

Jet fire test for fire protection – after exposure. Inset: jet fire test – standard box section. Above: large jet fire test – cylindrical hollow section.

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Protection for shale shakers

Engineers inspect a maritime protection dry inert gas generator and cooler/dryer system.

Wilhelmsen Technical Solutions (WTS) has received a repeat order to install its Unitor low expansion foam fire extinguishing system on a second jack-up newbuilding for Prospector Offshore Drilling.

The specialised fire fighting systems will provide fire protection for the shale shakers and mud pits on Prospector 1 and Prospector 5 during their charters to Total E&P UK. Prospector 1 was delivered from Dalian Shipbuilding Industry Offshore Co in September 2013; Prospector 5 was delivered in June 2014 from Shanghai Waigaoqiao Shipbuilding (SWS).

Order handling for the first contract was carried out between WTS' Singapore and Poland offices and was completed in just 12 weeks to the satisfaction of the customer, who immediately requested a similar installation for Prospector 5.

Engineering and manufacturing for the second contract was carried by WTS Poland while the rig was still under construction, with piping pre-installed by SWS. The rig arrived by heavy lift vessel at Invergordon (Scotland) in August where final installation was carried out.

Calum Mitchell, Manager – Technical, Prospector Offshore Drilling, commented: 'The installation performed on Prospector 1 at Invergordon had some initial challenges, as proposed locations for the equipment and piping had to be adapted. The installation team, combined with the onshore support, dealt with the issues accordingly and completed a successful install program whilst receiving high praise from the rig crew for their professionalism and execution. This was a major contributing factor to awarding the contract for the Prospector 5.'

Wilhelmsen Technical Solutions has also recently secured multiple orders to supply its Maritime Protection Dry Inert Gas Generator (DIGG) systems for installation on LNG carriers under construction at Japan Marine United's Tsu shipyard.

Two DIGG units will be installed on two gas carriers under construction for Japanese owners Tokyo LNG Tanker Co/Mitsui OSK Lines (first vessel) and Tokyo LNG Tanker Co/NYK Line (second vessel).

The MP DIGG system comprises an inert gas generator, refrigeration unit and a combined cooler/dryer, and will be delivered to the yard in 2016. Among the reasons for the selection of the system is that it occupies much less space and volume in the engine room compared with competing units.

DETECTING ELECTRICAL AND MECHANICAL HOTSPOTS WHEN WORKING OFFSHORE – BEFORE THEY DEVELOP INTO SOMETHING WORSE

Dräger Marine & Offshore, part of the Dräger Group, believes its thermal imaging technology is helping to improve asset integrity management for offshore oil and gas operators.

Its offshore benefits were initially discovered by Denmark-based Dräger Safety Account Manager, Peter Sonne, during a visit to an international oil giant.

'The discovery was made during a meeting at a customer site last year when I used a thermal imaging device to detect the fill level of a tank. Together we realised there was potential for using this kind of device in difficult-to-reach and hazardous locations offshore, and the customer therefore placed an order.

'Since then, the customer has seen substantial benefits in applying Dräger's technology on its North Sea oil platforms. The equipment is being used to detect potential overheated connections, fire or loose connections in electrical installations, and issues can be identified early to prevent costly downtime and save companies substantial amounts of money,' said Peter, adding that the first order was placed six months ago.

Thermal imagers are currently being used to detect hotspots prior to maintenance and repair work offshore, providing oil operators with a quick and easy solution to check for potential problems before implementation of a repair or strengthening plan, which can lead to reduced downtime. The cameras rely on heat signatures and can see in darkness, fog or smoke and even minor temperature differences are visible due to a difference in thermal characteristics. The camera is capable of capturing video and photographs of displayed thermal images, which can also be downloaded for review.

Dräger's thermal imaging cameras are also ATEX-approved, which means they can be used in explosive environments – extremely useful in a hazardous area such as an oil platform.

Phil Saxton, general manager for Dräger Marine & Offshore Aberdeen, said: 'It's 25 years since the world's worst offshore oil disaster, Piper Alpha, and while lessons have been learned, Dräger is going one step further with its preventative measures to ensure continuous improvement in offshore safety standards.

'Sometimes hotspots are not immediately apparent to the naked eye, the planning and execution of maintenance work can be highly targeted through identifying such areas of concern.'

Pumping 'on the move' with WS Darley

The Illinois-based designer, manufacturer and distributor of fire fighting, defence and emergency services equipment tells *IFJ* about the R-Evolution – a new pump controller that can be operated from anywhere in the world.

The latest pump controller has been designed to eliminate some of the risk involved in fire fighting and disaster relief. At the same time, Darley wanted to design a controller that would bring its product offering into the information age.

The result is the R-Evolution pump controller: it has all the features that come standard on auto pressure governors but with a lot more. The big difference is the ability to remotely operate the pump and the means to data-log all the pumping operations.

The R-Evolution pump controller comes equipped with software that enables communications with the pump from anywhere in the world with internet connectivity.

Once logged into the protected web portal, a screen similar to Google Earth pops up with the selected pump represented by a dot in its approximate geographic location. From there the operator has complete control of the pump. The operator can turn the power on, select whether to operate from draft or as a pressure fed pump. If draft mode is selected the pump will run an automatic prime sequence and begin pumping at the selected speed or pressure.

If the pump is in the pressure-fed mode it will turn on and ramp up to the selected operating point as soon as water reaches the suction inlet.

This gives an operator the ability to fight a fire without stepping into harm's way. Couple a fire fighting monitor to the discharge of the pump and it gives the operator the ability to remotely direct the flowing stream towards a desired target.

To further Darley's technological innovation, all of the pump and pump engine performance data is recorded and organised in the web portal to view in real time or to run reports. The user now has the ability to diagnose problems, identify possible failures before they occur, record water flow and improve their tactical suppression methods. Text messages and email alarms can automatically notify selected personnel of any concerning pump behaviour or operating conditions. The alarm notification group can be easily built within the web portal and has no limitation on how many people receive the alarms.

If there is no internet connection available, the pump can be operated from the main pump panel similar to the web portal, with very little operator input. Meanwhile, the data that is collected while the internet connection is unavailable will be stored locally and transmitted to the web portal when the pump has again acquired internet connectivity.

BBA's new design

Regional Fire Department of Legnica (southwest Poland) takes delivery of newly-designed fire fighting pumps from BBA.

The delivery from Dutch manufacturer BBA took place during the annual 'Firefighters' Day' on July 4. Following the official medal ceremony for local firefighting heroes, BBA Pumps representatives from Poland presented the two brand new firefighting pump units to the Regional Fire Department.

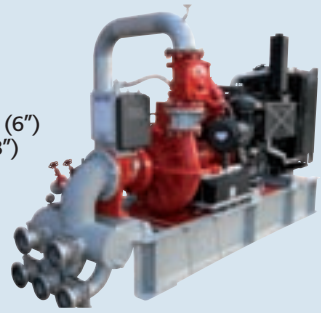
Netherlands-based BBA Pumps had only just launched the newly-designed pump.

The high head unit M80/8 consists of BA-C125H7 D416 auto prime pumps running at a maximum capacity of 580m^3/hour (8m^3/min) @ 80mwc max. The unit features a MP100 priming system to quickly prime and re-prime from dry conditions and a powerful 6-cylinder Perkins diesel engine that delivers 186 kW at full speed.

The whole package is mounted on a custom designed enclosed trailer, including a large fuel tank and suction and discharge manifold.

Pump specifications

Type: BA-C125H7 D416
Max. flow: 580 m^3/hour
Max. pressure: 102 mwc
Connections: discharge DN 150 (6")
Connections: suction DN 200 (8")
Solids handling: 25 mm
Impeller type: closed impeller
Priming system: BBA MP50
Engine: Perkins 1106D-E66TA
Frame: F15-40
Weight (net): approx. 2,100 kg



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High-volume pumping via remote control

High-volume pumps are steadily gaining worldwide acceptance for large-scale incidents, and the latest innovations enable remote control from several kilometres away – ideal for nuclear events, writes Johan Kramer of Hytrans Systems BV.

The mobile water transport system known as Hytrans Fire System (HFS) was developed to be set up in no time and with a minimum of manpower. It is capable of supplying water from any open water source at large volumes (up to 30,000 lpm at 12 bar) and over long distances of several kilometres. The system is used worldwide and has proven performance during large scale incidents, including Fukushima in 2011. Here, a HFS HydroSub 150 unit from Tokyo Fire Brigade was brought to the scene to provide water for cooling the reactor. The SuperPumper – as the HFS HydroSub 150 is called in Japan – played a major role in cooling the crippled reactor.

Following the Fukushima incident, nuclear power plants changed their back-up plans in regards to providing cooling water in case of large scale incidents. The realisation came that a solution was needed that still worked in case fixed installed systems became damaged by incidents, and where access to water could be difficult.

A proven solution is a diesel-driven mobile pump unit such as the HFS HydroSub. The hydraulically driven submersible floating pump of the HydroSub makes it possible to get water from any open water source – even in extreme conditions – and without any draft loss. It can be used not just to provide cooling water, but also to provide water during fires or to create a water curtain to knock down a chemical or even a radioactive cloud. For the latter, a remote control system has been developed to ensure the safety of the operator.

The HFS RCU (Remote Control Unit) controls HydroSubs or AutoBoosts from a distance just as if the operator were at the machine, using a portable wireless remote control. Up to four HFS units can be operated from a distance of up to several kilometres. From the RCU's screen an operator can change settings and read system information just as if he were at the unit's operating panel.

The HFS RCU consists of two parts: the Master RCU and the Slave HBC unit. The Master (in a hard case, pictured) can control up to four HydroSubs or Autoboosts. The Slave, which is built inside the HydroSub or AutoBoost, enables communications with the Master. The RCU has the same control functions as the operating panel.

An operator at the machine can overrule remote control settings in an emergency.

Specification for the RCU:

- Outer dimensions RCU hard case: 524 x 428 x 206 mm
- Weight: 17 Kg
- Connection battery charger/truck: MagCode (24V)
- Stand-alone operating (max): 8h with full battery
- Operating frequency within Europe: 433/434 MHz
- Antenna Slave: Omnidirectional Antenna; Gain: 2 dBi; Length 51 cm
- Antenna Master 1: Omnidirectional Antenna; Gain: 2 dBi; Length 51 cm
- Antenna Master 2: Gain: 0 dBi; Length 18 cm (standard in hard case)
- Communication distance between Master and Slave both equipped with Omnidirectional Antenna, provided no obstacles: 1.5/2.0 Km

Prepare for an 'eco evolution' in pumps

Things are constantly evolving and – in the ultra-competitive market of the fire fighting industry – the evolution is occurring faster and faster, writes Stephan Thibault, CEO and international representative for Canadian company CET Fire Pumps MFG.

Investments in R&D are on the increase and leading companies are striving to find optimal environmental solutions – portable pump manufacturers are facing these same market realities.

Be prepared for changes in the market in a relatively short period of time. At present, our manufacturing activities are centered on the production of portable fire pumps in the following categories: high-volume pumps, mid-range pumps, high-pressure pumps, high-pressure volume pumps, de-watering and floating pumps. But our range of products will be expanding. The sophistication of our production plant, combined with recently-developed technological innovations that offer alternatives to fuel engines, will allow us to add new and unique value-added features to our portable pumps, our main product line. This will be a big change.

A new category of pumps will emerge on the market within the next two to four years, the non-combustible engine (or less combustible engine) portable pump. Industry leaders will be able to increase their offering of green solutions to their clients without any negative effect on industry requirements in terms of power. These innovations will have a positive impact on the environment, on fire departments' variable costs and, most importantly, on the length of time a pump runs without needing to be refuelled. This major change has a direct impact on many applications in the fire industry.

Using alternative fuels is an integral part of our development strategy because it's simply the best thing we can do to add value to our product. At this point in time, pumps manufactured around the world are fulfilling all fire department needs from a technical standpoint. Today's pumps are reliable and adapted to a range of specific tasks, but the time has come to reduce their fuel consumption and make them more economical for the end user. To achieve this, we need to invest in durable and eco-friendly features.

Other trends in the pump market involve optimising the portable fire pump. Today, our engineers' main goal is to find ways to reduce pump weight without altering the reliability and longevity of the product.

Finally, it is expected that the market for floating pumps will increase and that water transfer solutions will reach new levels of expertise in the upcoming years.

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EXERCISE ORION

AVON FIRE & RESCUE SERVICE (AF&RS) IN THE UK HAS CONDUCTED A BULK FOAM EXERCISE IN ORDER TO TEST NEW EQUIPMENT NOW CAPABLE OF DEALING WITH A MAJOR INCIDENT IN THE AREA, WRITES JAMES BLADON, CORPORATE COMMUNICATION MANAGER, AF&RS.

The exercise last month at the Fire Service College at Moreton-in-Marsh marked the culmination of a lengthy research, procurement and training project which sought to significantly enhance the AF&RS's capability to deal with incidents requiring a major foam attack.

Involving six pumps, three bulk foam units, two high volume pumps (HVPs) and more than 60 firefighters, the successful exercise was the first time that all elements of the Service's new bulk foam plan had been tested together.

In the background was a fundamental review of AF&RS's bulk foam capability. An analysis of risks in the area identified a number of sites which would require a foam response beyond the Service's own resources. These were focused on the Avonmouth area of Bristol, which is home to petroleum storage depots, top-tier COMAH (Control of Major Accident Hazards) sites, and fuel transportation infrastructure. The analysis of the realistic requirements for mounting a major foam attack in Avonmouth also addressed a series of practical issues:

- assessment of fire appliance pump performance to confirm that they are capable of pumping at pressures in the region of 10 bar over at least a 65 minute foam attack;
- the supply of water required to undertake the foam attack, with options developed using both National Resilience HVPs and standard fire service appliances;
- the effect of the use of salt water on foam production/quality;
- the foam compound stocks required and methods for transportation and induction;
- the monitors and pressures required to achieve the necessary throw in order to project the finished foam onto the ignited surface of a fuel tank fire while ensuring that all operations are conducted at a suitable distance outside the bund wall in order to maintain firefighter safety;
- detailed analysis of friction losses over extended HVP and conventional hose line runs to ensure that adequate pressures are provided at the monitors themselves.

Foam proportioning now takes place remotely at the Salamandre units rather than through induction at the monitors (Angus Bipod and Titan), which means replenishment of foam stocks takes place at a safe distance.

With the petroleum storage facilities posing the single greatest risk, the aim of the review was to develop AF&RS's capability to become self-sufficient to achieve initial extinction of a full surface fuel fire in the largest single storage tank within its area. Calculations to deal with a fire on this scale allowed the project team to draw up an equipment specification required to fight such a fire in accordance with national standards and international best practice. An exhaustive procurement process identified the most effective foam proportioning equipment and monitors to meet the Service's requirements.

Three 'skids' were designed by the Service and made by Angloco. Each skid was designed to be carried by a prime mover which, when used together, provide a complete bulk foam resource to tackle a major petrochemical fire. Included on two of the skids are high flow foam proportioning units and concentrate tanks as well as large capacity foam monitors.

The foam proportioning is achieved using CTD's Salamandre 360 units supplied by ABC Macintosh; these draw Auxquimia SA Polyfoam AFFF-AR 3/3 pseudoplastic foam concentrate from the 7,000 litre on-board tanks. Each proportioning unit also carries two Angus Fire foam monitors – one Bipod and one Titan – as well as large diameter supply hose.

Exercise Director Pete Davis said: 'After several years of thorough research and planning, the new equipment was delivered to us in late 2013. Although we had tested our developing revised procedures many times on paper during the planning process and carried out independent tests of the new equipment, Exercise Orion was our first opportunity to bring all the elements together in one place. This gave us the opportunity to test our calculations and carry out full acceptance tests of the new equipment.'

The exercise made use of the oil storage tank at the Fire Service College. The first part of the exercise saw the deployment of two HVPs to provide sufficient water for the foam attack. AF&RS and Gloucestershire FRS's HVP teams set up the two pumps at the college's reservoir feeding two twinned large diameter hose lines over just under a mile.

These supplied six AF&RS pumping appliances which, in turn, fed the two Salamandre units. These proportioning units delivered the required foam solution to the three monitors in use. These demanded around 12,000 litres of water a minute at 10 bar inlet pressure, providing a throw on the day of around 60 metres at their optimum elevations.

Although the Salamandre 360 units were used together during Exercise Orion to rehearse a full-scale bulk foam attack, the specification allows them to be used independently at smaller incidents. 'Another of the key benefits we demonstrated on the day was how this new way of working improves firefighter safety at this type of incident. The foam proportioning now takes place remotely at the Salamandre units, rather than through induction at the monitors via pick up tubes. This eliminates the need for forklift trucks carrying bulk foam stocks to operate around the monitors themselves – instead, this can now take place at a greater distance from the fire at the Salamandre unit,' concluded Pete.

ATTACK WITH ATILA

After many years manufacturing and testing fire fighting foam concentrates, VS Focum in the north of Spain decided to develop a concept for a new foam that would protect tank storage farms in a safe and effective way – whilst using minimum amounts of water and concentrate. Managing Director Manuel Acuña explains the power of Atila.

The requirements for the development of the new foam were:

1. The foam had to be synthetic: to guarantee long product lifetime whilst maintaining extinction features.
2. It had to have a low Newtonian viscosity: to avoid the problems inherent with high viscosity pseudoplastics.
3. The foam had to be usable with a low percentage of concentrate (≤ 1%): to benefit from logistical (eg storage, transport) and economic advantages.
4. Be an alcohol-resistant, aqueous film forming foam (AFFF/AR): to achieve the lowest application rates possible on all types of fuel and water.
5. Be freeze-resistant: for flexibility of use in all weather conditions

The result is Atila: a 1% AFFF/AR foam that can be used at -15ºC and which has freeze-resistant properties.

The first certification milestone for Atila was the award by the UK Civil Aviation Authority of ICAO level C at 1% and ICAO level B at 0.5%.

The foam concentrate Atila has been tested on different types of fires and fuels, at different percentages and with differing types of water, using low, medium and high expansion devices – all with excellent results.

In addition, Atila has been tested in comparison with a well known fire fighting foam concentrate AFFF/AR 1x3 that is commonly used in tank storage farms and refineries. The results have shown better performances for Atila – especially when decreasing the percentage and the application rates.

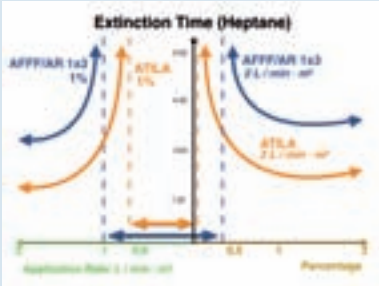
We can visually represent the fire performances of a foam concentrate using a double axis of coordinates. On the y-axis we can include features such as control, extinction or burnback resistance.

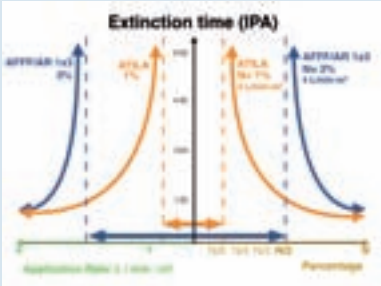
The result looks like a volcano, where the diameter of the 'crater', ie the distance between both asymptotes (lowest % and lowest application rate), measures the efficacy and the effectiveness of the foam. The foam with the smallest 'crater' is therefore the better one.

In order to guarantee a fast and safe extinction we have included in Atila a comfortable safety margin. This means that even though Atila has been designed to run at 1%, it is still able to extinguish the fire al 0.5% at nominal application rate (EN-1568-3:2008, 144B (2.5 l/min m^2) and EN-1568-4:2008, 55B (6.6 l/min m^2)), as well as extinguish the fire at 1% with a reduction in the application rate (EN-1568-3:2008, 233B (1,61 l/min m^2) and EN-1568-4:2008, 144B (2.5 l/min m^2)).

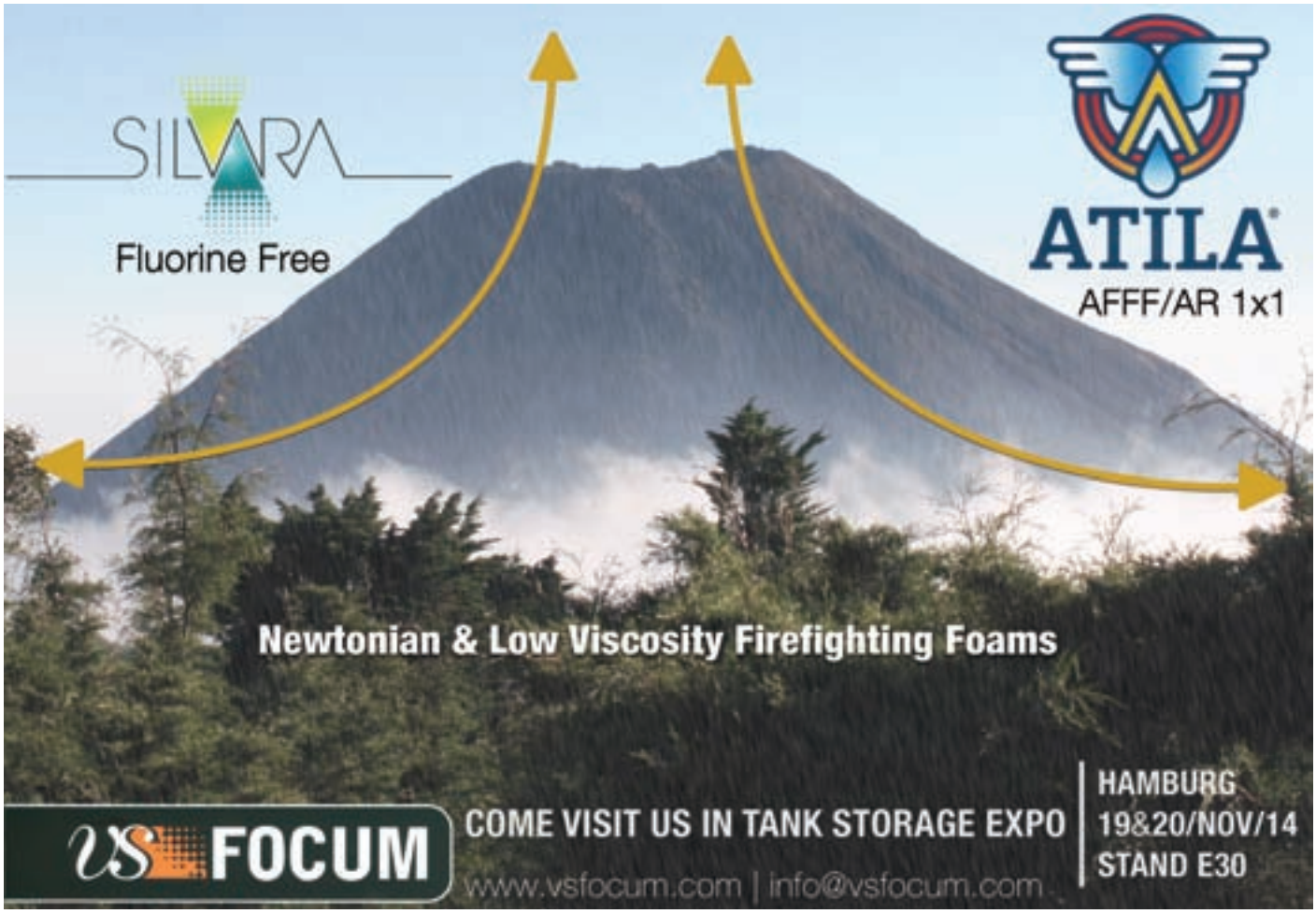
These tests afford a safety margin as well as a reliable extinction process even with a reduction in dosage or an increase in the size of the fire, or with a lower application rate.

Atila meets the high-specification standard launched by ICAO in 2013, which sought the ultimate performance in fire fighting foam with the minimum of water. VS Focum is now driving that same paradigm into tank storage protection.





Right x-axis: percentage of use. Left x-axis: application rate (l/min m^2).



A SOLUTION FOR RIM SEAL FIRES

RIM SEAL FIRE PROTECTION FOR FLOATING ROOF TANKS WITH NEW DEVELOPMENTS IN FIRE FIGHTING FOAMS CONTAINING WATER-SOLUBLE, HIGH MOLECULAR-WEIGHT POLYMERS, BY ARMI HARAN, PRESIDENT, ORCHIDEE INTERNATIONAL.

In oil floating roof tanks vapours collect in the rim seal between the floating roof and the tank shell. In case of damage to the rim seal the vapours are enriched with oxygen from the air, resulting in a hazardous mixture that can be ignited by lighting or sparks produced by static electricity.

For such incidents – and to avoid a complete tank fire – it is important to have early detection as well as the most suitable extinguishing agent.

A few fire fighting agents that can be considered for this purpose are:

1. Gas agent: in the past it was Halon, but following their phase-out there are a few Halon replacements that can be considered as an option.
2. Foams: AFFF, AR/AFFF and fluorine-free foams.
3. New fire fighting foams containing water-soluble high molecular weight polymers.

Foams – how they work

When foam is produced, the resulting bubbles increase the surface area of the gas-liquid. The surfactants contained in the foam formulation have a strong tendency to adsorb (ie accumulate on the surface/interface of a solid or liquid, forming a thin film), leading to a notable decrease in surface tension. The lower the surfactant's tension, the easier it is to create this surface or interface area.

An increase in adsorption (which corresponds to the number of adsorbed molecules by unit of surface) is usually linked to two factors: the cohesion capability of the molecules and their hydrophobic properties (the driving force leading to adsorption). A greater compactness in the adsorption layers can be achieved by the addition of water-soluble natural or synthetic polymers.

The film that forms between the foam bubbles is subject to complex stretching stresses. As the film gets thinner, the speed of drainage typically decreases. As the speed of drainage is inversely proportional to the viscosity of liquid and film area, it is possible to slow down the drainage with thickening agents and by the use of large polyhydric bubbles.

There are also several forces at play that produce a repellent effect, preventing the bubbles from coming closer to each other, resulting in the drainage of the film. These forces are the result of the interaction of the double layers that are produced by the adsorption of surfactants on each of the two surfaces of film.

The main properties of fire fighting foams are stability, vapour suppression, and burn-back resistance.

AFFF formulations containing water-soluble fluorosurfactants and hydrocarbon surfactants are effective at extinguishing non-polar solvent fires. Since the surfactant-containing solution draining from the foam is not soluble in the non-polar solvent, thin films form on top of burning fuel such as Heptane, gasoline or Avgas, acting as a vapour suppressor, and preventing re-ignition of the fuel. However, AFFF formulations are totally ineffective on polar solvent fires such as Isopropanol or acetone, which are water-soluble solvents.

The addition of a polar-solvent insoluble foam stabiliser in AFFF is a good way to obtain alcohol-resistant (AR) AFFF formulations. These alcohol-resistant additives precipitate in contact with the polar solvent, giving rise to a protective membrane that prevents the foam from dissolving into the polar solvent. This membrane plays the role of a vapour barrier that extinguishes the polar fuel and prevents its

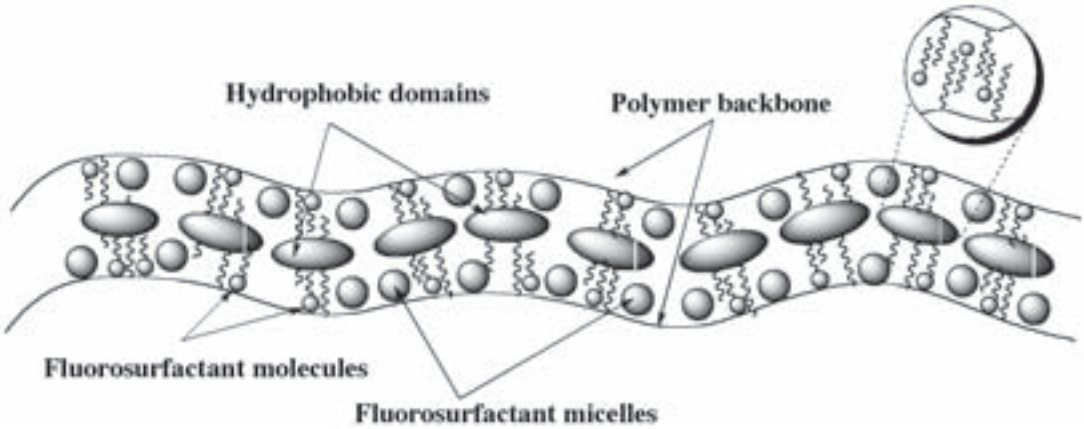


Figure 1: the hydrophobic properties of the FPC containing the hydrophobic segments of HM-polymer in contact with the exposed hydrocarbon/ fluorocarbon areas of micelles (playing the role of non-covalent interpolymeric cross-linkers).

reignition by keeping the foam hydrated. The foams stabilisers usually used in AR-AFFF concentrates are polysaccharides (or other high molecular weight synthetic polymers), which increase the viscosity of the foams. Another option for AR foams is to increase the content of the fluorosurfactants. Both these options are used in the production of foams worldwide, but are not the best solution.

Using option 1 – polysaccharides – increases the viscosity of the foam which in turn reduces its fluidity on the surface of the rim, so extinguishing time is longer than with a lower viscosity foam. In the second option – increasing the fluorosurfactants – the foam will have a low viscosity but it will contain too much fluorine, which persists in the environment. The lower the fluorosurfactant content the better the foam is for the environment.

A new development for foams containing water-soluble high molecular weight polymers

Following two years of research and development, Orchidee International's R&D team has succeeded in perfecting a foam stabiliser that provides excellent results when incorporated in low viscosity AR-AFFF foams and AFFF foams.

This stabiliser is a fluorine-containing polymeric complex (FPC) composed of water-soluble, high-molecular weight, grafted polymer, as well as a polymeric fluorosurfactant. The result is a foam that can fight hydrocarbon and polar solvent fires without the addition of any polysaccharides. The polymeric fluorosurfactant is based on a C6-carbon chain fluorotelomer product, preventing the toxicity, persistence and bioaccumulation footprint of PFOS- and PFOA-related contaminants.

PFC is based on an associative polymer (ie a macromolecule with attracted groups either attached to the ends or randomly distributed along the backbone) that has been hydrophobically modified and has surfactant-like qualities (HM-Polymer).

The addition of a polymeric fluorosurfactant to the HM-polymer results in hydrophobic properties. As the HM-polymer is sensitive to interactions with surfactant molecules, it forms a complex (FPC) with the polymeric fluorosurfactant molecules and micelles. The hydrophobic properties of the FPC containing the hydrophobic segments of HM-polymer in contact with the exposed hydrocarbon/fluorocarbon areas of micelles (playing the role of non-covalent interpolymeric cross-linkers), are shown in Figure 1 (opposite).

The co-adsorption of polymeric fluorosurfactant molecules and HM-polymer result in an appropriate stabiliser for fire fighting foams. Due to its highly hydrophobic character, FPC improves the extinction and burn-back on hydrocarbon fires. Moreover, thanks to its alcophobic character and therefore its insolubility in polar solvents such as Isopropanol or acetone, PFC forms a visible strong film at the surface of these polar solvents. The use of PFC to stabilise bubbles formation represents a new approach to reducing environmental impact (due to the reduced fluorine-content) while at the same time retaining performance.

The following tables I and II show some Class B fire test results effected with a low viscosity AR-AFFF /3x3 containing FPC based on C6 Fluoroalkyl chain, according to EN 1568-3 and EN 1568-4 Standards.

Fuel	90% Control	100% Extinction	25% Burnback	Class
Heptane	0 :47	1 :13	10 :47	IA
Acetone	0 :28	0 :54	14 :54	IB
Isopropanol	1 :07	1 :12	9 :35	IC

TABLE 1: large-scale fire tests

Foams	100% Extinction	25% Burn-back
LV AR-AFFF /3x3		
Heptane	0 :41	13 :30
Isopropanol	0 :50	14 :30
LV AR-AFFF/1x1		
Heptane	0 :38	16 :00
Isopropanol	0 :55	12 :00

TABLE II: small-scale fire tests

Conclusion

Orchidee has developed new low-viscosity foams that contain high molecular weight polymers with low fluorine content that we believe provide the best solution for high risks areas such as rim seals in floating roofs tanks, offering high resistance on hydrocarbons fuels and polar solvents. This type of foam is suitable for use with all types of rim seal protection systems as well as pressure vessels, CAFS (compressed air foam systems) and fire proportioners.

Opinion corner

MORE CAN BE DONE TO PROTECT LIVES AND LNG ASSETS, WRITES PAUL TAYLOR, FIRE PROTECTION MANAGER, DEBORAH SERVICES, UK.

Responders arriving at an LNG plant fire rely on the local fire station having identified the facility on its special risk register. But results vary because each fire station has its own system when authorising fire hazards. A universally-accepted and therefore consistent database should be created detailing for example:
• Date of last inspection – how reliable is the information we're being given? • How many tanks of what capacity? • Which materials do they contain? • Are they flammable or explosive? • Fire rating eg of structural steels eg how many hours the structural steel will bear what weight, how long into what temperature and type of fire? (eg jet fire, pool fire or blast).

This quick-to-access information would save precious time and help fire fighting crews make quicker and sounder judgements on their way to a fire. That information could also save lives and assets – buildings, structures and equipment – as they'd help crews decide how to mitigate the risks or let the fire burn out.

It's also in an LNG plant owner's interest to achieve high standards of fire protection to protect production revenues. Trade in LNG has increased one hundred fold from 3bcm in 1970 to 331bcm in 2011 and is set to double by 2020 (source: Economist).

As gas supplies increase, markets relentlessly globalise and integrate, prices may well fall which will put protecting assets and finding efficiencies top of the agenda, so LNG's safe handling is already rising up the agenda.

Let's get our own house in order first. We should start with a British special fire risk register which may then be adopted in other countries. Safety isn't just a priority, it's a value. Priorities change, values don't.

Paul Taylor has been involved in the design process as well as installing and maintaining passive fire systems for LNG assets for most of his career.

LEAK INTO ELK RIVER – FREEDOM INDUSTRIES 'DID NOT HAVE A RIGOROUS INSPECTION PROGRAMME FOR THESE CHEMICAL STORAGE TANKS'

In an update on the investigation to a leak in the bottom of a tank that contaminated the supply of drinking water for 300,000 residents in nine West Virginia Counties, the US Chemical Safety Board (CSB) has reported it has thus far found no record of a formal, industry-approved inspection performed on any of the chemical storage tanks at Freedom Industries prior to the massive leak that occurred on January 9, 2014.

Informal inspections may have occurred, preliminary findings indicate, but investigators have found a lack of appropriate engineering inspections with prescribed frequency and rigour of inspections.

The CSB commissioned an inspection of tank 396 and similar tanks at Freedom Industries, scanning the tank interior and the surrounding topography of the river bank.

The investigation found that two small holes ranging in size from about 0.4-inch to 0.75-inch in the bottom of the 48,000-gallon tank 396 were caused by corrosion, likely resulting from water leaking through holes in the roof and settling on the tank floor. Furthermore, the CSB inspection found a similar hole penetrating the bottom of nearby tank 397, containing the same chemical at the facility, located in Charleston. Other tanks also showed multiple signs of pitting and metallurgical damage, investigators said.

The growing corrosion in these tanks went unnoticed until the bottom of 396 was breached and up to an estimated 10,000 gallons of the chemical 4-methylcyclohexane methanol (MCHM), mixed with propylene glycol phenyl ethers, or PPH, made their way through the underlying mixture of soil and gravel under the facility and into the Elk River on January 9, 2014.

CSB Chair Rafael Moure-Eraso said, 'An underlying root cause of many of our investigations, including these latest two in West Virginia, is the lack of thorough inspections and hazard reviews, and the need for stricter regulations in areas where we find self-policing is not preventing accidents.'

NEW MODELLING SOFTWARE FOR THE OIL AND GAS, PROCESSING INDUSTRY

Modelling software for the oil and gas, processing and industrial storage markets has been unveiled by Norwegian company GexCon.

The new FLACS-Fire software completes the hazard modelling part of FLACS, an industry standard 3D (computational fluid dynamics) gas dispersion and explosion modelling software that was launched in 1986.

'It's what the industry has been asking for,' commented GexCon Vice President Products, Djurre Siccama. 'All the advantages of FLACS in a full 3D, CFD, fire-specific package. This will lead to greater efficiencies, detailed modelling – with our ability to include geometry such as equipment and piping, which affects fire behaviour – and tangible savings for client companies. For example, they can now create cost effective, optimised designs, while also increasing safety, by only installing fire prevention measures where they're actually needed, rather than throughout an entire facility. In that way FLACS-Fire represents a truly unique investment.'

The Windows and Linux-supported package models a wide range of scenarios, including, but not limited to, jet fires in cross winds, flash fires, over ventilated compartment fires, and large-scale field experiments. Typical application areas include escape route impairment (modelling heat, smoke, visibility etc.), vessel heat-up modelling, offshore and onshore installations, and factory building fires.

The firm's software and services have been used to assess a wide range of incidents, including Piper Alpha, Deep Water Horizon, TWA 800, the P-36 platform, and Buncefield.

SOLBERG'S RE-HEALING FLUORINE-FREE FOAM GAINS FM APPROVAL

Re-Healing Foam concentrate is a high performance fluorine-free foam concentrate for use on Class B hydrocarbon fuel fires. It is also used to prevent re-ignition of a liquid spill and control hazardous vapours. The new FM Approval for Re-Healing RF3 3% foam includes bladder tanks, proportioners, foam chambers, foam makers and fire sprinklers.

'Advances in foam technology have completed another revolution of the fire science world. We have passed from protein to fluorine-containing foam in the 20th century, to high performance non-halide containing Re-Healing foam for the 21st century,' explained Solberg's General Manager Steve Hansen. 'All of the ingredients in Re-Healing foam concentrates have been individually tested under the HOCNF protocol and are safe for use from the North Sea to the South Pacific. Every question that has been asked of Re-Healing foam has been answered without a sacrifice in fire performance. From this generation of products we see a great beginning for the next generation of Re-Healing foams.'

Re-Healing RF3 (3%) foam concentrate is both UL Listed and FM Approved for use in automatic sprinkler systems at exactly the same application rates and sprinkler operating pressures as aqueous film forming foam (AFFF) concentrates. Equal system performance has been achieved with a completely fluorine-free concentrate that also happens to be high-performance fire fighting foam.

'This is yet another singular milestone for The Solberg Company, achieving the world's only FM Approved foam concentrate that is completely free of all fluorine, whether called fluorosurfactant or fluoropolymer,' added Dennis Kennedy, Executive Vice President of Amerex Corporation, the parent Company of Solberg.

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Fluorine: is the future really free?

SIMON WEBB REPORTS FROM THE ANGUS FIRE FOAM SEMINAR HELD AT THE MANCHESTER UNITED STADIUM, OLD TRAFFORD, IN MANCHESTER (UK) ON 3-4 JUNE 2014.

Top: Day Two saw four fire tests pitting Angus Integrity foams against fluorine-free alternatives (results opposite).

THE AUTHOR
Simon Webb is semi-retired and has found that his experience and knowledge allows him to assist and advise on a range of fire and rescue subjects. Formerly he was the Rescue and Fire Fighting (RFF) Technical Specialist with the UK Civil Aviation Authority (CAA). Previous to his seven years with the CAA he had a 30-year career within the fire and rescue service culminating as the Head of Operational Practices within Her Majesty's Fire Service Inspectorate. He holds a Master's Degree in Civil Emergency Management and was a member of the Institution of Fire Engineers and a Chartered Member of the Institute of Occupational Safety and Health.

The main aim of the seminar was to launch Angus' new Integrity range of foam products, which the company believes would be a 'foam game changer' for industry. It would also address the current environmental and fire fighting issues facing foam users in the fire industry. The new range of Integrity products are based on existing products with the crucial difference that PFOA has been replaced with C6 fluorotelomers.

The programme was spread over two days with speakers from Angus, the Environment Agency, DuPont and Falck RPI presenting on the first day, followed by fire test demonstrations on the second day. The event had the feel of the Reebok Foam Attack seminars, but with a focus on the re-branded Angus products.

Presentations

Paul Williams, Managing Director of Angus, started the proceedings with some background on Angus, including the recent management buyout. The separation from US ownership meant that Angus had regained the capability to set its own destiny (and products). Including Angus employees and their agents, Mr Williams estimated seminar attendance at 105 persons, and he commented that by the end of the seminar any confusion over fluorine-free foams would be dispelled – and the demonstrations next day would serve as proof.

Martin Hough, National Sales Manager for Angus, presented further detail around the composition of the C6 foams, with slides highlighting that the percentage of fluorocarbons present in Integrity was so small as to not present an environmental issue. He emphasised the company's responsible characteristics, adding that Angus' experience in testing fluorine-free foams showed that they just did not work. Mr Hough quoted from research reports and testing to support his argument that fluorine-containing foams were more effective and did not damage the environment. There were issues around defining risk, viscosity, the need for aspirating equipment for fluorine-free foams, compatibility and system approvals. He concluded his presentation by saying that one foam couldn't do everything – it was a question of choosing the right foam for the right application.

The most interesting presentation – for me – came from Matt Gable of the UK Environment Agency. Unfortunately it was also the most confusing. Mr Gable fulfils a number of advisory roles in England, including advising the Chief Fire Officers Association and local authority fire services. His intention was to set out the environmental impact of foams, the legal position and training. The Environment Agency is a government agency that enforces locally the legal framework and policy that has been set by UK government. It is a response organisation with a policy and regulatory remit.

Mr Gable covered the issues around oxygen depletion, PFOS, PFOA, biodegradation and persistence. He was very clear that the operational imperative was that the most effective foam for the job should be selected. However, as was pointed out by a delegate during questions, this conflicted with advice contained in the Fire and Rescue Service Manual on Environmental Protection, which stated: 'FRSs are encouraged to consider the use of these (fluorosurfactant-free) products where they can satisfy themselves that the fire performance meets their needs.'

Talking about the legal position regarding offences for pollution, Mr Gable doubted that any fire service would be prosecuted where foam had been used in life-saving situations. However, during the later questions session, that advice was questioned in the context of courts having the final decision, as well as the fact that action could be taken around negligence during the planning for a response.

Mr Gable emphasised that the use of foam in training required appropriate management, and that their use should be discussed with local water companies in order to reach prior agreement on procedure, and to ensure any discharge consents were in place.

The next speaker was Ronald Bock, the Environmental Risk Manager for DuPont, currently the leading worldwide manufacturer of fluorosurfactants.

Mr Bock gave a very interesting presentation dealing with fluorosurfactants in foam, including the USA Environmental Protection Agency's Voluntary Stewardship programme for reducing PFOA, as well as other regulatory controls taking place abroad, for example joint work being carried out by Norway and Sweden.

Mr Bock acknowledged that there was no full research and data on C6 at present, and he was careful to only go so far as saying that fluorine-free foams did not perform as well as AFFFs. However, he did not clarify whether that was in terms of environmental, fire fighting or burn-back performance.

David Plant of Angus then introduced delegates to a case

study involving a petrol leak at Banksmeadow in New South Wales, Australia. The foam application had ensured that there were no flammable vapours to ignite. The site responders were able to use less foam than the local authority fire and rescue service that had attended as part of the emergency response plan, and which had used recently-selected fluorine-free foam.

Dr Niall Ramsden of Falck RPI then presented on Standards for Foam Testing, a thorough overview of the key components for foam testing. He emphasised the need for fit-for-purpose tests, safety margins, fire tests in critical areas, relevant application rates, vapour suppression, burnback, repeatability, and evaluation criteria, re-emphasising that different uses may require different foams. He also made the point that for some industries – such as aviation – the aim was to control the fire rather than total extinguishment.

Dr Ramsden touched on the changes within performance that he was noting as a result of the move from C8 to C6, such as batch variations and production location variations. He also made the point that manufacturers did not necessarily know what was best for the users in terms of specification. Regarding future research, he talked about proportioning viscous foam, overlaying of infrared spectra of samples, fluorosurfactant testing, and integrity assurance.

The first day was wound up by a joint presentation by Paul Williams and David Plant with an overview of Integrity Foams, and how Angus wished to be regarded as a trusted, consistent, level headed and respected company with integrity – hence the name for the foam range. Mr Plant then focused on Angus' emergency/back-up service and its effectiveness; the performance of the Integrity range of foams; its warranty; and an offer for anyone to visit the manufacturing facilities.

During the question-and-answer session, issues raised covered foam selection, the Environment Agency guidance, liabilities for polluting, fluorine in foams, differences between C8 and the new C6-based Integrity range.

Test demonstrations

The second day of the seminar was devoted to witnessing four fire tests designed to highlight the different fire extinguishing capabilities of Angus Integrity foams against fluorine-free alternatives. The demonstrations were based on ICAO and EN tests, and Angus emphasised that they should only be considered as demonstrations.

The seminar and demonstrations were an interesting means for Angus to launch the new Integrity range of fire fighting foams. As a past delegate of the Reebok Foam Attack conferences, the similarity in format proved to me that imitation was indeed the sincerest form of flattery.

Demonstration	Foam	Result
ICAO	FFF	Failed on time-to-control
ICAO	Angus C6 FFFP	Extinguished in 1m 31 seconds
EN 1568	FFF AR	Extinguished in 6m 41s – fail
EN 1568	Angus C6 AR	Extinguished in 31s

All the presentations and the facilities were to a very high standard. However, with any type of marketing activity the delegates had to judge what they heard and saw. What I found particularly interesting were the few areas that were not covered, for example the Water Framework Directive and its Groundwater Daughter Directive (and its effects on potential pollutants), and the subject of independent testing of foams. The inconsistency in the Environment Agency guidance was, for me, the biggest issue to come out of the seminar.

Hazmat & waste recycling fires – the impact

THE ISSUE OF FIRES BREAKING OUT AT WASTE RECYCLING SITES REMAINS ONE THAT CONTINUES TO CHALLENGE THE EMERGENCY SERVICES AND THE ENVIRONMENTAL AGENCIES, BOTH IN PREVENTION AND IN TACKLING THEM, WRITES BILL ATKINSON, BUREAU VERITAS, UK.

Whilst the causes of these fires can be the cause of some supposition and controversy, what isn't contested is the shockingly high frequency and severity with which they break out. Between 2012-2013 there were 600 fire-related incidents at waste recycling and storage sites, of which all but five were at privately operated sites. The discrepancy between the public and private figures can in part be explained by the far greater numbers of privately operated sites (over 10,000) compared to local authority operated sites. However the rate of fires is much higher in private sites, with a fire at one in 18 facilities over that period compared to one in every 110 local authority run sites. Why should this be? Again, it is easy to speculate but commercial pressures can certainly add to the temptation to have large quantities of materials stacked densely into every available square metre of the footprint of the site. Not only will this increase the likelihood of a fire occurring, but once fire does break out then tackling the fire becomes much more onerous and lengthy, exposing responders and neighbours of the sites alike for potentially a lengthy window of exposure. The questions are, what are the potential causes of the risks and how real are they?

Air pollution

It is the densely packed conditions in which waste is stacked that lead to the problems of slow, persistent and incomplete burning of materials. These conditions of incomplete combustion can result in a cocktail of chemical species and compounds being formed. These include:

- Carbon monoxide
- Hydrogen cyanide
- Hydrogen sulfide
- Unburnt hydrocarbons
- Ammonia
- Acid gases (eg HCl, NOx, SOx)
- Halogenated hydrocarbons,
- Poly aromatic hydrocarbons (PAH)
- Carbon particulates measured by size (typically PM10 and below)

Above and below: the incomplete combustion of tightly-packed waste creates a cocktail of toxic chemicals. Picture credit: Bureau Veritas.

Extended periods of exposure to CO around the Short-Term Exposure Limit (STEL) of 200ppm (parts per million), particularly without interruption, raise concerns for adverse health effects, and should be avoided. CO is a product of incomplete combustion and exposure to high levels (1,700ppm) can prove fatal.

Hydrogen cyanide may be released during combustion of plastics including polyurethane. Exposure to relatively low levels (50ppm) can prove fatal.

Hydrogen sulfide is typically associated with bacterial decomposition of organic materials and may be encountered in waste streams and industrial effluents. Exposure to high levels (100ppm) can prove fatal.

Hydrogen chloride may be released during combustion of plastics including polyvinyl chloride with exposure to relatively low levels (43ppm over 30 minutes) causing disabling effects.

Ammonia is typically associated with cleaning products and industrial refrigerants. It may be encountered in waste streams and industrial effluents, exposure to high levels (3000ppm) can prove fatal, exposure to much lower levels (250ppm) can incapacitate.

Smoke from whatever source poses a risk when inhaled, but the Public Health England advice is that while the larger particles are obvious when deposited on cars, washing and the outside environment, they pose only a minimal risk. It is the much smaller particles (PM10 and below as defined by their diameter in micrometres) which are not visible to the naked eye that can be inhaled and taken deep into the lungs, which may cause problems particularly to susceptible individuals. People at most risk would be those with pre-existing respiratory conditions, such as asthma and chronic obstructive pulmonary disease (COPD), or pre-existing cardiac conditions such as angina. This is because the particulate matter contained in the smoke acts as an irritant. If enough smoke is inhaled, this can cause a sensation of tightness of the chest, difficulty with breathing, or coughing.

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IN PROFILE: GEMCO MOBILE SAFETY

Mass decontamination unit as built for civil defence organisations.

Based in Eindhoven (the Netherlands) GEMCO Mobile Safety BV is dedicated to the design, manufacturing and assembly of special intervention and/or support vehicles and systems for hazardous situations.

Safety vehicles and systems offered by GEMCO range from decontamination units, technical/ medical rapid intervention vehicles, containers, mobile laboratories, and mobile repair and maintenance units to self-supporting command units and mobile wireless network support vehicles – including telescopic mast systems.

Decontamination units are fully self-supporting and suitable for hazardous material disasters when rapid response intervention is required or urgent mass decontamination (in the case of epidemics). The decontamination units are based on a 'hook arm' system, and all necessary equipment, materials and consumables are available within the unit and installed in roller containers. With quick inflatable tents on both sides, the container can rapidly be converted into a 48m^2 treatment/ handling area per tent (small and large capacity deco-units are available).

GEMCO's mobile laboratories can be used for air and water analysis in the case of hazardous materials or pollution hazards, and they can also be equipped for in situ repair and maintenance. The units come fully equipped with laboratory equipment, machinery and tools especially suited for the task in hand. The company has produced mobile lab units for several public organisations to fulfil multiple tasks ranging from hazardous material analysis to forensic research.

The UK has set national Air Quality Objectives, following European Directives, that cover common air pollutants including particulates (PM10 and PM2.5), carbon monoxide, ozone, nitrogen dioxide, benzene and 1,3 butadiene. The objective for PM10 particulates is for the limit of 50µg/m3 (measured as a 24hour mean) not to be exceeded more than 35 times per year.

To assess the risks to the public during incidents like this, the National Air Quality Technical Advisor (NAQTA) will mobilise the Air Quality Cell (AQC) to undertake air quality monitoring to assess the risk to the general public. This is especially important when fires are located close to residential areas or areas of high public amenity (eg schools). A fire broke out on 21st August at Averies Recycling in Marshgate, Swindon – a built up area less than 100 metres from residents – despite the operator previously being fined and warned as to the risks of fire breaking out.

The fire involved over 1,000 tonnes of densely packed waste plastic, wood and other materials. The team from Bureau Veritas, operating as part of the AQC, began monitoring early the next morning for two days. It was clear that the weather conditions, particularly overnight on the 22nd August, led to elevated levels of particulates which were for brief periods detected at levels which were well above the air quality guideline levels. The fire continued to burn (and at the time of writing is likely to burn for some weeks) prompting a second call-out of the AQC on 27th August. By this time, sufficient waste had been removed from the site so that intense fire fighting operations could begin. It was these operations and the concerns for the welfare of the responding crew that prompted Wiltshire Fire and Rescue Service to call in a separate monitoring team from Bureau Veritas to conduct air sampling to assess the potential exposure to the responders, both from walk-round surveys and at static sites including where the crews were based.

The results from the monitoring carried out indicated carbon monoxide levels that did briefly exceed the Workplace Exposure Limit (WEL) of 30ppm during the walk-round survey but the concentrations of other toxic gases (hydrogen cyanide, chlorine, hydrogen sulfide) were below detectable concentrations at all locations (less than 0.1ppm). The concentrations of particulates showed a significant variation at each of the sampling locations due to changes in wind speed and direction (something I can personally vouch for!). The levels recorded were more consistently above the WEL with occasional but fleetingly higher levels recorded.

An earlier incident occurred during the night of the 20th August 2013 at around 9pm, when a large fire broke out on the site of Junction 25 Recycling, a waste recovery facility situated close to Junction 25 on the M60 at Bredbury, Stockport. This resulted in a smoke plume depositing ash and soot over the surrounding areas. A Bureau Veritas monitoring team was requested by Greater Manchester Fire and Rescue Service to attend and monitor the area affected by the plume. The majority of the fire was extinguished relatively quickly but the tightly compacted bales of waste had to be individually broken up and damped down, a process that took at least two weeks.

Monitoring was set up for both chemical species and carbon particulates. While the chemical gases results again showed levels that did not exceed STEL, the total inhalable particulate concentration was above the Air Quality Guideline Level for PM10 of 50µg/m^3 at all monitoring points apart from the Incident Command Unit. At these levels, protective measures such as the use of correct filter masks would need to be put in place.

The environmental risks generated by liquid leaking from the waste and the impact of water run-off has to be factored into the fire fighting plans, adding further complexity and delays in initial firefighting operations. However the damaged caused can still be severe and long-lasting.

A fire at Arcwood Recycling in Lows Lane, Stanton-by-Dale, Derbyshire in 2013 resulted in the prosecution of the site operators who were deemed to have put people 'at risk of death or serious injury'. The fire broke out in a pile of 8,000 tonnes of wood stored at the plant, which was stored too close to a gas supply. Extinguishing it took two months, costing over £300,000 ($450,000) and resulting in the death of thousands of fish, even after seven tons were moved for their protection, and damaged 6 km of river.

Summary

In conclusion, prevention rather than cure definitely remains the best strategy in relation to waste recycling site fires. There is evidence that there are potential health impacts to crews responding to fires from breathing air pollution of particulates but little or no evidence of exposure to high levels of chemical species. Particulates monitoring looks to be needed not just because of the levels being measured but crucially because of the length of time exposure can occur, something that sets waste recycling fires apart from more 'normal' fires.

The air pollution risk is also of concern for the vulnerable population, especially if they have little choice in moving away from a fire. Given the possible risks, fire services also have a duty of care to their employees, so the case for air monitoring will remain, especially for the long and complicated incidents (which seems to be most of them) along with control measures to limit exposure (eg PPE). The environmental impact of these fires is also clear. Mine is not the first voice to say Something Must Be Done to put measures in place to both prevent these fires from breaking out and stop them being so difficult to tackle, but I would hope I might prove to be one of the last.

Sources

- Letsrecycle.com news, 10th April 2014 "Rogerson outlines scale of fires in waste sector".
- Containment News, Business Synergies, August 2014 mailout.
- Bureau Veritas monitoring reports.

Bill Atkinson SA is Technical Director of the Fire Science and Chemicals Management group of Bureau Veritas, delivering hazmat training, emergency response services and air quality monitoring. He is also a retained scientific advisor to West Midlands Fire Service.

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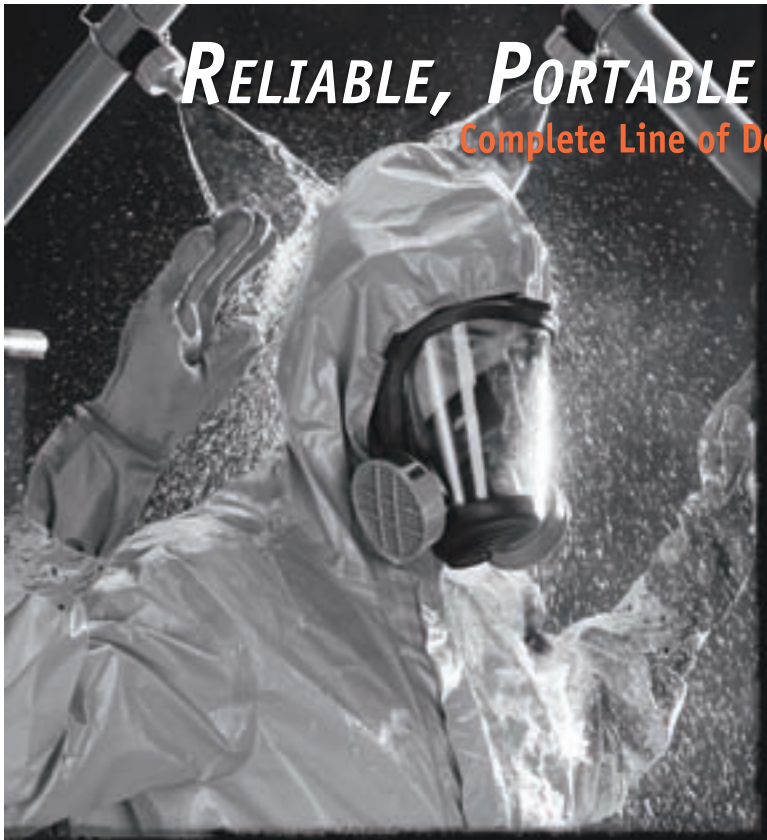

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IN SAFE HANDS

GOOD HAND PROTECTION IS AT THE HEART OF FIRE FIGHTING AND EMERGENCY OPERATIONS – *IFJ* SERVES UP THE LATEST GENERATION OF GLOVE TECHNOLOGY.

Bristol Uniforms ventures into gloves

Bristol Uniforms' black leather fire glove.

Bristol Uniforms is launching its own range of structural fire fighting gloves at Emergency Services Show 2014 (24-25 September). In a further extension of its own-manufacture product strategy, Bristol has designed a range of three structural firefighting gloves to meet EN659: 2008 and which have focused on providing class leading protection and manual dexterity.

The new gloves, which have been designed by Bristol's in-house design team as part of Bristol's New Product Development Programme (BNPDP), have been fully tested by UK firefighters before going into production and will be available in three different fabric combinations. A robust development programme included extensive trials on alternative material combinations as well as the cut, finger shaping and overall dexterity of the fire gloves.

Bristol Uniforms' TITAN 1220 red fire glove.

The first product will be available from the autumn of 2014, which is a black, soft, flexible leather design incorporating a Gore Crosstech membrane with a Kevlar lining. Special features include silicone finger and palm grips and a knitted Nomex cuff. Independent testing has shown the glove to score exceptionally well in cut and tear resistance;

Test type	EN standard	Score
Cut resistance	EN388	5
Abrasion	EN388	3
Puncture	EN388	3
Tear resistance	EN388	4
Dexterity	EN420	4

Two other gloves in the range, which will be available in 2015, will incorporate Hainsworth Titan fabrics – the former using Titan PBI 1260 and the latter a Titan 1220 in red.

In common with the leather glove, these both include a Gore Crosstech membrane with a Kevlar lining. Identifying features include silicone palms, reflective piping, knuckle protectors and knitted Nomex cuffs.

Get a grip with the help of Rosenbauer

Rosenbauer's new Safe Grip 3 set of gloves provides heat and flame resistance for fire fighting operations, while the new Rescue II set has been designed for technical assistance purposes. When responding to an emergency firefighters generally have at least two pairs available. The first of these consists of protective gloves for use in fires, which have to be certified according to EN 659:2008. The second pair consists of operational gloves for the operation of extinguishing technology at the vehicle and all other types of work.

Top: Rosenbauer's Safe Grip 3 fire fighting glove and Rescue II operational glove.

Rosenbauer's protective gloves are tested and certified according to EN 407 (*Protection against thermal risks*) and EN 388 (*Protection against mechanical risks*).

'Compared to its predecessor model, the Rescue II possesses improved cut resistance. The new operational glove now meets the highest performance level 5 of the EN 388 standard. The palm consists of highly abrasion-resistant Kevlar with a revamped silicone-carbon coating, while the back of the hand is covered by red nylon with additional impact protection over the knuckles. The inner lining, which is made from cut-resistant polyethylene, also contributes to enhanced safety and an elasticated wristband at the entry to the cuff protects against splinters,' commented Rosenbauer's Gerda Konigstorfer, adding: 'The Rescue II also incorporates marked improvements with regard to sense of touch, firmness of grip and dexterity – from Level 4 to Level 5. Above all, the new movement folds and the optimised material construction provide excellent tactility, while the elastic gathering at the wrist ensures an optimum fit.'

Schmitz aims to work and play, day after day

In 2005, Randy Schmitz – a 22-year firefighter and extrication specialist – was all too familiar with the reasons safety gloves were not being worn: they can be bulky, uncomfortable, and even diminish dexterity and performance. He also even struggled to find sufficient hand protection that would last beyond its first use.

By 2010 Randy and his team had started Schmitz Mittz Inc (SMI), aiming to bridge the gap between hand protection requirements and available safety products through the creation of a task-specific safety glove – The RescueX – for extrication and rescue. 'This glove has been designed with materials known for their individual protective qualities, such as Armortex Kevlar, Cordura, Hypora and carbon fibre. It protects the hands of first responders and front-line personnel from virtually all hand injury risks in the line of duty while offering ergonomic comfort, a snug fit to allow maximum dexterity, superior performance, and a high level of protection in all the right places. The result is a glove so durable that it can be used over and over again, and when washed it can become even more comfortable,' said Randy Schmitz.

Today the SMI team offers four task-appropriate glove styles: UtilityArmor, UtilityArmor Waterproof, RescueX and Ulta-Mittz.

Both of the Utility Armor styles are now undergoing tests at the Hohenstein Institute to qualify for the CE EN388 2003 standard required on PPE in the EU. This will enable distribution to European and Asian markets.

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FLAMEPRO TO SHARE EXPERTISE

At the Emergency Services Show Flamepro will be exhibiting new structural fire fighting suits and specialist garments specifically designed for emergency response, writes Managing Director Philip Johnson.

The new suits we are launching use advanced materials from Dutch manufacturer Tencate. The Gemini XTL is the best-performing, PBI-based outer shell and it incorporates a patented high strength grid which combines extreme durability and outstanding resistance to abrasion with lightweight comfort and excellent thermal protection. Also new is the Advance Light, a high-performing plain weave ripstop outer shell that combines a high percentage of para-aramid with both meta-aramid and antistatic yarns to ensure outstanding resistance to cuts and punctures, excellent durability and exceptional strength retention.

We continue to offer the ever-popular Kermel HTA Ripstop and Kermel A90 outer shell fabrics for structural firefighters turnout gear, with the A90 available in a range of colours and certified to the Marine Equipment Directive (MED, Wheelmark).

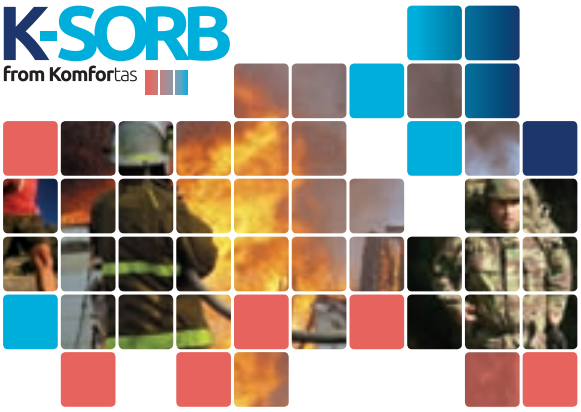
The PBO Millenia Light 450 system structural firefighters suits still lead the world market for lightweight suits. They provide remarkable levels of comfort by enabling greater levels of work output whilst reducing heart rate when firefighters are subjected to heavy workloads or in hot and humid conditions.

The modern firefighter has to undertake a much wider range of operational activities than just fighting fires; high volume pumping (HVP), rescue from height, extrication from restricted places, wildland firefighting and road traffic collision are just some of the duties now undertaken. Structural kit is not suitable for these activities and since high levels of thermal protection are not required it makes sense to use garments actually designed for more specific rescue operations. We have a wide range of specialist clothing, and we use fabrics that provide high levels of durability and comfort whilst actively giving the levels of protection required. Featured below is the new Flamepro Level 1, flame retardant, waterproof breathable jacket currently being used by the Magnox Emergency Response Team at Oldbury Nuclear Power Station in Gloucestershire.

One area in which Flamepro specialises is that of offering bespoke garments for individual firefighter's requirements, whether that is for a perfect fit or for additional features such as specialized protection, pocket styles or types of fabrics. We have many years of experience in garment design, specialist textiles and waterproof, breathable membrane systems, and we enjoy using this knowledge to guide firefighters towards the best solutions for their requirements. A major problem with emergency response teams is a lack of a proper understanding of modern textile systems and we pride ourselves on being able to educate and advise procurement managers in this area.

The new Flamepro Level 1, flame retardant, waterproof breathable jacket as worn by the Magnox Emergency Response Team at Oldbury Nuclear Power Station in Gloucestershire (UK).

K-SORB
from Komfortas



Stay dry, stay cool

K-Sorb is a woven, washable and durable material containing Technical Absorbents patented Super Absorbent Fibre technology. It's unparalleled levels of absorption and sweat retention, gives the wearer a cool, dry feeling. The fabric can be converted into a wide range of washable garments which are worn next to the skin and provide effective results when wearers are working in extreme or challenging environments, or wearing heavy outer clothing.

K-Sorb is designed to absorb up to 10 times its own weight of sweat during use - the equivalent of 4.5litres of sweat for a standard size jacket. The fabric is fully washable, allowing repeated use.

K-Sorb is a product from Technical Absorbents Komfortas range

THE EMERGENCY SERVICES SHOW

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STAYING COOL IS NO SWEAT WITH K-SORB FABRICS

A super absorbent fabric that offers comfort for hard-working firefighters is to be launched during Emergency Services Show in Birmingham NEC, 24-25 September.

UK-based Technical Absorbents's K-Sorb (formerly KoolSorb) has been re-worked to offer improved comfort and containment of body perspiration while maintaining the durability and washability of the original material.

K-Sorb contains the company's patented Super Absorbent Fibre (SAF) and provides unparalleled levels of absorption and retention of sweat, which in turn affords the wearer a cool, dry feeling. The composite structure of the K-Sorb material allows sweat to rapidly be absorbed from the body, providing a dry, comfortable feeling for the user. The sweat is locked away within the highly absorbent core, reducing that wet, clammy feeling. In addition, a waterproof outer layer reduces the risk of wet back onto outer garments, keeping the rest of the user's clothes dry and fresh. The fabric is designed to absorb up to 10 times its own weight of sweat during use, the equivalent of 4.5 l of sweat for a standard size jacket (1.5 square meters of fabric). However, the fabric is fully washable, allowing repeated use of the material.

'K-Sorb fabric is designed to work under extreme conditions where normal evaporation is limited or prevented – such as under heavy protective wear or within a sealed environment,' explained Technical Sales Manager Dave Hill. 'The ability of the material to absorb and retain many times its own weight in sweat, while still remaining dry to the touch, allows the user to maintain a cool, dry feeling for an extended period.'

LED THERE BE SOFTLITE!

FUNCTIONALITY AND SUSTAINABILITY ARE THE NEW TRENDS IN PORTABLE EMERGENCY LIGHTING SOLUTIONS, WRITES PHIL WINNINGTON, MANAGING DIRECTOR OF THE UK-BASED MORRIS SITE MACHINERY.

Working in highly pressurised and difficult environments, many emergency teams require instant light and are turning to portable and lightweight solutions to help support and improve field response and rescue missions.

We are seeing an increased number of enquiries from people looking for portable light that is functional, easy to set up and more increasingly environmental and sustainable. The LED provides immediate ambient lighting that's quiet and fuel efficient to help keep teams working through the night.

The Soflite range (known as Lumaphore in France) has made a name for itself in the emergency services industry, as the products are highly reliable with the ability to be transported in carry cases and moved around with ease – the lighting unit with mast offer users an immediate, no-hassle solution. The lights can be fitted onto the side of vehicles to light work zones and ensure safety whilst keeping teams working efficiently. Robust and wind resistant, the products are capable of performing in difficult weather conditions.

With a powerful illumination of 32,000 lumens and 345 watts, the Softlite LED 400L has the ability to light up to 1,700m^2. These features, combined with immediate illumination and continuity of lighting for up to 50,000 hours, mean that the product is an ideal tool for all types of emergencies (as seen in action below at Brétigny Station in France).

Lightweight and compact, the tower weighs just 6.5kg but does not compromise on robustness and durability. The lighting covers are made of 3 mm thick anti-shock plexi-glass plastic and the head and base are made of ABS composite plastic, both of which increase strength, ensure protection and can withstand strong winds of up to 162 km/h. Additionally, multiple units can be transported together which helps reduce costs and enables units to be deployed across sites where light is required at speed.

Morris Site Machinery has been the exclusive UK distributor of Softlite (manufactured in France by ELC) since 2011.The range compliments our own lighting towers, power and welder generators, pumps and power washers. Our products are supplied to a huge variety of industries including construction, rail, petrochemical, mining and quarrying, emergency services and event management.

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LET'S BE CLEAR

LIGHTING IS ONE OF THE MOST IMPORTANT ASPECTS AT ALL INDUSTRIAL SCENES – BETTER LIGHTING NOT ONLY PROVIDES SAFER ENVIRONMENT FOR PERSONNEL, BUT CAN ALSO IMPROVE PRODUCTIVITY, WRITES TRAVIS TOMLIN, COMMAND LIGHT.

Companies invest millions of dollars[1] to provide better lighting inside their facilities each year, but what about outside their facilities? Construction sites, oil and gas, utility companies – all have to rely on great mobile lighting solutions.

It is imperative that mobile industrial scenes are well lit as to not only provide safety for the workers on scene, but to also protect the financial well-being of the company. Obviously worker safety is the number one goal, but companies also risk losing large settlements – a New York man recently was awarded nearly $500,000 dollars[2] because of having poor lighting at the work site.

Light towers are a great solution for this growing problem, as more night operations take place throughout the world, and as the days grow shorter. There are many things to consider when purchasing a light tower, such as type of light, size, mobility, power requirements, and others.

Command Light has addressed these issues with some of the most innovative light towers on the market. Light towers can be retrofitted for large utility trucks all the way down to lights that can fit atop pickups and SUVs. Units can run on generators with AC power, or can be powered by low voltage DC running from the battery of a vehicle.

There are a number of variations that can make it very difficult to light industrial emergency scenes. Being prepared to be able to light a variety of scenarios can be challenging, but in the long run will improve safety and efficiency. This being said, it is important to remember to use lighting positions to your advantage. Remember, putting a light at a higher position does not solve every issue. You may light more area, but the further the light source gets from a scene, the less intense the light actually is. You may think you are lighting the entire scene, but you may be leaving your workers and company in a vulnerable state with subpar light.

Another important decision to make is the type of lights you want to use for scene lighting. Quartz halogen lights have been around for years and are an extremely reliable and economical choice. In recent years there has been a growing trend toward LED lighting. LEDs have a longer life, are low maintenance as well as shockproof and emit a cleaner whiter light. There have been numerous studies and articles comparing the two[3] and as more information comes out, expect LEDs to become more prevalent.

As you can see, scene lighting is a crucial part of helping employees stay safe and productive and is often overlooked. With many options and configurations available, it can be a bit overwhelming deciding which tower is right for each industry, but with a little help and guidance, scene lighting can help workers and industries all over the world stay safe and save money.

SEARCHING FOR ATEX LIGHTING?

Wolf Safety has launched the Wolf ATEX Zone 0 Flood Bank to offer hazardous area workers a truly portable and self-contained LED temporary floodlighting solution in areas where the most extreme hazards may be present in flammable concentrations.

The ATEX Zone 0 Flood Bank's Handlamps can deliver collectively, within a stand, an illumination of up to 2,100 lumens to a Zone 0 hazardous task area.

The Flood Bank Stand incorporates the Wolflite XT Rechargeable Zone 0 Handlamps (XT-75) that are CE marked to the ATEX Directive and IECEx Certified, for safe use in Zone 0, 1 and 2 potentially explosive gas atmospheres, where a T4 temperature class permits (available in 2, 4 or 6 handlamp bank configurations).

With safety and efficiency in mind, Peli Products, the global manufacturer of portable lighting and high-performance protective case solutions, will present its new ATEX Certified Safety lights at the Congrès National des Sapeurs Pompiers (Hall K - Stand K53), held from October 1-4 in Avignon, France.

'Peli's advanced lighting tools are innovative and tough, and trusted for more than 35 years by professionals working in the fire and rescue, mining, pharmaceutical, hazmat and other high-risk industries,' said Peli's Maria Sistachs. The company has an extensive array of advanced lighting tools: almost 60 models, 16 of them ATEX certified Zone 1&0.

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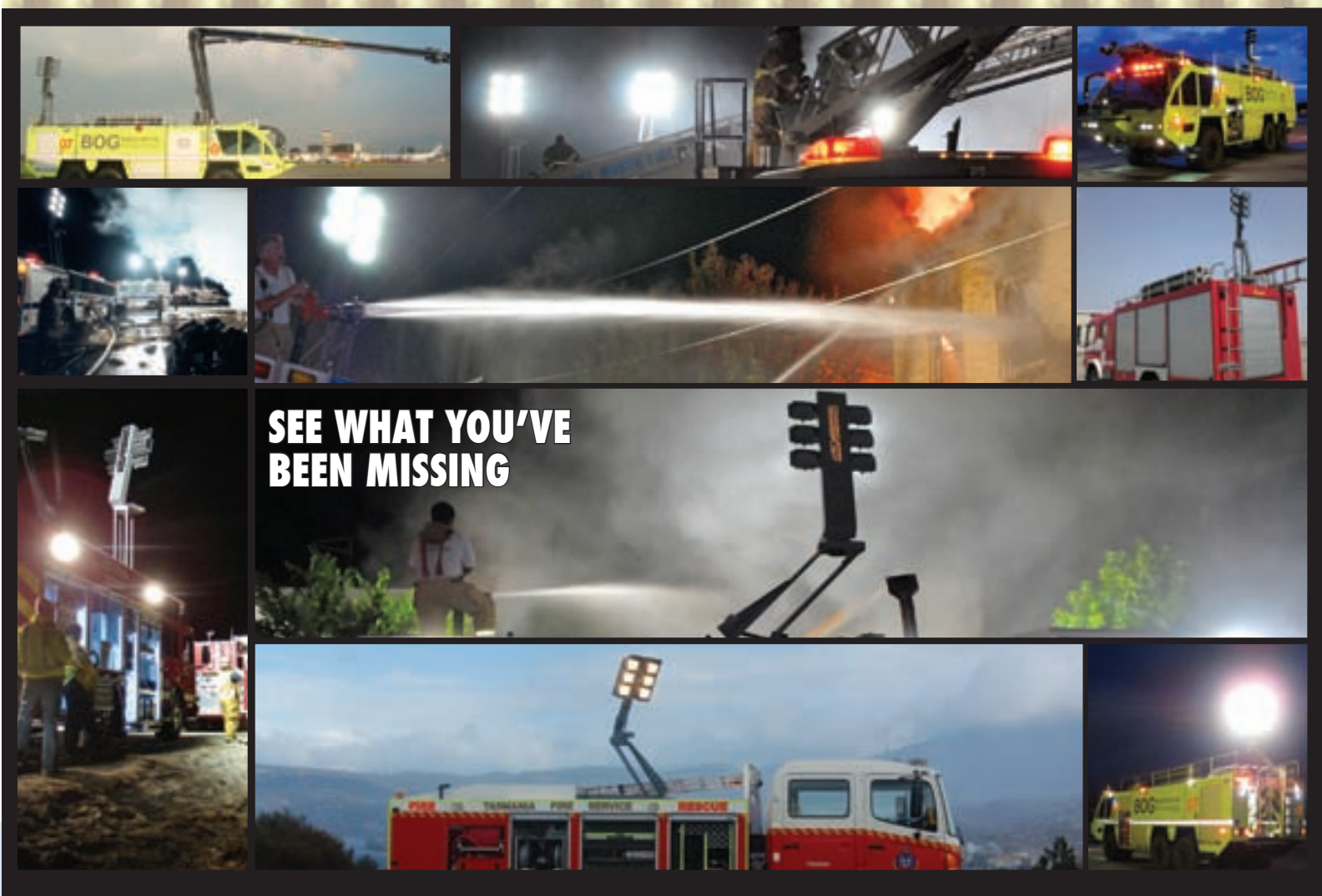

VEHICLE NEWS

Turbine-aided fire fighting!

EmiControls based in Bolzano (South Tyrol, Italy) has started production of the TAF20 turbine, which the company says will 'introduce a paradigm shift in the world of firefighting'. The TAF20, which is to be sold by Magirus under the name Aircore, is the result of research into achieving more efficient fire and smoke control through the combination of water atomisation with innovative vehicles and bolt-on installations.

The TAF20 is basically a turbine mounted on a tracked vehicle.

The turbine atomises large quantities of water into a fine mist to achieve a greater cooling effect over a large surface area. This method, says EmiControls, is more efficient at dispersing smoke and soot particles than conventional fire monitors.

The mist smothers burning objects and can also access parts of the fire source which are out of reach of a conventional extinguisher jet.

The turbine is suitable for use with extinguishing foam and flame inhibitors, and can be used for ventilation. It can be lifted to a height of up to four meters, and the vehicle rotates 360° (the angle of the turbine ranges from -20° to +50°).

Up to 3,500 l/min water can be atomised to an effective spray that targets the source of the fire.

It is envisaged that the active binding of the soot particles and the high efficiency of the fan will prove particularly advantageous in tunnel fires. In such cases, the TAF20 is sent by remote control into the tunnel ahead of the firefighting crew who can follow at a safe distance.

The large surface area of water gives the product enormous potential for use in industrial plants, where the flames can be knocked down quicker and with less water than with conventional means.

The TAF system has undergone a number of tests by different institutions, including the Saxony-Anhalt Fire Services Institute, MPA Dresden, MOL Refinery, and TST Tunnel Safety Testing.

Rosenbauer expands its production line with new plant

Following a 12-month conversion and adaptation phase, on the 23rd of June 2014 Rosenbauer officially opened its new vehicle production plant.

The central element in Plant II Leonding consists of two synchronized production lines for the Panther ARFF series and the AT series of municipal fire and rescue vehicles.

Production at the new plant started in April 2014, with the first vehicles coming off the production lines only a few days after start up. The first Panther from Plant II Leonding was supplied to Sibu Airport in Malaysia, and the first AT was supplied to Thüngen Fire Service in Germany.

The new facility has been designed for the annual production of around 150 Panther ARFF trucks and 250 AT municipal fire and rescue vehicles in single shifts, although this capacity can be raised.

During 2013 and 2104, over €12 million was invested in the new plant, which will employ around 350 people in the future.

The new premises cover approximately 52,000 m² with some 15,000 m² of hall space and roughly 5,000 m² of office accommodation, and they are situated just three kilometres away from Rosenbauer Group's headquarters. A modern training centre houses three seminar rooms, a large showroom for completed vehicles and simulators, as well as workshops for practical training.

Plant II Leonding increases the production space at Leonding by around 60%.

During the official opening press conference Dr Dieter Siegel, Rosenbauer International AG Chairman, commented: 'We have thus obtained the room that we urgently required. In addition we have been able to completely reshape our production. Intensive competition demands technical solutions that facilitate the faster manufacture of top quality fire service vehicles. With this extremely modern plant, we have already set the stage for a continuation of our business success in the hotly contested, international fire industry market.'

Darley Attack apparatus for Southern Peru

A 1,000 GPM Vision Series Attack apparatus manufactured by WS Darley & Co has been sent to Southern Peru Copper Corporation.

The fire truck features a side-design pump operator's panel and module. A Darley LDM 1000 midship pump system and a pressure governor have been built around the pump proportioning system. The body, built on a Ford Super Duty F550 4x2 chassis, has been constructed with ultra-durable polyprene, which is an especially-formulated thermoplastic that provides incredible tensile strength in both high and low temperatures. WS Darley and Pro Poly of America are both parent companies of the PolyBilt Corporation, which builds these durable polyprene bodies.

Other features on the Vision Attack apparatus include a 350-gallon polymer tank, a 25-gallon foam tank, and Robinson roll-up style doors. In addition, a dry chemical system has been installed.

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HEAVY PROTECTION

'A LEAP IN TECHNOLOGY' IS HOW TYCO DESCRIBES THE LAUNCH OF A NEW HEAVY VEHICLE DETECTION AND ACTUATION SYSTEM INTRODUCED AND DEMONSTRATED IN MADRID, SPAIN, IN FRONT OF A RECEPTIVE AUDIENCE OF DISTRIBUTORS FROM 20 DIFFERENT COUNTRIES.

The Next Generation Ansul Checkfire Electronic Detection and Actuation Systems are the culmination of a three-year research and development project that aimed to address a number of fire-related issues in the mining sector as well as other industries that use heavy vehicles.

According to the NFPA, underground mining accounts for more fatalities than any other industry (by far). Between 1900 and 1999, more than 100,000 miners died in US coal mine incidents alone as a result of fires or explosions. In the same 100-year period approximately 23,000 miners have died in non-coal mines.

Thankfully, mine accidents have declined dramatically as a result of research, technology, and preventative programmes and, according to the US Mine Safety and Health Administration (MSHA), mine accidents resulting in five or more deaths (the traditional threshold for the qualifying term 'mine disaster') are no longer common.

Top: Madrid demonstration using the Ansul LVS Vehicle Fire Suppression System. Below: built with ease-of-use in mind, the Checkfire 110 operator interface and Checkfire 210 panel.

Demonstration

To set the scene, a coach delivers around 40 distributors to Grupo Fortem's fire training installation 30 miles northwest of Madrid. In the middle of the training ground is an engine rigged up with the Ansul LVS Vehicle Fire Suppression System, consisting of a gas cartridge, a container of LVS premix, and eight nozzles positioned at various points surrounding the sizeable engine.

A belly pan under the engine serves to start proceedings, and a fire quickly spreads to cover a large area of the oil and grease-covered engine, where a third fire (turbo) has also started to burn. The rig is allowed to burn for around 40 seconds, quickly generating warmth and – according to thermal sensors – reaching temperatures of around 700 °C. The LVS system is then manually activated, and the eight nozzles spray the premix agent for around 40 seconds, extinguishing the fire and reducing the temperature of the rig to around 320 °C. Mission successful.

Building on the Checkfire SC-N

Back at Tyco's new office in Madrid, which features a new TechXchange Training Centre, Ronnie Drugan, Business Development Manager at Tyco Fire Protection Products, explains where the Next Generation Checkfire came from.

Checkfire is not a new name to the market. It has been protecting heavy industrial vehicles for 15 years.

The Checkfire 110 system provides electrical and/or pneumatic input to actuate an Ansul fire suppression system for single-zone protection. When a fire is detected, the control module sends an electrical signal to release the gas from the gas cartridge to pressurise and discharge the fire suppression system. Operating components include the control module, spot or linear thermal detection, electric manual actuators and a protracting actuation device.

The Checkfire 210 system is the 'big brother' of the Checkfire 110 system, and is engineered to protect multiple hazard areas. Equipped with two independent detection circuits it can provide single-zone detection, two-zone detection, cross-zone detection, discharge pressure feedback monitoring or alarm only. It is designed for use with an Ansul LVS, A-101, or Twin-Agent Vehicle Fire Suppression System.

While the Checkfire 110 is designed for the protection of smaller vehicles (eg waste disposal, forestry), the 210 version is for larger applications such as hydraulic excavators, haul trucks, wheeled loaders, dozers and graders.

Next Generation Checkfire

The FM-approved and CE-marked Checkfire system has been engineered to protect the lives of the vehicle operators in case of fire, but also to ensure that their lives stay protected in the case that the system develops a fault.

If the system recognises it is faulty, it can automatically shut off the engine of the heavy vehicle and stop it operating until the alarm system has been fixed. 'Our competition has what they call ''fail safe mode'', which actually just releases the entire agent. We have gone one step forward to identify that there is a false alarm, and instead of releasing $10,000 of agent, we stop the machine, investigate, and solve the problem, thereby saving the customer a lot of money,' explained Ronnie Drugan, adding that the system can be configured so that an alarm signal is also sent to a programmable logic controller.

Furthermore, the New Generation Checkfire has the capability to provide time-stamped false alarm reports, which can be downloaded onto USB sticks in the field for review back in the office.

As with the previous generation Checkfire, the Next Generation is offered with the choice of spot or linear detection. In areas where the heat would be contained, such as the electrical control room of a large excavator, Ronnie suggests a spot detector would be more appropriate. In more open areas such as an engine bay, linear detection would be recommended. 'For some of the top high-value assets we

would promote infrared detection, because it would detect a fire in three or four seconds as opposed to five to 15 seconds.'

The LVS extinguishing agent is described by Ronnie as environmentally friendly, and can be used in any country. It is sold as a premix, he explains, to avoid potential problems with local water quality, and it has a 25-year guarantee. The demonstration used a ten-gallon tank of LVS, but a five-gallon and up to a 30-gallon version are available with different nozzle configurations (up to 20 nozzles on the larger set-ups). 'We can protect from a $5,000 fork lift truck in a hazardous environment in a paper mill up to a $36m machine,' says Ronnie, adding that being able to pre-empt a problem before it occurs is particularly significant in the mining industry, where lead times for specialist giant machines can be anything from six months to two years. 'With the technology now we can ensure that the operator and the vehicle are protected 24/7. And if not, it is better to take the vehicle offline and repaired rather than having a real fire that damages it substantially. If you lose an excavator with a two-year construction lead-time, the impact is significant because that excavator might have been feeding 10 trucks. So if you lose that excavator you also lose 10 trucks. If our system goes off and extinguishes the fire, then at least the equipment can be repaired and the system recharged, and back online 24 hours later.'

As to the potential risk of a large vehicle that has been immobilised by actually blocking an escape route (eg tunnel entrance), Ronnie answers that that is a conversation to be had with the client. The engine cut-off function doesn't have to be activated, or the system can be set up so there is a 10-15 second delay between the alarm going off and the engine cutting out, with the option for the operator to delay this further manually. 'We also have the facility to override the release mechanism, so if an operator needs to get out of a tunnel to a safe place he can press the delay function until he reaches the evacuation point.'

Worldwide availability

The new system will be available through Ansul's certified distribution network, and Ronnie is keen to point out that its installers will all be thoroughly trained before being authorised to sell the system. In the case of Checkfire, this entails a three-day training course followed by an open-book test. 'We want to make sure they understand how the system works, because typically the machines they will be protecting can be anything between $1m and $5m. The largest one I have protected was $36m. And we are protecting assets, production time and safety. We protect the operator and give him the safety.'

Some distributors will fit the Checkfire directly at the factory where the vehicles are manufactured, and which may be disassembled for transport and later assembled at site. Others will retrofit the systems using purpose-built vehicles that double up as mobile workshops. 'We have operational guys in Ghana, Tanzania, Namibia and Siberia. We even have one distributor working with a vehicle manufacturer installing the mining vehicles with Checkfire, followed up by an audit.'

Looking at the market for this type of technology, Ronnie believes Ansul have a 70% market share in Europe and the US, with Australia and Asia Pacific trailing behind (but catching up). 'We have been the market leader in vehicle protection for 50 years now, and we want to jump ahead.'

As with fire safety-related equipment in most countries, the adoption of this technology is driven by standards, insurance companies, and education. Countries that don't have international mining houses operating within them and bringing in their standards and practices are not always up to date with best practice or equipment. 'They may use portable extinguishers without realising that when you lift the engine hood up you are allowing more oxygen in, so the fire flashes back. What we are promoting is a system that is contained and doesn't put the operator at risk.'

PRESENTING... AQUAMIST

TYCO FIRE PROTECTION PRODUCTS INTRODUCES A COMPLETE WATER MIST FIRE PROTECTION SOLUTION COMPRISING THREE TECHNOLOGIES THAT OFFER OPTIMAL FIRE PROTECTION IN A VARIETY OF APPLICATIONS, FROM OIL FRYERS TO MACHINERY SPACES AND CABLE TUNNELS.

Based on proven and reliable technologies, AquaMist offers a versatile and highly efficient fire fighting solution to safeguard lives and property while reducing water usage. 'By reducing the water droplet size, AquaMist achieves a larger surface area to quickly convert the droplets to vapour,' explained Àlex Palau Bosch, Product Manager (Water Mist), Tyco Fire Protection Products.

'This smothers the fire and prevents oxygen from fuelling it. Simultaneously, the effective evaporation of the water droplets creates a significant cooling effect on any combustion gases or adjacent combustible materials and pre-wets them to prevent the spread of the flames. It also blocks the transfer of radiant heat, inhibiting the fire from flaring up. In some cases, this is the best solution for the hazard while in other instances a different system could be the right choice.'

Water mist nozzles atomise water droplets which in turn evaporate quickly and smother the fire.

The three systems comprise AquaMist Ultra Low Flow (ULF), AquaMist Fog and AquaMist Sonic, all featuring the latest innovations in nozzle design.

AquaMist ULF

AquaMist ULF is a complete engineered fire suppression solution that includes pumps, valves, discharge nozzles, pipes and fittings. The system operates at pressures of seven to 16 bar and can provide a reduction in the water required for the system, without any detrimental effect on fire fighting capability. AquaMist ULF is suitable for a wide range of applications, including machinery protection, industrial fryers and a variety of buildings, and is supplied with a specific nozzle for each hazard.

AquaMist Fog

AquaMist Fog is a high pressure system that reduces pipe diameters while providing a fast and efficient fire protection solution for class A and B fires. Operating at working pressures between 70 to 200 bar, the high speed of the droplets ensures that the mist can penetrate the hot fumes and reach the combustion area quickly. The system design is ideally suited to applications where piping dimensions or pressure losses are critical. It is also suitable for areas where fragile infrastructure needs specialist attention and excessive water damage could cause problems, including older buildings, libraries and archives, as well as machinery spaces, such as paint spray booths and transformer rooms.

AquaMist Sonic

AquaMist Sonic is a unique innovation in class B fire protection, ideally suited to machinery protection applications. Featuring stainless steel machined components and no internal moving parts, it offers superior strength and reliability with multiple mounting options for ease of installation and enhanced flexibility. The system provides a higher volume of smaller water droplets mixed with nitrogen for high discharge velocity while reducing total water consumption. AquaMist Sonic's twin-fluid technology is safe in occupied spaces, environmentally-friendly and inexpensive to recharge. This high performance fire suppression system is specifically engineered to cover a wide range of industrial applications.

'Our complete AquaMist range offers an innovative fire protection solution,' said Wouter Bossink, Director of Marketing EMEA (Water FPP), Tyco Fire Protection Products. 'We've designed the systems to meet the demanding requirements of a wide range of varying applications, such as industrial fryers and machinery spaces. This latest development in fire suppression is supported by technical expertise and comprehensive service, offering a real alternative to many other systems on the market.'

Exova Warringtonfire, the specialist fire and security testing and certification provider, has announced an expansion of testing capabilities to include water-mist systems.

The introduction of DD 8458-1 testing will allow customers to test bespoke fixed fire protection systems featuring water mist technology, and their ability to suppress a fire in residential settings. Although currently a draft standard, the test has been introduced early by Exova in response to customer demand. The test will be run from the company's main Warrington site in the northwest of England.

Water-mist systems are becoming increasingly popular due to their suitability for smaller spaces, and the reduction in associated damage to property and fixtures and fittings that can be caused by traditional sprinkler systems.

Rob Veitch, Director at Exova Warringtonfire, said: 'Developments in the technology available for fire suppression means that our customers are continually looking to us to review our testing capabilities in line with their business demands. By introducing this new testing, we can continue to help customers stay ahead of ever-changing legislation.'

Exova Warringtonfire tests reaction to fire, as well as fire resistance of different materials and products for the construction and transportation sectors.

With more than 45 years' experience, Exova Warringtonfire is the world's leading independent fire and certification organisation, with a diverse range of services including fire, security, and automotive testing, fire engineering and a range of specialist fire safety services. It operates globally covering multiple international markets from a network of accredited sites around the world including Europe, Middle East, Asia and Australia

Globe Fire Sprinkler Corporation in Michigan has introduced 11.2K extended coverage ordinary hazard (ECOH) sprinklers to its Extended Coverage product line.

Compared to maximum coverage area of 12.1m^2 provided by standard coverage sprinklers, Globe GL ECOH sprinklers protect areas up to 37.2m^2. The use of ECOH sprinklers can significantly lower the cost of a sprinkler system by reducing the number of branch lines, sprinklers, and installation hours.

Combining an aesthetically appealing compact design with performance characteristics, the Globe GL ECOH is aimed at light manufacturing areas and other Ordinary Hazard applications such as parking garages, retail spaces, restaurants, and libraries, in accordance with NFPA.

The GL ECOH is available in upright, pendent, and ¾"-adjustable recessed pendent configurations with standard finishes of bronze, chrome, and white.

The GL ECOH features a nominal discharge coefficient of 11.2K (160 metric) and is cULus listed for quick response with spacings of 3.7m x 3.7m and 4.3m x 4.3m, and standard response for spacings of 4.9m x 4.9m, 5.5m x 5.5m, and 6.1m x 6.1m. Quick response activation temperatures are 68°C and 93°C; standard response activation temperatures are 68°C, 79°C, 93°C, and 141°C.

Marioff (part of UTC) has received a new VdS type approval for its Hi-Fog Modular Sprinkler Pump Unit (MSPU) and an extension of the existing VdS type approval for its Hi-Fog Gas-driven Pump Unit (GPU) for the protection of enclosed turbines, machinery and special hazard machinery.

The new type approval for the MSPU enables the protection of machinery with combustible and flammable liquid hazards, such as emergency generators and transformer rooms in buildings with volumes up to 1,375m^3 with the Hi-Fog solution.

The GPU type approval extends the protectable volume capability from 500 to 1,375 cubic meters. The improved GPU approval for gas turbines and machinery spaces enables to use more flexible installation criteria, which take the geometry of a combustion turbine into account.

Customized Solution.
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Through our expertize and knowledge, we can advise you on which AquaMist system is best suited to the environment to be protected and work with you to develop the best specification to match the risk.

We believe in customizing a solution to the application, to ensure optimum performance from your fire protection system. Selecting the right AquaMist system is not only about extinguishing the fire, it is about caring for the contents of the building and minimizing water damage.

Take a closer look at Tyco's AquaMist offerings at **www.tyco-fire.com/aquamist**

AquaMist Ulf

AquaMist Fog

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EXCLUSIVE

New solution for metal fires

AT A TIME WHEN FIRES IN RECYCLING AND WASTE MANAGEMENT SITES ARE FORCING INSURERS TO PULL OUT OF THE SECTOR, A NEW PRODUCT AIMED AT EXTINGUISHING METAL FIRES HAS BEEN LAUNCHED INTO THE MARKET. JOSE SANCHEZ DE MUNIAIN SPEAKS WITH DUPRE MINERALS' MANAGING DIRECTOR ANDREW BAYLAY, TO FIND OUT ABOUT AQUEOUS VERMICULITE DISPERSION – A NEW TECHNOLOGY WITH KEY BENEFITS OVER EXISTING SOLUTIONS.

Aqueous Vermiculite Dispersion is the name given to an aqueous dispersion of chemically exfoliated vermiculite. Raw Vermiculite is a mineral composed of laminar iron-magnesium silicates containing microscopic layers of water. Vermiculite has a wide number of applications, some of which are already in the fire market. Micalite is the brand name of shaped vermiculite board that is used for insulation and heat resistance in the construction market. Micashield is a Vermiculite dispersion for improved heat resistance, again widely used in the construction industry for rendering buildings.

Extinguishing a magnesium powder fire with a backpack misting system (below) and a fixed misting system (above).

When did you realise that vermiculite could be used for fire fighting?

It always had the right properties, but the issue was finding a way of getting it suspended in the right solution. Traditionally it has been used in fire protection as a render in granular form – never as a liquid. For the last four to five years we have been finding a way of chemically exfoliating Vermiculite. For traditional applications we used a process called thermal exfoliation, which involves heating the vermiculite and causes it to expand and concertina to ten times its size, a bit like popcorn.

Isn't it contra-intuitive to add a product with water on a metal fire?

The product resembles nothing like water – it is an unctuous liquid in its own right. It propels from a cylinder as a fine mist of nano sized particles and the aqueous element evaporates before the vermiculite platelets hit the fire.

How does AVD extinguish a metal fire?

The AVD platelets immediately form a barrier on top of the fuel, gradually starving the fire of oxygen and forming a ceramic crust stopping further production of flammable gases, cooling and controlling the fire. Unlike traditional solutions like salt and sand, where the fire can continue to burn for a long period of time and indeed reignite when disturbed, with AVD the fire is extinguished completely much quicker, which means the material can then be disposed of faster. The firefighter takes immediate control of the fire.

What hurdles have you come across in marketing this new product?

As it's a new product we have to educate people that this is a solution to Class D fires through a misting system – whether

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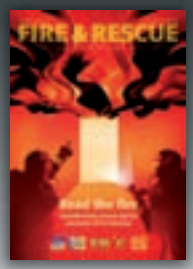

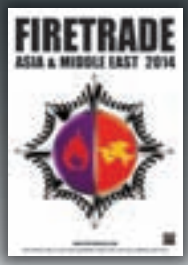

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fixed or portable. The problem we are coming across is that people just don't have an ideal solution for these types of fires, as recent fires have shown. Also, you cannot just take the product, add it to an existing system and expect it to work – droplet size, application rate etc all have to be taken into account.

How is AVD's performance being measured?

Ironically there isn't an approvals test in the UK for Class D fires, so we are having to go to UL in the USA.We are working with the Health and Safety Laboratory at Buxton to create a UK standard test. In this country we hope that AVD will become the accepted solution for Class D fires, be it a fixed or portable system.

What are your target areas?

Our target markets are class D metal recyclers, lithium battery producers and recyclers, storage and transportation, where we believe there is a lot of demand. In the future we'll also be looking at plastics fires, as it also works with these. There are a lot of people out there with no mechanisms to put out a metal fire other than – if small – smothering it with sand or thousands of gallons of water. In today's world you would want to pick up a cylinder and control it in seconds.

In addition, one of our employees is a firefighter and he's looking at a portable backpack system with a constant pressure. The idea is that a single firefighter could extinguish a vehicle fire without the aid of a fire tender. We are working with strategic partners to offer various solutions of application, we estimate that five litres comfortably extinguishes a 20 kg Magnesium fire within a few minutes.

Are there any environmental concerns with AVD?

None. Because it is a raw mineral – and therefore inert – Vermiculite is used in garden centres to grow tomatoes!

What has been the reaction from the fire industry?

We have a strong belief we have identified a genuine market need, and the feedback we have received has been very positive. Literally every day we are getting phone calls and speaking to big names that you will know, so it is obvious that there is a need and an opportunity. The product is gathering momentum and we have a possibility of installing 18 fixed systems in the near future.

You can see AVD in action on You Tube, under 'AVD Fire Extinguisher Solution'.

Problem encapsulated!

Extinguishing lithium-ion battery and combustible metal fires is possible with F-500 Encapsulator Agent, writes Chris L Champion, Vice President of the Georgia-based (USA) Hazard Control Technologies.

In January 2008 Bosch Industries in Germany began testing foams, powder and F-500 Encapsulator Agent on lithium-ion batteries. In 2009, Bosch named F-500 EA the product of choice for extinguishing lithium-ion battery fires.

Later, in 2012, Dekra Automobil GmbH concluded testing of F-500 EA for high-voltage vehicles and confirmed their recommendation. In April, 2013, a paper written by Dekra, Daimler AG and Deutsche ACCUmotive GmbH & Co KG of Germany was presented at the SAE International 2013 World Congress and Exhibition in Detroit. The report addressed concerns over lithium-ion battery fires in electric automobiles and solutions for extinguishment from their cooperative testing in Germany. They found F-500 EA was able to penetrate lithium-ion batteries and extinguish them without reignition.

As an encapsulator agent, F-500 EA can be applied to Class D combustible metals, without violent explosions. When water or foam is applied to Class D metal fires, the extreme temperatures cause the water to separate into explosive hydrogen and oxygen. Powder doesn't cool a fire, so re-ignition can occur. F-500 EA creates a protective layer around the surface of the water droplet and changes the heat mechanism from steam conversion to thermal conveyance. F-500's rapid cooling capabilities quickly extinguish the fire and prevent reignition. These attributes make F-500 EA suitable not only for combustible metal fires such as magnesium and titanium, but also for lithium-ion battery fires.

The manufacturer of F-500 Encapsulator Agent is Hazard Control Technologies (HCT) in Georgia. Firefighters use F-500 EA for its broad capabilities and rapid knockdown with Class A, B (polar), B (nonpolar), Class D and three-dimensional fires and many industries use F-500 EA to improve the performance of fixed suppression systems.

The technology recommended for lithium-ion battery storage is HCT's AquaTech Plus Water Mist Systems, which are custom-designed systems for specific hazards. AquaTech Plus is available as a self-contained system for enclosed areas, such as lithium-ion battery transport containers, or as large, fixed systems capable of mitigating large storage areas. Within the AquaTech Plus family is the F-500 Encapsulator Dragon, which is a powerful misting system, capable of propelling F-500 EA solution over 300 feet, with 359° oscillation to cover even larger areas, over 250,000 square feet.

AquaTech Plus Water Mist Systems is the solution of choice for a titanium metal recycler dealing with a history of unexpected fires. A large California fire department has been recommending – and in some cases insisting on – the use of F-500 EA for industrial facilities. Proper fire suppression equipment can save money on soaring insurance costs, as most providers require systems, especially after an incident. Another California company is evaluating a self-contained system for transporting lithium-ion batteries.

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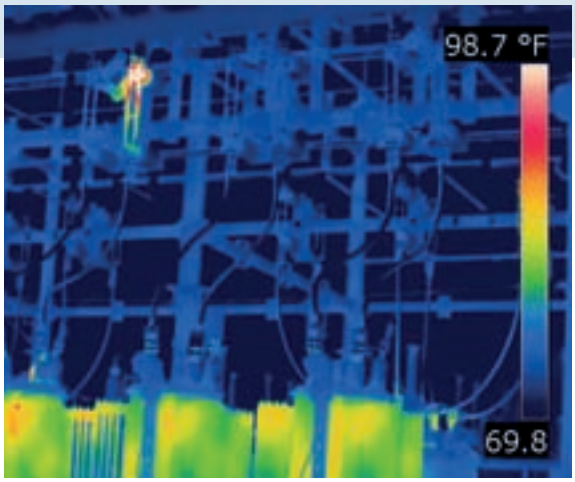
ALL-SEEING ATEX EYE

The concept of infrared cameras is gradually gaining traction at industrial waste management facilities – but the launch of an ATEX infrared camera now brings the technology to the petrochem industry. Jose Sanchez de Muniain speaks with Flir Product Specialist Chris Brown about the A310ex.



Launched in the UK at Firex in June was the new Flir A310 ATEX-compliant (zones 1, 2, 21 and 22) infrared camera, which can detect elevated temperatures before the outbreak of fire and 'see' through smoke and dust. And not only can it prevent a fire, it can even aid in casualty detection too.

The Flir A310 is not new, having been in the market for a number of years, but Chris Brown explained that due to market demand the decision was taken to integrate the camera in an explosive-proof housing.

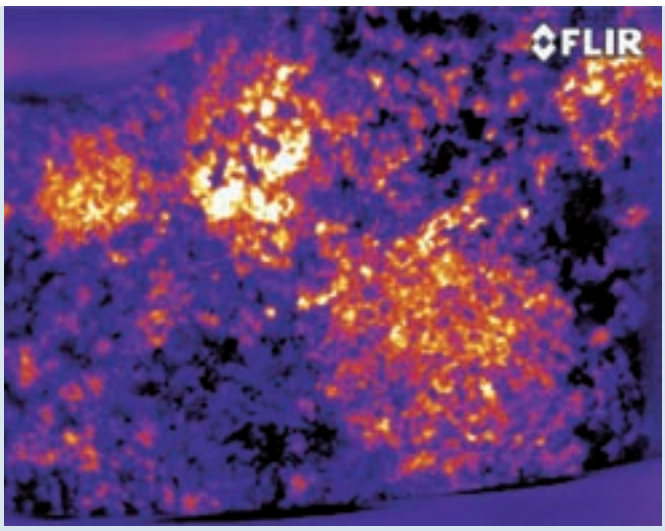
A key feature of the A310 is its radiometric features, meaning that it can actually measure temperature. 'And as you can imagine, once you can do that you can create alarm functionality for identifying a hot spot or an area where temperatures are rising. Applications range in anything from monitoring pipelines and looking for escaping gas or liquid, right over to waste bunkers where there are all kinds of materials with potential for chemical reactions.'

Infrared technology does not 'look' into the material itself, explained Chris, but rather it sees the heat that is radiating to the surface. Using the inbuilt intelligence of the camera units, the user can set a temperature limit over which a notification will alarm, for example in the form of flashing lights or horns. The system can be preconfigured to automatically take an image and then email it to the responsible person. 'It is all highly useful pre-notification of a fire. The interesting thing that thermal detection brings to fire prevention is that you get exactly the same image in daylight as in the middle of the night – and this technology sees through smoke without visualising it. So in an enclosed environment the emergency responders can see a visual image of what they have to deal with, prior to entry.'

More sophisticated systems have been used in the past which link the infrared detection system to a water monitor, which means that hot areas can not only be rapidly spotted, but also dealt with quickly.

Flir is selling around 60 of these systems per year in the UK, estimates Chris, and the expectation is that the new ATEX

The camera can be configured to set off an alarm when a pre-set temperature is reached. Below: infrared technology is increasingly being used in waste management centres.



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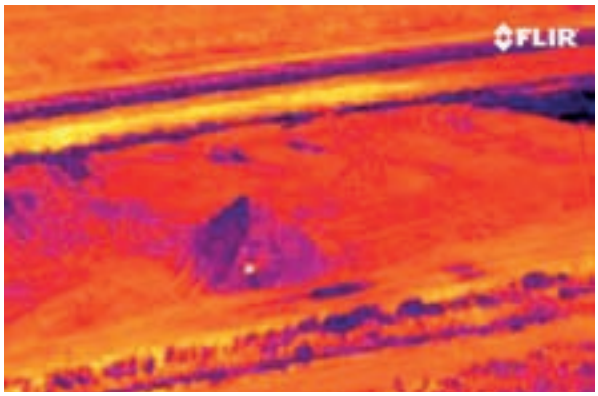

Thermal detection works both during the day and the night, and can 'see' through smoke.

housing will help establish the technology even further. 'We have been selling this technology into the petrochem market for some time, but there were limitations to its use without the Atex certification. Its installation had to be temporary and for specific tasks, while now it can be installed permanently in a potentially explosive environment.'

The new ATEX housing is made in stainless steel to withstand harsh environments, and it can even be lacquered for extra protection for offshore conditions. 'If it's going offshore we just have to accept that it will eventually have to be replaced – but that is the housing only, not the camera itself.'

Multiple launches from Apollo

Over the last three months detection manufacturer Apollo has introduced a number of developments into the fire detection market.

First off is Soteria, described by Apollo as the **'next generation in fire detection technology'**.

The Soteria range promises improved detection and reliability, reduced false alarms, as well as compatibility with legacy versions.

Currently in the external product approval stage, Apollo says that the detector has been extensively tested using in-house facilities that boast some of the most advanced private testing equipment in the UK.

Soteria is underpinned by another Apollo innovation, **an enhanced protocol named CoreProtocol, which provides greater control and more loop power**.

The new protocol builds on the capabilities of XP95 and Discovery, with forward and backwards compatibility and the ability to manage a significantly increased number of devices.

And just in from Apollo **is the addition of an EN54-20 approved Point Based ASD** to its range of specialist detection products.

The Aspirating Smoke Detector (ASD) can be **an essential tool when it is impractical to place the detector head in situ.** It 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.

The point-based ASD has an IP65 enclosure, which provides protection against ingress from the environment. The code protection controls and bespoke removal key provide protection against vandalism and tampering.

Available in two variations, both use Discovery optical detectors and are fitted with a mini-switch monitor which allows for the monitoring of fail-safe fault relays. A maximum of 50m of sampling pipe can be utilised on a single chamber (ASD-1) and the dual version of this product allows for two 50m sampling runs (ASD-2).

Award-winning Multi Sens ASD from Wagner to be displayed at Security Essen 23-26 September

Wagner's Titanus air sampling smoke detectors for very early smoke detection have long since proven their worth and established a name for themselves.

The technology **detects even the minutest quantities of smoke particles and is up to 2,000 times more sensitive than conventional point-type detectors**.

The latest product in the Titanus range is the Titanus Multi Sens, which the Langenhagen-based company (Germany) will be presenting at security in Essen and which is now ready for serial production.

Multi Sen's special feature is that **it can detect and analyse burning patterns to determine what substance is burning** eg it can distinguish between a burning cigarette and burning plastic, and can evaluate whether a notification alarm or a fire alarm should be triggered.

Torsten Wagner, managing director of Wagner Group GmbH, who is also responsible for research and development, commented: 'The knowledge gained into what is burning makes it possible to define new protection concepts in order to initiate the appropriate and effective countermeasures directly. **As such, staff can simply be notified of cigarette smoke, instead of the fire brigade being called in.'**

The prototype of the new air sampling smoke detector Titanus Multi Sens has already been awarded **the German Data Centre Award 2013 in the Data Centre Security category**.

At Essen, Wagner will also be showcasing its OxyReduct fire prevention system – live. The system uses nitrogen to reduce the oxygen content in the rooms to be protected, so that it is no longer possible for a fire to develop and spread. Wagner has recently announced that it has optimised OxyReduct's nitrogen-generation technology for even better energy management.

You can find this and further fire prevention innovations from Wagner at Booth 408 in Hall 3.0.

No missing persons during industrial emergencies

Dutch company Bacon DDI has developed an application that **increases the chances of quickly finding and rescuing potential victims during emergencies in industrial environments**.

The Safe and Secure system activates on alarm and determines the exact location of individuals, so there is no risk of missing persons.

The technology – which was two years in development – can trace anyone located at a plant or industrial site, including bunkers, cellars and hazardous areas. This compares to typical systems which require visitors to be registered on paper or digitally.

The Safe & Secure system is an automated process. **After registration everyone receives an especially developed small tracking module that is placed on the helmet or any other garment**.

In an emergency case the system is automatically activated, and at a glance all the people wearing the device are immediately visible on a screen in the control room.

All the assembly points are clearly marked on the screen and it is even possible to zoom in by area, by location or even by building. The tracking module can be made anonymous or personal.

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E2S, the designer and manufacturer of high performance audible and visible signalling devices for use in industrial, marine and hazardous area applications, has published a fourth technical bulletin to assist system integrators and specifiers to choose an effective signal for their specific application.
The first three bulletins published covered specialist products Hootronic and Appello, and the dB(A) performance of the AlertAlarm industrial range.
The Hootronic family, which electronically produces realistic legacy electro-mechanical signalling device alarm sounds such as the industrial claxon/motor-driven horn, is available in a number of different configurations with outputs from 112 dB(A) to 124 dB(A). The primary advantages of the Hootronic unit are its increased reliability and much reduced current requirements when compared to the original motor-driven devices.
The Appello next generation user-recordable alarm signals can store up to two minutes of content, enabling specific messages or instructions to be played with or without any of the 45 tones already on the device. Outputs range from 105 dB(A) to 121 dB(A).
The AlertAlarm family is available with three or four stages with maximum output levels from 104 dB(A) to 131 dB(A) at 1m.
The fourth technical bulletin is titled *Audible signals: what is automatic synchronization?* The bulletins are available at www.e2s.com/technicalbulletins.

Elmdene International Limited – a subsidiary of Potter Electric Signal, LLC – used IFSEC 2014 (June, London ExCeL) to unveil a record number of new product lines, including an EN54-23:2010 compliant fire alarm beacon and the Flexi-Bell modular siren. The fire alarm beacon is an indoor 'Type A' VAD (visual alarm device) that is built around low power consumption LED technology. Elmdene reports that the beacon has already completed a rigorous testing process to secure a certificate of approval from the LPCB. Another new concept, which Elmdene has high hopes for, is the Flexi-Bell modular siren which is available in Grade 2 and Grade 3 versions.
What makes this external sounder stand out from competing solutions on the market, according to Elmdene, is the capability to use one common backplate with simple 'snap in' clips to accommodate all of Elmdene's sounder covers: Vertec, HS and Quartz. This not only minimises the stock that distributors need to hold, but also opens up the potential for customer's to have their own bespoke covers, in terms of shape and colour.

Gent by Honeywell has introduced the S-Quad range of visual alarm devices (VADs) to meet all of the requirements of the latest EN54-23 standards to help alert occupants in noisy environments and the hard of hearing. The devices combine Gent's sensor, sounder and speech technology with high efficiency EN54-23-compliant visual alarms.
A variety of high intensity S-Quad VADs are on offer with variable power settings and red or white LEDs. Each variant includes three separate intensity settings achieving maximum flexibility for different room coverage while optimising the loop power capability of the entire FD&A system.
Ben Wolf, product manager for Gent, commented: 'There are several key features such as the advanced power management that increases loop capacity and integrity allowing up to 100 sensor sounder VADs per loop. S-Quad also keeps EN54-23 design simple as our unrivalled light output allows our new range to be sited at standard smoke detector spacing, meaning you can continue to design and install as you always have done.'

Hochiki Europe has announced the imminent release of a full range of EN54-23 compliant VADs including base sounder beacons, wall sounder beacons and ceiling beacons, all of which are loop-powered.
The Disability Discrimination Act of 1995 made the inclusion of VADs mandatory in all public buildings, but they are also a requirement for those

working in areas of high ambient noise, such as factories. The British Standards Institute (BSI) introduced EN54-23 in June 2010 in order to set stricter guidelines on the installation and performance requirements of VADs.
Hochiki's new wall and ceiling beacons are available with either red or white LEDs, which provides the installer with additional flexibility when deciding on the requirements of each installation.
The brightness of the LEDs can be adjusted from the control panel (dependent on control panel compatibility), and this can reduce the number of devices an installer is required to stock, as each one can produce up to three different ratings.
'EN 54-23 marks a seismic shift in the way fire detection products and systems are designed, manufactured, specified and used,' commented Graham Lowe, Sales Director at Hochiki Europe. 'Its impact will be significant and anything that enhances the protection of people should be welcomed.'

Siemens has designed a new fire alarm and intelligent voice communication system to deliver clear, targeted messaging – both for everyday use and life safety.
According to Siemens Industry, the Intelligent Voice Communication systems are flexible, networkable panels that leverage the latest in Voice over Internet Protocol (VoIP) technology to deliver state-of-the-art fire protection with the added option of high-quality digital voice communication capabilities over the same connection.
UL-listed as a fire alarm and an emergency communication system, the systems have a two-channel message player that supports up to 64 digital messages. Each panel can deliver up to three targeted or differentiated messages simultaneously, as needed.
Brian O'Mahoney, senior director of fire products at Siemens Industry, commented: 'Customers can choose from a full range of detection options, as well as fire protection, digital voice communication and mass notification functionality all from a single panel.'
Until now, smaller and mid-sized facilities seeking a more highly sophisticated emergency communication fire alarm system would often acquire systems designed and intended for larger buildings.
Siemens' Intelligent Voice Communication systems have changed all of that, as they're able to efficiently deliver high-quality fire protection, emergency voice communication functionality, and industry-leading detection that are often associated with higher end systems.'

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Fixed system reassurance

Coltraco Ultrasonics is a UK-based designer and manufacturer of ultrasonic liquid level monitoring systems for fire suppression systems: George Hunter, Director of Sales, explains why these systems are gaining acceptance in the Middle East's power generation sector.

George Hunter, Director of Sales, Coltraco.

The fast-paced development of the Middle East over the last decade, in particular the UAE and Saudi Arabia, has presented challenges to the infrastructure networks of these nations. With the growth in population and residential developments, the power networks in these nations have been placed under increasing strain, facilitating the need for new power plants.

Coinciding with the development and construction of these power plants has been the development of local fire codes. Globally, fire protection codes differ from country to country and continent to continent. Many countries with developing infrastructure networks base their fire protection codes on NFPA standards from the USA.

By their very nature, power plants whether powered by fossil fuels, nuclear or renewable energy sources present a challenge when it comes to fire protection. At the present time outside of Iran there are no active nuclear power plants, although a nuclear power plant at Barakah in the western region of Abu Dhabi, should be active by 2020. Nuclear power plants present their own special challenges for fire protection, so for the purpose of this article we will focus on more traditional power generation fuel sources.

Power plants fire protection solutions comprise all areas of the fire protection spectrum from detection, alarms and suppression systems. Most power plants have three separate protection systems. This starts with the detection of the fire. There are a number of ways to detect a fire including heat detection, smoke detection and fire detection systems. Once a fire has been detected the automatic fire suppression system in place will go to work. The automatic suppression system can include deluge systems, water mist solutions and gas and foam extinguishing agents. The onsite fire brigade will only be deployed as an absolute last resort.

One of the key areas in development of fire protection systems has been the monitoring of fixed fire suppression systems. In most instances a fire suppression system and its component parts such as cylinders only have to have their liquid level checked once per annum. Starting with the oil, gas and naval industries there has been a gradual changing of this attitude within high-risk industries. The power generation industry has implemented many of these changes. The ability to monitor a fixed fire suppression system 24/7, 365 days a year gives the owners and operators of power plants confidence in the integrity of their fire suppression systems.

In many instances a power plant facility will cover a large area with different buildings for turbines, cooling towers and transmission substations as a couple of examples. All of these areas present a high fire risk. To continually monitor the cylinder points in the fire suppression system in all of these buildings manually would be far too time consuming too be feasible.

Permalevel Single Point was originally developed for the UK Atomic Energy sector. That initial product has now been developed into a system Permalevel Multiplex. This system is ideal for protecting power plants from fire and the risks associated with it. Permalevel Multiplex is the first system of its kind, with the ability to monitor fire suppression gases.

Top right: the Permalevel module continually monitors the cylinders in a fire suppression system.

Prior to the development of Permalevel Multiplex, most installations would have to manually check the liquid level of their fire suppression system cylinder points. This is a time consuming process and presents risks. Each individual cylinder has to be taken of its cylinder point and manually weighed. If a fire were to break out whilst this task was being carried out, it would compromise the effectiveness of the suppression system.

Permalevel Multiplex gives the facility operator the ability to monitor up to 700 cylinder points continuously. As a system, it is mounted to each cylinder point within the fire suppression system. In a large facility such a power plant this is of real benefit, allowing the operator to monitor each cylinder point in real time. As an example the control room manager can call up cylinders 75 and 402 at the same time. The system will then provide a real time read-out to the control room operator of the liquid level in those two cylinder points. Due to this level of sophistication (with real time monitoring) a comprehensive data logging system is required, which gives the operators the ability to check the liquid level of their fire suppression systems over the course of a year.

Permalevel Multiplex has an accuracy of +/-1.5mm. The monitoring system has a standard relay that triggers an alarm the minute the liquid level drops below the required level. If the alarm is triggered, the onsite maintenance team can quickly respond to the threat this poses. In addition, Permalevel Multiplex is designed to monitor all types of suppressant gases. This versatility allows the system to be specified in facilities that may have more than one suppressant gas utilised in their fixed fire suppression system.

In conclusion, whilst this system is not suitable for every application, in high-risk high-value facilities Permalevel Multiplex is the ideal partner. As the pace of development continues apace in the Middle East with our partners in the region, we want to continue to educate the industry. The ideal scenario is that other industries within the Middle East will look to the power generation industry for education on fire protection.

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